SREENIDHI EDUCATIONAL GROUP

<u>Programme Outcomes and Course Outcomes</u> <u>for all Programmes offered by the institution</u>

Programme Outcomes			
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Course Outcomes for all Programmes			
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1	B.Tech - Civil Engineering	2 - 25	
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Programme Outcomes





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

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- 2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- 6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



Course Outcomes of CIVIL Department

SREENIDHI INSTITUTE OF SCIENCE AND





Department of CIVIL Engineering

COs for A22-1st Year and 2nd Year, A20-3rd Year and 4th Year courses/subjects

Year and regulation	Course code	Course name		Co's
			C01	classify the crystal structures, their parameters and draw the various crystal planes using Miller indices.
			CO2	analyze various crystal defects-its types.
			CO3	explain vibrations, radius of gyration, moment of inertia and ultrasonic.
	9НС06	APPLIED PHYSICS	CO4	analyze the wave nature of light, superposition principle, differentiation between interference, diffraction and their applications
I-I & A22			CO5	explain about the types of emissions, laser principle, working of different types of lasers and their applications. To understand the nuclear fission and fusion, radioactivity emission of alpha, beta and gamma rays.
			CO6	contrast nano& bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods, analysis techniques like XRD & TEM.
	9FC01)1 Problem Solving using C	C01	Formulate simple algorithms for arithmetic, logical problems and translate the algorithms to programs (in C language)
			CO2	Execute and test the programs and correct syntax and logical errors, implement conditional branching, iteration and recursion
			CO3	deduce a problem into functions and synthesize a complete program using divide and conquer approach.
			CO4	relate arrays, pointers and structures to formulate algorithms and programs.

			CO5	write programs to solve matrix addition and multiplication problems and searching and sorting problems.
			CO6	solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.
			CO1	Check the consistency or inconsistency of a linear system and solve the problems.
			CO2	Find the Eigen values and Eigen vectors and solve the problems associated with these concepts.
			CO3	Find the nature, index and signature of the quadratic form.
	9HC11	9HC11: MATRIX ALGEBRA AND CALCULUS	CO4	Verify the applicability of mean value theorems and express the given standard function in series form using Taylor's and Maclaurin series.
			CO5	Find the solutions of first order first degree differential equations and solve the problems on Newton's law of cooling, Natural growth and decay.
			CO6	Solve higher order ordinary differential equations with constant coefficients using some standard methods.
		9HC01 ESSENTIAL ENGLISH LANGUAGE SKILLS	CO1	Demonstrate competence with suitable accuracy in vocabulary and language fluency.
			CO2	State the definition of nouns, verbs, adjectives, and adverbs.
9	9HC01		CO3	Identify the differences of each tense and use the tenses accurately.
			CO4	Identify specialized reading strategies for specific types of texts
			CO5	Produce written work that is substantive, organized, and grammatically accurate
		9HC61-Oral	CO1	Describe people, objects and situations using simple sentences.
	9HC61	Communication LAB - I	CO2	Use appropriate tenses and expressions in different contexts

				of conversations.
				Identify major areas of concern in
			CO3	their oral communication and
				address them.
				Create a SMART plan to enhance
			CO4	their own communication skills in
				English
				Analyze the concept of radius of
			CO1	gyration and periodic
			01	vibrations, modulus-types, stress,
				strain and Hook's law.
				Analyze the LCR circuit
			<u> </u>	combination, parallel, series,
			02	electrical resonance, fundamentals
				of R & C and time constant.
				Demonstrate the resonance
			CO 2	concept, transverse laws of
			COS	stretched strings, Sonometer, types
				of waves.
	9HC65	PHYSICS LAB	CO4	Understand the concepts of
				interference, conditions, formation
				of Newton's rings- reason.
			CO5	Recognize the difference between
				the interference and diffraction,
				grating, laser characteristics, LED
				and forward resistance.
			CO6	Explain properties of light,
				dispersion, prism, minimum
				deviation, fundamentals of
				magnetic induction, Ampere's
				law, Oersted's law and the Biot-
				Savart law.
			CO1	Enumerate the algorithms for
				simple problems
			CO2	Classify the given algorithms to a
				working and correct program
			CO3	Correct the syntax errors as
				reported by the compilers
			CO4	Identify and correct logical errors
9F	9FC61	9FC61-Problem		encountered at run time
	71 001	Solving using C Lab	CO5	Write iterative as well as recursive
				programs
				Represent data in arrays, strings
			CO6	and structures and manipulate
				them through a program
				Declare pointers of different types
			CO7	and use them in defining self
			referential structures.	

CO3 simple text files. CO1 use the instruments to solve engineering problem and draw various type of curves used in engineering CO2 explain Orthographic projections and draw projections of simple drawing entities such as points Lines. 9BC01: CO3				CO8	Create, read and write to and from
CO1 use the instruments to solve engineering problem and draw various type of curves used in engineering CO2 explain Orthographic projections and draw projections of simple drawing entities such as points Lines. 9BC01: CO3				08	simple text files.
CO1 engineering problem and draw various type of curves used in engineering CO2 explain Orthographic projections and draw projections of simple drawing entities such as points Lines. 9BC01: CO3					use the instruments to solve
CO1 various type of curves used in engineering CO2 explain Orthographic projections and draw projections of simple drawing entities such as points Lines. 9BC01: CO3				CO1	engineering problem and draw
CO2 engineering CO2 explain Orthographic projections and draw projections of simple drawing entities such as points Lines. PBC01: CO3				01	various type of curves used in
CO2 explain Orthographic projections and draw projections of simple drawing entities such as points Lines. 9BC01: CO3					engineering
CO2 and draw projections of simple drawing entities such as points Lines. 9BC01: CO3					explain Orthographic projections
9BC01: CO2 drawing entities such as points Lines. CO3 Draw projections of different types of regular Planes, solids in various positions wrt principal				CO2	and draw projections of simple
Sector Sector 9BC01: CO3 Lines. Draw projections of different types of regular Planes, solids in various positions wrt principal				002	drawing entities such as points
9BC01: CO3 Draw projections of different types of regular Planes, solids in various positions wrt principal					Lines.
9BC01: CO3 types of regular Planes, solids in various positions wrt principal					Draw projections of different
9BC01: various positions wrt principal				603	types of regular Planes, solids in
			9BC01:	203	various positions wrt principal
9BC01 ENGINEERING planes of projection.		9BC01	ENGINEERING		planes of projection.
GRAPHICS Draw Sections of various Solids			GRAPHICS		Draw Sections of various Solids
including Cylinders, cones, prisms					including Cylinders, cones, prisms
CO4 and pyramids and draw the				CO4	and pyramids and draw the
developments of these solids and					developments of these solids and
their sections.					their sections.
CO5 Construct Isometric Scale,				CO5	Construct Isometric Scale,
Isometric Projections and Views.					Isometric Projections and Views.
Convert Isometric to orthographic				CO6	Convert Isometric to orthographic
CO6 views and understand basic					views and understand basic
sketching using computer aided					sketching using computer aided
design (CAD) software.					design (CAD) software.
analyze microscopic chemistry in				C01	analyze microscopic chemistry in
CO1 terms of atomic orbital s,					terms of atomic orbital's,
intermelacular foreas					intermolocular forces
Identify and differentiate					Identify and differentiate
notwars, thermoplestic				CO2	nolymore thermoplestic
CO2 polymers, mermoprastic,					thermosetting plastics and
variouslubricants					variouslubricants
Percognize and select the					Pacogniza and select the
domestic and industrial problems					domestic and industrial problems
01C04. CO3 caused by hard water and also				CO3	caused by hard water and also
lug A22 OLCO4 ENCINEEDING		011C04	9ficu4:	205	learn about the municipal water
1-11 & A22 9HC04 ENGINEERING feature about the municipal water CLIEMISTRY treatment using various methods	I-II & AZZ	9HC04	ENGINEEKING		treatment using various methods
interpret the important					interpret the important
fundamental concepts of					fundamental concepts of
CO4 electrochemistry and solve the				CO4	electrochemistry and solve the
problems related to batteries.					problems related to batteries.
Differentiate the types of					Differentiate the types of
corrosion and methods used to					corrosion and methods used to
CO5 prevent the corrosion, surface				CO5	prevent the corrosion. surface
coating techniques					coating techniques
explainsynthesis of drug					explainsynthesis of drug
CO6 CO6 molecules and analytical				CO6	molecules and analytical

				taabniquaa lika alaatraatia
				vibrational and rotational
				spectroscopy
				Design the programs using
			CO1	structures, unions and enum
				Structures, unions and enum
			602	Abstract data targe and alar
			02	Abstract data type and also
				applications of stacks and queues
				Implement basic operations on
		9EC01 - DATA	CO3	single, double and circular linked
	9EC01	STRUCTURES		list
			CO4	Solve problems involving Binary
				Search trees and AVL trees
			CO5	Articulate the concepts of graphs,
			605	heaps and hashing
				Develop algorithms for various
			CO6	searching and sorting techniques
				and analyze their performance
		9HC12: ADVANCED CALCULUS		Find the limits and test for the
			CO1	continuity and differentiability of
	9HC12			a function
				Solve the problems on multiple
			CO2	integrals
			CO3	Solve linear and nonlinear first
				order partial differential equations
			CO4	Find Series expansion a function
				defined over the intervals
				Find directional derivative
			CO5	gradient divergence and curl of a
			663	function
				Solve problems of line surface
			CO6	and volume integrals
				analyse the system of forces and
				draw free body diagrams to solve
			CO1	problems dealing with a system of
				forces in a plane
				Torces in a plane
			602	explain various types of incubi
			02	and analyze and solve real world
9	01/201	9K201: Engineering		problems related to Inction
	9K201	Mechanics (For Civil		explain the concepts and compute
		Engineering)	CO3	Center of gravity for various
				shapes
				explain the concepts and compute
				mass moment of Inertia for
			CO4	various regular and composite
				shapes and bodies to evaluate the
				strength of the body

			CO5	predict the geometry of motion of a particle and explain work
			205	energy, impulse momentum, virtual energy principles
			CO6	distringuish different motions of a rigid body in a plane and predict geometry of rigid body motion and compute forces in the body
			CO1	Prepare Inorganic compounds
			601	Determine surface tension of a
			CO2	liquid, viscosity of lubricant, and acid value of an oil
	011064	9HC64:	CO3	Estimate hardness of water and Analyze the amount of chloride content
	9HC04	CHEMISTRY LAB	CO4	Determine cell constant and conductance of solutions, redox
				potential and emf of solutions, the rate constant of acid
			CO5	Synthesize a polymer (Thiakol rubber / Urea-Farmaldehyde resin), a drug- Aspirin
			CO1	Write programs on structures and unions
		9EC61 - DATA STRUCTURES USING C LAB	CO2	Implement Stacks, Queues and circular queues using arrays
	9EC61		CO3	Write programs to implement basic operations on various types of linked list
			CO4	Implement insertion and traversal operations on binary search tree
			CO5	Develop programs on various searching, sorting algorithms
		9HC62- ORAL Communication LAB- II	C01	demostrate the nuances of striking a great conversation in formal and informal situations
	9HC62		CO2	face an audience and speak in public
-			CO3	Design a winning presentation and present it with ease
			CO1	Use various types of conventional manufacturing Processes
	0BC61	WORKSHOP/MANU	CO2	Manufacture components from wood, MS flat, GI Sheet etc
	7 DC 01	PROCESSES LAB	CO3	manufacture components such as shafts, holes, and threaded holes by machining and surface finishing
	l	1		υ – – – – – – – – – – – – – – – – – – –

			CO4	Produce small devices / products /appliances by assembling different components
			C01	Solve problems on analyticity and conformal mapping
			CO2	Evaluate Series expansions of a function using Taylor's and Laurent's series and also evaluation of definite integrals and improper integrals
	9HC15	8HC15 - Complex analysis, Probability, and Statistics	CO3	Solve problems on probability and will able to solve problems on discrete and continuous probability distributions
			CO4	Describe basic concepts of sampling distribution and solve problems on estimation
			CO5	Solve problems on quality control
			CO6	define the test of hypothesis and solve problems based on the concept
	9K301	8K301 - Solid Mechanics	C01	evaluate the strength of concept of the stress and strain for different materials
II-I & A22			CO2	evaluate the behavior of different beams for Shear Force and Bending Moment diagrams
			CO3	valuate the behavior and strength of flexural stress, direct and bending stresses
			CO4	evaluate the deflection of beams subjected to various loads
			CO5	determine the Principal Stresses and Strains in the members subjected to stresses
			CO6	evaluate the Shear Stresses and Theories of Failure
			CO1	Calculate angles, distances using chain and tape
	9K302	K302 8K302 - Surveying and Geomatics	CO2,CO3	Identify data collection methods using a compass and enhance knowledge of the various field applications of levelling Apply the concepts of Trigonometric levelling
			CO4	Set out curves on the field and overcome obstructions in curve ranging

			CO5	apply the concepts of Remote sensing and GIS/GPS to Civil
				Engineering problems
			CO6	Read Aerial maps and perform
				Identified different heilding
			004	Identify different building
			01	materials and differentiate use
				them appropriately
				Test the various properties of
			CO2	cement and to use the appropriate
				admixtures
				Identify the various mortars and
		8K303 Building	CO3	check for its suitability in various
	9K303	Materials and Planning		jobs
		Materials and Flamming		To effectively use new building
				materials and appropriate paints
				for the various works undertaken
			004,005	Appropriately suggest the
				different roof and floor types for
				different construction practices
			CO6	Plan construction activities in
				adherence with the bye-laws
			CO1	demonstrate the importance of
				certain soft skills like time
				management, goal setting and
				etiquette so that they can make
				their mark in their career and life
				in general
			CO2	sharpen their verbal ability to
	9HC7/			handle the competitive exams
				anhance their team skills and
				design thinking canabilities for
		C . A C1-:11.	CO3	affactive problem solving and
	JIIC / 4	SOIT SKIIIS		decision making
				lucision making
				which swides their thinking
			CO4	which guides their thinking,
				benavior and neips them manage
				stress efficiently
				equip themselves with the
			005	prerequisites, and the relevant
			CO5	techniques to effectively tackle the
				corporate interview process in
				vogue
			CO1	show basic knowledge on Skills
	0	Open elective - I: 8ZC02		ot Entrepreneurship
	9ZC02	ZC02 – BASICS OF ENTREPRENEURSHIP		demonstrate the techniques of
			CO2	selecting the customers through
				the process of customer

				segmentation and Targeting
			CO3	compare business Models and their validity
			CO4	explain the basic cost structure, Revenue Streams and the pricing strategies
			CO5	illustrate project management and its techniques
			CO6	choose marketing strategies and business regulations for Start ups
			CO1	list Python versions and their specifications and build programs
			CO2	Write applications that include functions, modules, packages along with respective exceptional handling mechanism
	9FC22	Open elective - I: 8FC22 Python Programming and Computer Algorithms	CO3	Write applications using OO features of Python and applications using Files
			CO4	interpret NumPy/Tkinter/Plotpy modules
			CO5	Analyze worst-case running times of algorithms using asymptotic analysis
			CO6	Describe the dynamic-programming paradigm and the greedy paradigm and explain when an algorithmic design situation calls for it
	9HC03	Universal Human Values	CO1	make self-assessment
			CO2	explain the importance of certain soft skills like time management, goal setting and etiquette and how they make a mark in their career and life in general
			CO3	assess their emotional strengths which guides their thinking, behavior and helps them manage stress efficiently
			CO4	identify the prerequisites, and the relevant techniques in order to tackle corporate interview process in vogue
	9K371	MECHANICS OF SOLIDS LAB	CO1,CO2	Conduct compression tests on spring, wood and concrete Conduct flexural and torsion test to determine elastic constants
			CO3	Determine hardness of metals
	08272	SURVEYING	CO1	Stake out/Lay out different types of curves in the field
	9K372	LABORATORY	CO2	Use modern instruments such as Total Station and GPS for locating

				and plotting any/all ground
				features
				Course Outcomes of All the
				Subjects (AY 0-)
				Make use of AutoCAD
			CO1	commands for drawing D building
		COMPLITED AIDED		drawings
	012272	COMPUTER AIDED	<u> </u>	Create plans and sections for
	9K3/3		02	simple buildings
		BUILDINGS LAB		Present drawings in required
			CO3	format according to user
				requirements
				Demonstrate public speaking with
			CO1	the aid of Power Point
				Presentations
				Identify current general and
		TECHNICAL		specific technological topics of
	9K384 S	SEMINAR		interest and prepare and present
		-III		the
			CO2,CO3	content cogently
				Demonstrate communication
				skills and interview performance
				skills
				recall the concepts in the core and
	9K394	Comprehensive Test and	CO1,CO2	elective courses
				Exhibit technical knowledge to
				face interviews
		Viva Voce – III	CO3	Exhibit lifelong Learning skills
				for higher education and to pursue
				Professional practice
				recall basics of Managerial
			C01	Economics at Micro level,
				Demand analysis and production
				analysis in particular
				define cost concept, Revenues
			02	and Market structure
				list various basic concepts of
			CO3	Accounting, Double entry system
	07001	Economics,		and Book keeping
11-11 & AZZ	92C01	Accountancy, and Monogement Science		explain the concepts of Capital
		Management Science	CO4	expenditure, Revenue expenditure
				and Final accounts
				outline the basics of
			605	Management, its principles and
			05	various functions performed in
				organization
			60 6	explain various personality traits.
			CO6	perception, attitudes of individuals

				working in organization
			601	evaluate the deformation of
			01	structures
				Describe the stability of structures
			CO2	under certain loading conditions
				assess the deformation for
				structures under load actions
			CO3.CO4	evaluate the force-stress
	9K404	Mechanics of Materials		equilibrium relationship in
				Multiaxial load condition
				evaluate the displacement-strain
			CO5	relationship in Multiavial load
			000	condition
				solve the stress behavior pettern
			CO6	in this onlinder and ophere
				Explain the properties of fluids and
			CO1	determine shear force on the surfaces
			01	applying newton's law of viscosity
				Compute hydrostatic forces on
			CO2	immersed and floating bodies and
	9K405		662	predict stability of floating bodies
			CO3	Apply laws of kinematics to fluid
				flow and arrive at D, D, D continuity
				equations
				Workout Eulers and Bernoullis
		Fluid Mechanics	CO4	equations for average flow along a
				streamline and apply these laws to
				measure fluid flow; understand
				principles of dimensional analysis to
				arrive at non dimensional quantities
			CO5	Workout equation for friction loss
				for flow through conduits and predict
				The behaviour in pipe networks
			606	Apply the concept of boundary layer
			00	assess its effects on these bodies
			CO1	aughtify precipitation:
			01	quantity precipitation,
			CO2	estimate various abstractions of
				precipitation;
			CO3	estimate runoffs from given data;
	077407	Hydrology and Water		apply the knowledge of various
	9K406	resources engineering	CO4	water withdrawals and uses to
				practical problems;
			COF	design basic water distribution
			05	systems;
				arrive at hydrologic design of
			COB	spillways
	01/ 400	ENGINEERING	664	Describe different concepts and
	9 N 408	GEOLOGY	01	terms used in Engineering

				Geology
			CO2	Identify and explain various types
			02	of minerals and rocks
				Apply the various concepts of
			CO3	Engineering Geology to civil
				engineering field
				Examine and select the sites
				related to dams, roads, tunnels and
			CO4 CO5	slopes
			04,005	Identify the hazards prior and
				able to take the necessary
				precautions
			CO6	list geological hazards
				explain the concept of OOP with
				the need of constructing objects,
				and classes Write programs using
			CO1	classes, objects, members of a
				class and the relationships among
				them needed for a specific
				problem
		Open Elective - II: 8EC42- PROGRAMMING IN		Identify the purpose and usage of
				principles of inheritance and
			CO2	polymorphism Implement
				concepts of polymorphism,
				encapsulation and method
				overloading
	9EC42		CO3	Create Java application programs
		JAVA		using sound OOP practices (eg,
				interfaces and APIs) and proper
				program structuring (eg, by using
				access control identifiers,
				automatic documentation through
				comments)
			CO4	implement error exception
				handling and multi-threading
			CO5	create GUI for the specific
				Write programs for event
			606	write programs for event-
			006	interface components on applete
				avalain the stages of Startup and
				the turbulence environment it
			CO1	undergoes and the stages related to
		Open Elective – II		growth of the Startup
	9ZC23	8ZC23- Advanced		classify various business models
		Entrepreneurship		and critically evaluate the
			CO2	effectiveness of the business
				models and products
				models and products

				define the method of business
			CO3	traction, create roles and build
				their A- team
				list various channels of revenue
			CO4	building and exploration of new
				revenue avenues
				dissect the need of sales planning,
			CO5	people planning, and financial
				modeling
				explain legal implications
				affecting the company's prospects
			CO6	and identifying right mentors and
				advisors to support startups
-				demonstrate ecosystem and
			CO1	energy flow among the organisms
				name resources available and
			CO2	explain overexploitation of the
		C05 Environmental Science and Ecology 471 FLUID MECHANICS LAB	602	resources in the nature
				summarize the value and use of
	9HC05		CO3	biodiversity
				list the causes and effect of
			CO4	pollution and implement measures
				in control of pollution
				explain the sustainable
			CO5	development and implement green
				technology for sustainable
				development
				implement policy to protect the
			CO6	anyironment
-				Determine coefficient of
			CO1	discharge for orifice and
				mouthnice
	0K/71			Calibrata notabas, venturimeter
	/14/1		CO2	calibrate liotenes, venturimeter,
				Determine major and miner losses
			CO3	in pipes
-		ENGINEERING		Identify the various rocks and
	9K472 (GEOLOGY	CO1	minerals depending on geological
)IX 172 (LABORATORY	001	classifications
-		LADORATORI		operate in the MATLAB
			CO1	environment using programming
			01	fundamentals
				write basic metleb programs
	9K473	MATLAB	CO2	while basic manage and functions
				using commanus and functions
			<u> </u>	while MATLAB programs for
			03	Civil Engineering
ŀ	017.40 7			Civil Engineering
	9K485	TECHNICAL	CO1	Demonstrate public speaking with

		SEMINAR – IV		the aid of Power Point
				Presentations
				Identify current general and
				specific technological topics of
			CO2,CO3	interest and prepare and present
				the
			02,003	content cogently
				Demonstrate communication
				skills and interview performance
				skills
				Comprehend the concepts in the
			CO1 CO2	core and elective courses
		COMPDEHENGIVE	01,002	Exhibit technical knowledge to
	9K495	VULA VOCE IV		face interviews
		VIVA VOCE – IV		Exhibit lifelong Learning skills
			CO3	for higher education and to pursue
				Professional practice
				Analyse uniform flows through
			CO1	open channels and work out
	8K510		01	resistance to the flow and most
				economical sections
			CO2	Analyse gradually varied flows
				through open channels and able to
				classify different profiles and
				compute profile lengths
				Workout sequent depths and
		HYDRAULICS AND	CO3	energy dissipation of hydraulic
		HYDRAULIC		jumps in open channels
		MACHINERY	CO4	Arrive at the force generated on
				vanes and work done by vanes due
				to impact of jet on the vanes
			CO5	Compute work done by the
III-I & A20				turbines and able to arrive at
				hydraulic design of the turbines
				Compute work done by
			CO 6	centrifugal and reciprocating
			COB	pumps and able to prevent
				cavitation conditions in the pumps
			CO1	depict the various phases and
			01	fabric of soil
			603	determine the index properties
			02	and classify the soil
	QV511	SOIL MECHANICS		apply the concepts of water flow
	0111	SOIL WILL TANICS		through soil in the context of
			CO 2	design and construction of
			03	embankments, canals etc
				apply stress distribution and
				effective stress in soil for

			designing the foundation
		CO4	compute the compressibility of different types of soil
		CO5	draw the Mohr's circle and find out shear strength parameters of soil
		CO1	test cement and know cement applications
		CO2	assess aggregates and its properties
		CO3	assess fresh concrete and its behaviour on using admixtures
8K615	CONCRETE TECHNOLOGY	CO4	evaluate and analyse behaviour of hardened concrete and testing of hardened concrete
		CO5	arrive at proportions for different mix-design of concrete using IS code books
		CO6	assess different types of concrete and its behaviour and applications
8KC51	(PROFESSIONAL ELECTIVE – I) 8KC51: REINFORCED CONCRETE DESIGN	C01	explain basic requirements of concrete structures and fundamentals of different design philosophies
		CO2	interpret various specifications of relevant standards, to field problems and professional practices
		CO3,CO4,CO5	design singly reinforced, doubly reinforced rectangular and flanged beams design slabs with different conditions and different supports design for uni-axial and biaxial bending of columns and design isolated square, rectangular and circular footings
		CO6	Interpret and communicate the design and detailing of rc beams, slabs, columns, stair cases and footings, through appropriate structural drawings
	(Open elective-III)	C01	Explain Abstract data type, stack and Queues with their applications
8EC44	8EC44: DATA BASE SYSTEMS CONCEPTS	CO2	Write programs on Singly linked lists, Doubly linked lists, Circular list and explain their operations
		CO3	Explain concepts of Trees, AVL

				Trees and Graphs with examples and applications
			CO4	Describe and solve problems of searching and sorting and evaluate the time complexity of each algorithm
			CO5	Explain concepts of OOPs and implement programs using objects, classes, constructors and destructors
			CO6	Explain and apply concepts of oops, write programs implementing functions, operator overloading and inheritance
			CO1	identify the basic concepts of a product
			CO2	distinguish the process of new product development and stages in the process
	8ZC24	(Open elective – III) 8ZC24 - PRODUCT AND SERVICES	CO3	illustrate the concept of product testing, product planning and the preparatory groundwork for launching a new product
			CO4	describe the nature of services, its differences with the goods and the application of marketing principles for services
			CO5	explain the attributes of a good service design and the tools for producing and distributing the services
			CO6	recognize the importance of quality of services and apply measurement scales to evaluate the service quality
			CO1	Interpret cyber-attacks, and outline types of cybercrimes
		CVRED SECUDITV	CO2	explain cyber laws
	8FC24	(Mandatory course)	CO3	demonstrate how to protect themselves and ultimately the entire Internet community from cyber attacks
	8K571	HYDRALILICS AND	C01	compute Mannigs coefficient, 'n' for uniform flow in the open channel
		HYDRAULIC MACHINERY LAB	CO2	determine work done by fluid jet on vane, compute work done and draw performance characteristic curves for turbines and centrifugal pumps

				nonform budroulis imme and
			CO3	verify sequent depths ration and
				energy loss
				determine basic engineering
			CO1 CO2	properties of soil
		SOIL MECHANICS	01,002	Attorborg's limits and
	8K572	SOIL MECHANICS		Classification of soil
		LAD		determine the schesion and
			CO3	friction using direct shear test and
			205	tri-avial tests
				Test Fineness Specific
				Gravity Setting Time Soundness
			CO1	and Compressive Strength of
				Cement
				Test Specific Gravity of
				Coarse Aggregate and Fine
			CO2	Aggregate Bulking of Fine
	8K573	CONCRTE		Aggregate, Dunting of The
	011070	TECHNOLOGY LAB		Design Concrete Mix
			CO3	Proportioning by Using Indian
				Standard Method
			CO4	Test Workability of Fresh
				Concrete and Compressive
				strength, Split Tensile Strength of
				Hardened Concrete
			C01	Use the concepts learned in the
				courses, so far, in conceptualizing,
				designing and executing the
				modules of the projects
			<u> </u>	Exhibit the interest in learning
			02	the modern tools and technologies
				demonstrate enthusiasm to use
	8K577	GROUP PROJECT-I		the creative ideas to build the
			CO3	innovative projects which are
				meeting the current needs to the
				marked and society as a whole
			CO4	exhibit communication skills and
				team work skills
			CO5	Work as in individual and in a
				team
			CO1	recall the concepts in the core and
				elective courses
	012505	COMPREHENSIVE	CO2	Exhibit technical knowledge to
	8K596	VIVA VOCE-V		Tace interviews
			<u> </u>	Exhibit lifelong Learning skills
			CO3	for nigher education and to pursue
				Professional practice

			CO1	explain the fundamentals of electrical engineering and DC machines
			CO2	define the principles of AC circuits
	8AC48	ELEMENTS OF ELECTRICAL & ELECTRONICS	CO3	explain the principle and operation of three phase induction motor and measuring instruments
		ENGINEERING	CO4	summarize the principle and operation of diode
			CO5	recall the principle and operation of transistor
			CO6	summarize the principles of digital electronics
			CO1	recall the basic definition of GIS
			CO2	generate various model from raw
	8K613	GEOGRAPHIC INFORMATION SYSTEM	CO3,CO4,CO5	edit and rectify the topography data analyze and interpret the data generated apply GIS in Projects
III II & A20			CO6	list out various spheres of application for Civil Engineers
III-II & A20		ENVIRONMENTAL ENGINEERING	CO1	design the treatment units based on the population estimation
	7K614		CO2	analyse a water supply network
			CO3,CO4,CO5	describe collection of sewage and treatment of sewage water distinguish basic phenomenon/ units involved in the treatment plants explain the basic treatment processes involved in treating water
			CO6	explain solid waste management and low cost treatment technologies
	8K717	Disaster Mitigation and Management	C01	analyze and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at local, national and international levels
			CO2	choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan
			CO3	explain various mechanisms and consequences of natural and human

				induced disasters for the
				participatory role of engineers in
				disaster management
				Develop an awareness regarding
				the chronological phases of disaster
		CO4	preparedness, response and relief	
			operations for formulating effective	
				disaster management plans
				list various participatory
			CO5	approaches/strategies and their
				applications in disaster management
				explain the concepts of remote
				sensing and geographical
			CO6	information systems for their
				effective application in disaster
				management
				design various Steel Structures
			CO1	and connections and interpret the
		DESIGN OF STEEL STRUCTURES (PROFESSIONAL		specifications of relevant codes
			(0)	apply the design principles to
			02	field problems
			CO 3	apply design principles to field
			03	problems of tension members
				draw, understand and interpret
	0VCc1		CO4	the detailing aspects of steel
	8KC01			structural drawings
		ELECTIVE – II)		Is able to investigate into the
				critical issues of steel structures,
			CO5	compare various options and
				chose the
				best solution for the problems in
				the area of steel structures
				design the end bearing Stiffness
			C06	and intermediate stiffness
				contrast Python versions and their
			CO1	specifications
				Build programs using primitive
			CO2	data types
8EC				Write applications that include
				functions, modules, packages
	8EC45	ARTIFICIAL	CO3	along with respective exceptional
	01010	ENGINEERING		handling mechanism
				Write applications using OO
			CO4.CO5	features of Python
				Write applications using Files
				develop NumPv/Tkinter/Plotpv
			CO6	modules
				1110 44100

8K671	GEOGRAPHICAL INFORMATION SYSTEMS LAB	CO1,CO2,CO3	extract various details from the topography survey map The student shall be able to convert the raw data into vector and raster forms The student shall be able to generate maps with various geographic features
8K672	ENVIRONMENTAL	CO1,CO2	establish water and wastewater quality, and know which tests are appropriate for given environmental problems? Statistically analyse and interpret laboratory results
011072	LABORATORY	CO3	use the water and wastewater sampling procedures and sample preservations
		CO4	Obtain the necessary background for subsequent courses in environmental engineering
8AC95	ELECTRICAL & ELECTRONICS ENGINEERING LAB	CO1,CO2	Use Excel sheets for Civil Engineering applications Write computer programs for structures with various loading and support conditions using Civil Engineering related software such as STAAD Pro
	GROUP PROJECT-II	CO1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing small conceptual projects
		CO2	Exhibit interest in learning the modern tools and technologies
8K678		CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs to the marked and society as a whole
		CO4	Improve their communication skills and team work skills
		CO5	Work as in individual and in a team
	COMPREMENSION	CO1	recall the concepts in the core and elective courses
8K697	VIVA VOCE –VI	CO2	Exhibit technical knowledge to face interviews
		CO3	Exhibit lifelong Learning skills

				for higher education and to pursue
				Professional practice
				apply potential energy method to
			CO1	structural engineering problems
				generate and solve the governing
			CO2	FE equations for one-dimensional
				problems
				generate and solve the governing
	91717	Finite Element Method	CO3	FE equations for two-dimensional
	OK/1/	for Civil Engineers		problems
			CO4	formulate FE equations using four
				nodded iso-parametric element
			CO5	solve FEM equation using the
				Gauss quadrature
			CO6	analyze basic structural elements
				using ANSYS software
			CO1	design and detail Surplus weir;
			CO2	design and detail Direct sluice ;
				design and detail Glacis type
	8K718	Design and Detailing of	CO3 CO4 CO5	canal drop;
		Hydraulic Structures	000,004,000	design and detail Cross regulator;
				Design of super passage
			CO6	design and detail and understand
				design concepts of syphon
IV-I & A20			CO1	prepare detailed estimates for
	84710			different buildings
			CO2	do the rate analysis for different
			CO3	items of works of buildings
				prepare the rate analysis for
		Estimation and Valuation		different items of works
	ok/19		CO4,CO5	prepare the schedules for shuttering and har handing
				work out different types of
				contracts, prepare tenders, to suit
				the present day practices of
				tendering
			CO6	valuate buildings as per norms
				explain the necessity of ground
				improvement and the factors
			CO1	which decide the method of
				ground improvement
		Professional		contrast mechanical modification
	8KC74	Elective_III(7KC74:	CO2	of the ground by compaction and
		Ground Improvement		various methods of compaction
		rechniques)	СОЗ	outline hydraulic modification of
				the ground by lowering of water
				table and other methods
			604	Understand the necessity of

			drainage of slopes, vertical drains
			sand drains etc,
			Understand chemical
		CO5	modifications of the ground by
			lime stabilization and other
			methods
		606	Understand the method of grouting
		06	and other advanced methods
		601	Identify the implementation layers of
		01	an IoT application system
			Summarize the characteristics and
		CO2	challenges of designing SDN and
			NFV
	Open elective III	603	Describe the management of an IoT
8DC55	(7DC55) Internet of	605	system using necessary protocols
000000	(7DC55) Internet of Things		Design, Develop and Illustrate IoT
	Things	CO4	applications using Raspberry PI
			platform and Python Scripting
		CO5	Implement web based services on
		605	IoT devices
		CO6	Design new projects using Raspberry
			PI
			The students gain the knowledge
		C01	on the inputs required for
			innovation and also gain
			familiarity on Entrepreneurship
			The students will get exposure on
			creative methods of ideation and
		CO2	the importance of protecting the
	Open elective_III (7ZC24) Innovation and Design thinking		ideas
			The students gain knowledge on
87C24		500	design thinking and types of
02021		005	thinking
			The students gain familiarity on
		604	The students gain failing file
		CO4	
			Internet of things (IOT)
		CO5	The students understand the
			process of building the startup
			The students gain knowledge on
		CO6	various startup funding and also to
			branding building for the startup
			Test Fineness, Specific Gravity,
		CO1	Setting Time, Soundness and
			Compressive Strength of Cement
	Concrete Technology		Test Specific Gravity of Coarse
8K771	Lah	CO2	Aggregate and Fine Aggregate
	2		Bulking of Fine Aggregate
			Design Concrete Mix
		CO3	Dronowtioning by Using Indian
			r toportioning by Using Indian

				Standard Method
				Test Workshility of Fresh
				Concrete and Compressive
				concrete and compressive
				strength, Split Tensile Strength of
				Hardened
			CO4	Concrete
				Develop the architectural design
			CO1	for the structure based on the
	88777	Dovit Lob		requirement of end user
	011/12	Kevit Lab		Develop the design and
			CO2	documentation for the various
				structures using REVIT software
			CO1	Use Excel sheets for Civil
		Estimation & Quantity	01	Engineering applications
	8K773	Surveying Laboratory		Develop the documentation for
		Surveying Laboratory	CO2	material quantities and rate analysis
				for different structures
				review and outline various civil
			CO1	engineering problems that can be
				taken up as project work
				Work in a team to select a
			CO2	problem for project work
		Project - I		Review and evaluate the
			CO3	available literature on the chosen
				available interature on the chosen
				formulate, with the help of
			CO4	faculty advisor, a methodology to
				solve the identified problem
			CO5	Apply the principles, tools and
				techniques to solve the problem
			CO6	Prepare and present project
			00	report
		1		explain significance of AI
				list out different types of AI agents
				and AI search algorithms
		Mandatory course	CO1	infer fundamentals of knowledge
		Walldatory course		representation
				build simple knowledge-based
				systems
				Differentiate between statically
				determinate and indeterminate
				structures
			CO2,CO3	Sketch the SF and BM diagrams for
		Professional		determinate and indeterminate beams
IV-II & A20	8KC81	Elective_IV(/KC81:		Calculate the deflections in beams
		Structural Engineering) -		and frames
		studied in III-I	CO4	draw the SFD and BMD for
				structures with and without sway
			CO5	Aanalyse the indeterminate
				structure for various types of loads

analyze the truss and also able to determine the Plastic moment capacity of a structure capacity of a structure calculate earth pressures on foundation Analysis and Design - studied in III- II) CO1 CO2 calculate earth pressures on foundation Analysis and Design - studied in III- II) CO5 Design the Pile foundation CO6 illustrate the concept of well foundation CO1 review and outline various civil engineering problems that can be taken up as project work CO2 Work in a team to select a problem for project work CO3,CO4 Review and evaluate the available literature on the chosen problem formulate, with the help of faculty advisor, a methodology to solve taken up as project work CO3,CO4 Review and evaluate the available literature on the chosen problem formulate, with the help of faculty<				
8KC86 Professional CO1 recall soil exploration methods 8KC86 Professional CO2 calculate earth pressures on foundations and retaining structures 8KC86 Foundation Analysis and Design - studied in III-II) CO3 Analyse shallow foundations CO4 determine bearing capacity of soils and foundation settlements CO6 illustrate the concept of well foundation CO6 illustrate the concept of well foundation CO6 illustrate the concept of well foundation CO1 CO2 Work in a team to select a problems that can be taken up as project work Review and evaluate the available literature on the chosen problem for project work Project - II CO3,CO4 Review and evaluate the available literature on the chosen problem CO5,CO4 CO3,CO4 Review and evaluate the problem CO5 Apply the principles, tools and techniques to solve the problem			CO6	analyze the truss and also able to determine the Plastic moment capacity of a structure
Professional CO2 calculate earth pressures on foundations and retaining structures 8KC86 Foundation Analysis and Design - studied in III-II) CO3 Analyse shallow foundations II) CO4 determine bearing capacity of soils and foundation settlements III) CO5 Design the Pile foundation CO6 illustrate the concept of well foundation CO6 illustrate the concept of well foundation CO1 engineering problems that can be taken up as project work CO2 Work in a team to select a problem for project work Project - II CO3,CO4 Review and evaluate the available literature on the chosen problem for mulate, with the help of faculty advisor, a methodology to solve the identified problem CO5 Apply the principles, tools and techniques to solve the problem CO5 Apply the principles, tools and techniques to solve the problem			CO1	recall soil exploration methods
BKC86 Elective_V(7KC86: Foundation Analysis and Design - studied in III- II) CO3 Analyse shallow foundations CO4 determine bearing capacity of soils and foundation settlements CO5 Design the Pile foundation CO6 illustrate the concept of well foundation CO6 illustrate the concept of well foundation CO1 review and outline various civil 		Professional	CO2	calculate earth pressures on foundations and retaining structures
8KC86 Foundation Analysis and Design - studied in III-II) CO4 determine bearing capacity of soils and foundation settlements II) CO5 Design the Pile foundation CO6 illustrate the concept of well foundation CO6 review and outline various civil engineering problems that can be taken up as project work CO2 Work in a team to select a problem for project work Project - II CO3,CO4 Review and evaluate the available literature on the chosen problem formulate, with the help of faculty advisor, a methodology to solve the identified problem CO5 Apply the principles, tools and techniques to solve the problem CO5 Apply the principles, tools and techniques to solve the problem		Elective_V(7KC86:	CO3	Analyse shallow foundations
II) CO5 Design the Pile foundation CO6 illustrate the concept of well foundation review and outline various civil engineering problems that can be taken up as project work CO2 Vork in a team to select a problem for project work Review and evaluate the available literature on the chosen problem formulate, with the help of faculty advisor, a methodology to solve the identified problem CO5 CO5 Apply the principles, tools and techniques to solve the problem CO6 Prepare and present project report	8KC86	Foundation Analysis and Design - studied in III-	CO4	determine bearing capacity of soils and foundation settlements
CO6 illustrate the concept of well foundation review and outline various civil engineering problems that can be taken up as project work review and outline various civil engineering problems that can be taken up as project work CO2 Work in a team to select a problem for project work Project - II CO3,CO4 Review and evaluate the available literature on the chosen problem formulate, with the help of faculty advisor, a methodology to solve the identified problem CO5 Apply the principles, tools and techniques to solve the problem CO6 Prepare and present project report		II)	CO5	Design the Pile foundation
CO1review and outline various civil engineering problems that can be taken up as project workCO2Work in a team to select a problem for project workProject - IICO2Work in a team to select a problem for project workCO3,CO4Review and evaluate the available literature on the chosen problem formulate, with the help of faculty advisor, a methodology to solve the identified problemCO5Apply the principles, tools and techniques to solve the problemCO6Prepare and present project report			CO6	illustrate the concept of well foundation
CO2Work in a team to select a problem for project workProject - IIReview and evaluate the available literature on the chosen problem formulate, with the help of faculty advisor, a methodology to solve the identified problemCO3,CO4CO3,CO4CO3,CO4Apply the principles, tools and techniques to solve the problemCO5Apply the principles, tools and techniques to solve the problem			CO1	review and outline various civil engineering problems that can be taken up as project work
Project - II Review and evaluate the available literature on the chosen problem CO3,CO4 formulate, with the help of faculty advisor, a methodology to solve the identified problem CO5 Apply the principles, tools and techniques to solve the problem CO6 Prepare and present project report			CO2Work in a team to select a problem for project workReview and evaluate the ava literature on the chosen problemCO3,CO4formulate, with the help of formulate, with the help of formulate, and the identified problem	Work in a team to select a problem for project work
CO5Apply the principles, tools and techniques to solve the problemCO6Prepare and present project report		Project - II		Review and evaluate the available literature on the chosen problem formulate, with the help of faculty advisor, a methodology to solve the identified problem
CO6 Prepare and present project report			CO5	Apply the principles, tools and techniques to solve the problem
			CO6	Prepare and present project report





Course Outcomes of EEE Department





Department of Electrical & Electronics Engineering COs for A22-1st Year and 2nd Year, A20-3rd Year and 4th Year courses/subjects

Year and regulation	Course code	Course name		Co's
			CO1	Explain semiconductor behavior, types and their applications
			CO2	Differentiate the wave and particle, and its application for a particle in one dimension box
			CO3	Explain about emission, its types, laser principle and applications of optical fibers (sensors and medical endoscopy)
	911007	Engineering Physics	CO4	Reveals about the magnetism-its origin and types and its applications
			CO5	Explain the basic concepts of dielectric materials, polarization and its types, their applications (piezo, ferro and Pyro electricity).
			CO6	Summarize nano& bulk concepts, surface to volume ratio and its applications.
	9FC01		CO1	Explain basic fundamentals of Compute Systems, computing environments, Compute Languages – Machine Languages.
			CO2	Describe C language Programs, Structure of a C Program
		Problem Solving using C C C C	CO3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break
I-I & A22			CO4	Write programs implementing application on arrays
			CO5	Write programs using Pointers and string handling functions
			CO6	Write programs using Enumerated, Structure, Union types and files.
			CO1 Basic operation of matrices and ab cO1 linear system and some analytical meth solution.	Basic operation of matrices and about the linear system and some analytical methods for solution.
			CO2	Concept of Eigen value and Eigen vector and their properties and applications.
			CO3	Quadratic form and its properties.
	9НС11	MATRIX ALGEBRA AND CALCULUS	CO4	Mean value theorems and their applications to the given functions, series expansions of a function.
			CO5	Various analytical methods to solve first order first degree and also the equations not of first degree ordinary differential equations.
			CO6	Methods to solve higher order ordinary differential equations.
	9HC01	Essential English	CO1	Demonstrate competence with suitable accuracy in vocabulary, and language fluency.

	Language Skills (EELS)	CO2	State the definition of nouns, verbs, adjectives,
			and adverbs.
		CO3	Identify the differences of each tense and use the tenses accurately.
		CO4	Identify specialized reading strategies for specific types of texts
		CO5	Produce written work that is substantive, organized, and grammatically accurate.
		CO1	Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering
		CO2	Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes
9 BC 01		CO3	Draw projections of different types of regular solids in various positions wrt principal planes of projection
36001	Engineering Graphics	CO4	Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.
		CO5	Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views
		CO6	Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software
		CO1	Describe people, objects and situations using simple sentences.
		CO2	Use appropriate tenses and expressions in different contexts of conversations.
9HC61	Oral Communication Lab-I	CO3	Identify major areas of concern in their oral communication and address them.
	CO4	CO4	Create a SMART plan to enhance their communication skills in English
		CO1	Demonstrate the wave length of monochromatic source of light by using Newton's Rings
011044		CO2	Analyze refractive index of a material prism and Dispersive power of a glass Prism by using spectrometer
7000	Engineering Physics Lab	CO3	Determine the wave length of spectral light and laser Source of light by using Diffraction Grating
		CO4	Design and Analyze RC Circuits
		CO5	Analyze RLC Series circuit and parallel circuit
		CO6	Investigate magnetic Circuits
9FC61		CO1	To formulate the algorithms for simple problems

		Problem Solving using C	CO2	To translate given algorithms to a working and
		Lab	002	correct program
			CO3	To be able to correct syntax errors as reported by the compilers
			CO4	To be able to identify and correct logical errors encountered at run time
			CO5	To be able to write iterative as well as recursive programs
			CO6	To be able to represent data in arrays, strings and structures and manipulate them through a program
I-II & A22			CO1	To understand microscopic chemistry in terms of atomic and molecular orbitals
			CO2	To learn the preparation and applications of commercial polymers and lubricant materials
		ENGINEERING	CO3	To learn the industrial problems caused by water and municipal water treatment
	9HC04	CHEMISTRY	CO4	To acquire knowledge about different types of batteries and their working mechanism
			CO5	To develop the concepts and types of corrosion and the factors influence corrosion
			CO6	To understand the control methods and protective coatings for metals and other surfaces
			CO1	Apply Kirchhoff's laws for solving electrical circuits.(L3)
			CO2	Construct the network graph and solve the problems of electrical networks. (L3)
	9A201	ELECTRICAL CIRCUITS AND NETWORKS – I	CO3	Solve the problems of composite magnetic circuits and electrical networks using network theorems. (L3)
		NET WORKD - T	CO4	Explain the basic concepts of single phase AC circuits and solve the problems related to steady state analysis. (L2)
			CO5	Evaluate various parameters such as Q factor and bandwidth for resonance circuits. (L5)
			CO1	Design the programs using structures, unions and enum.
			CO2	Demonstrate the concepts of Abstract data type and also applications of stacks and queues.
		DATA STRUCTURES	CO3	Implement basic operations on single, double and circular linked list.
	9EC01	DATA STRUCTURES	CO4	Solve problems involving Binary Search trees and AVL trees.
			CO5	Articulate the concepts of graphs, heaps and hashing.
			CO6	Develop algorithms for various searching and sorting techniques and analyze their performance.
	9HC12	ADVANCED CALCULUS	CO1	Basic concepts of multivariable differential calculus.

			CO2	Evaluation of double and triple integrals.
			CO3	Solutions of first order linear and non-linear
			CO4	Series expansion of a given function in terms of sine and cosine terms.
			CO5	Basic Concepts of vector differential calculus.
			CO6	Concepts of vector integral calculus,
			CO1	Understand the nuances of striking a great conversation in formal and informal situations.
	9HC62	Oral Communication Lab- II	CO2	Gain experience of facing an audience and speaking in public.
			CO3	Design a winning presentation and present it with ease.
	9HC64	Engineering Chemistry	CO1	Describe the principle and theory in determination of Hardness of a water sample.
	JIIC04	Lao	CO2	Experiment the method of preparation for organic compounds.
			CO1	Write programs on structures and unions.
	9EC61	Data Structures Using C Lab	CO2	Implement Stacks, Queues and circular queues using arrays.
			CO3	Write programs to implement basic operations on various types of linked list.
			CO4	Implement insertion and traversal operations on binary search tree
			CO5 CO6	Develop programs on various searching, sorting algorithms.
	9BC61	Workshop/Manufacturing Processes Lab	CO1	Use various types of conventional manufacturing Processes
			CO2	Manufacture components from wood, MS flat, GI Sheet etc. – hands on experience
			CO3	Manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc.
			CO4	Produce small devices / products /appliances by assembling different components
			CO1	Use the Laplace transforms techniques for solving ODE's
II- I A-22		TRANSFORM	CO2	Use the Z-Tranforms technique for solving Difference equations
	9HC14	TECHNIQUES AND NUMERICAL METHODS	CO3	Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.
			CO4	Find the root of a given equation.
			CO5	Estimate the value for the given data using interpolation

			CO6	Find the numerical solutions for a given ODE's
				An ability to understand number systems and
			CO1	apply the rules of Boolean algebra and K-maps
				to simplify Boolean expressions.
				An ability to design MSI combinational
			CO2	circuits such as full adders, multiplexers,
		DIGITAL LOGIC		decoders, encoders, Code converters.
	9CC02	DESIGN		An ability to design basic memory units
			CO3	(latches and flip-flops) and sequential circuits
				such as counters and registers
				An ability to design digital design using PLD's
			CO4	such as ROM's, PLA's, PAL's and digital
				Charte
				Charts.
			001	Demonstrate the concepts of pn Diode, Zener
			COI	Diode, Bipolar Junction Iransistor, Field
				Effect Transistor and their characteristics.
		ELECTRONIC	CO2	using BIT and FFT
	9CC01	DEVICES AND		Classify and characterize the Feed Back
		CIRCUITS	CO3	amplifiers and design various Oscillator
				circuits.
				Understand the Basic regulator circuits and
			CO4	voltage multipliers.
-	9A302	ELECTRO MAGNETIC FIELDS CO	CO1	Understand the Principle of electrostatics.
			CO2	Understand the principle of dipole and field
			002	due to dipole.
			CO3	Understand the Fundamentals of dielectrics
				and calculation of capacitance.
			CO4	Understand the Fundamentals of Ampere
				circuital law and force in magnetic field.
			CO5	potential
				Understand the self and mutual inductance and
			CO6	time varying fields.
			001	Understand the Electromechanical Energy
			COI	conversion.
			CO^{2}	Understand the constructional features &
			02	Principle of operation of DC machine.
		ELECTRICAL	CO3	Understand the characteristic features of DC
	9A303	MACHINES – I		machines.
			CO4	Understand the starting & speed control
				Analyze the various testing precedures of DC
			CO5	machines
				Understand the various applications of DC
		ELECTRICAL MACHINES – I	CO6	machines.
		ELECTRICAL	CO1	Understand the three phase circuits.
	9 \ 301	CIRCUITS and	CO2	Understand the DC and AC transients.
	77304	NETWORKS- II	CO3	Understand the network functions.
			CO4	Analyze the network parameters.

			CO5	Understand the different types of filters.
			CO6	Understand the Fourier analysis of AC circuits.
	9EC42	PROGRAMMING IN JAVA	CO1	Understand the concept of OOP with the need of constructing objects, and classes. Write programs using classes, objects, members of a class and the relationships among them needed for a specific problem.
			CO2	Identify the purpose and usage of principles of inheritance and polymorphism. Implement concepts of polymorphism, encapsulation and method overloading.
			CO3	Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifiers, automatic documentation through comments)
			CO4	Students understand and implement error exception handling and multi- threading.
			CO5	Students learn to create GUI for the specific applications.
			CO6	Write programs for event-handling using various user interface components on applets.
	9HC05	ENVIRONMENTAL SCIENCE AND ECOLOGY	CO1	To understand structure and function of ecosystem
			CO2	To learn classification and uses of natural resources
			CO3	To learn about Understanding the impacts of developmental activities and mitigation measures.
			CO4	To know the source, causes and preventive methods of pollution
			CO5	To understand the importance of ecological balance for sustainable development.
			CO6	To understand the environmental policies and regulations
			CO1	Understand color coding, operations on Diode, BJT, FET and other electronic components.
		ELECTRONIC	CO2	Correlate theoretical concepts with practical implementation.
	9CC71	LAB	CO3	Apply the knowledge of Diodes, Capacitors and Transistors for the realization of rectifiers, regulators, amplifiers and Oscillator circuits.
			CO4	Adapt effective Communication, presentation and report writing skills.
		ELECTRICAL	CO1	Perform the test for verification of various network theorems
	9A371	CIRCUITS AND NETWORKS	CO2	Measure the frequency for a RLC series/parallel circuits under resonance.
		ANALYSIS LAB	CO3	Conduct an experiment for determination of self & mutual inductance and coefficient of coupling

			CO4	Construct current locus diagram by performing
			COF	a test on single phase parameteric discuss
			<u>CO5</u>	Determine the normators of the soil
			C00	Determine the parameters of the coll
			COI	Deliver lecture on emerging technologies.
			CO2	Explain domain knowledge to resolve real time technical issues
	9A393	TECHNICAL SEMINAR – III	CO3	Demonstrate ability to lead and explain concepts and innovative ideas.
			CO4	Demonstrate team leading qualities.
			CO5	Demonstrate public speaking skills.
			C06	Exchange new information that would not
			000	have been available otherwise.
		COMPREHENSIVE	CO1	Comprehend the concepts in the Core Courses 1^{st} year and 2^{nd} year 1^{st} Semester.
	9A383	IESI AND VIVA VOCE	CO2	Assess technical knowledge to face interviews.
		- 111	CO3	Exhibit lifelong learning skills to pursue higher studies or professional practice.
II- II A-22			CO1	Solve the random variable problems and probability distributions.
		PROBABILITY & C16 STATISTICS	CO2	Estimate the parameters and solve the problems using central limit theorem.
	9HC16		CO3	Test the hypothesis related to samples concerning to the means and proportions of large size samples.
			CO4	Apply and solve the problems using t-test, Chi-square test also testing the hypothesis problems on small size samples, goodness of fit and independence of attributes.
			CO5	Solve the problems on measures of central tendency, Correlation and regression models
			CO1	Learn basic concepts of single phase transformer.
			CO2	Study about testing of single phase transformer and auto transformer.
	0 \ 405	ELECI KICAL MACHINES H	CO3	Study about poly phase transformer.
	JA403	WACHINES-II	CO4	Study about poly phase induction motors.
			CO5	Study about torque speed characteristics and circle diagram of induction motor.
			CO6	Study about different starting methods of induction motor.
			CO1	Learn basic concepts of hydro electric and thermal power plants.
			CO2	Study about gas and nuclear power plants.
	9A406	406 POWER SYSTEMS - I	CO3	Study about transmission line parameters and efficiency.
			CO4	Study about performance of transmission lines.
			CO5	Learn basic about over head insulators and mechanical design.
		CO6	Learn fundamentals of underground cables.	
	0 A (70 7	LINEAR CONTROL	CO1	Learn basic concepts of control systems.
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			CO2	Study about time response analysis.
			CO3	Learn basic concepts of stability and root locus method.
	9AC07	SYSTEMS	CO4	Study about frequency response analysis.
			CO5	Learn basic concepts stability analysis in frequency domain.
			CO6	Learn fundamentals of state space analysis.
			CO1	Distinguish between small and large signal amplifier and able to compare the conversion efficiency levels
			CO2	Analyze and Design tuned RF amplifiers and different types of sweep generators
	90005	ANALOG CIRCUITS	CO3	Understand linear and non-linear wave shaping methods and able to Analyze various types of Logic gates and Sampling gates.
			CO4	Understand and design various types of multivibrators and applications
		DATABASE SYSTEMS CONCEPTS	CO1	Students will learn basics of databases and understand the architecture of database management systems.
	9EC44		CO2	Students will learn about good database design techniques and database theories behind.
			CO3	Understand conceptual database designs, and functional dependencies and normalization.
			CO4	Students will understand the Mathematical foundation for relational databases.
			CO5	Student will be able to understand concept of Constraints, Views and will be able to create dynamic databases.
			CO6	Learn transaction management, concurrency controls.
		UNIVERSAL HUMAN VALUES (UHV)	CO1	Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
	9HC17		CO2	Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
			CO3	Strengthening of self-reflection.
			CO4	Development of commitment and courage to act.
			CO1	Assess them using SWOT analysis.
			CO2	Appraise the importance of certain soft skills like time management and goal setting.
	0003	SOFT SKILLS	CO3	Improve their verbal ability to handle the competitive exams.
	711003		CO4	Enhance their team skills and design thinking capabilities for effective problem solving and decision making.
			CO5	Know their emotional quotient which guides their thinking, behavior and helps them

				manage stress efficiently.
				Equip themselves with the prerequisites, and
			CO6	relevant techniques to effectively attend
				corporate interviews.
			CO1	Understand the principles of DC electrical machines
	FLECTRICAL	CO2	Understand the load characristics.	
	94473	MACHINES I AR – I	~~~	Understand the principle and operation of DC
	21110		CO3	machine speed control methods.
			~ ~ /	Understand the calculation of losses in DC
			CO4	machines.
				To understand the design and working of
			CO1	various linear and non-linear wave shaping
				circuits.
				To demonstrate the working principle of
			CO2	various multivibrators and functionalities of
	9CC74	Analog Circuits Lab		various logic gates.
			CO^{2}	10 perform and verify the working of
			005	regulators
				To perform laboratory experiment to verify the
			CO4	conversion efficiency of various power
			001	amplifiers.
			CO1	Deliver lecture on emerging technologies
			Explain domain knowledge to resolve real time	
		9A494 TECHNI CAL SEMINAR - IV	CO2	technical issues
			CO3	Demonstrate ability to lead and explain
				concepts and innovative ideas.
	9A494		CO4	Demonstrate team leading qualities.
			CO5	Demonstrate public speaking and lifelong
				professional practice
				Exchange new information that would not have
			CO6	been available otherwise.
			CO1	Comprehend the concepts in the Core Courses
	01101	COMPREHENSIVE	001	1^{st} year and 2^{nd} year.
	7/1404	VIVA TEST – IV	CO2	Assess technical knowledge to face interviews.
			CO3	Exhibit lifelong learning skills to pursue higher
				succes or professional practice.
III-I & A20			C C C	Demonstrate the concepts of Differential
			COI	Amplifier and Operational Amplifier and their
			CO2	Design the basic circuits using IC 741 on ann
		IC APPLICATIONS		Explore design and analyze active filters
	8CC07		CO3	timers, oscillators, voltage controlled oscillator
				DACs and ADCs, and IC regulators.
				Classify and characterize the TTL/ECL/CMOS
			CO4	Logic Families and design of various logic
				gates using them.
	8A508	ELECTRICAL	CO1	Explain the constructional details and

		MACHINES - III		generation of FMF
		MACIIINES - III	CO2	Explain the causes for harmonics and its suppression and also armature reaction
			CO3	Evaluate the performance of alternator by different methods.
			CO4	Explain how to operate the alternators in parallel for load sharing and how to control the reactive power.
			CO5	Analyze and explain applications of synchronous motor.
			CO6	Explain the various applications of single phase induction motor and special purpose motors.
			CO1	Understand the construction and operation of various power semiconductor devices and analyze about the series and parallel operation of SCRs.
			CO2	Analyze the operation of different configurations of single phase converters for different loads.
	8A509 POWER ELECTRONICS	CO3	Analyze the operation of different configurations of three phase converters for different loads.	
		CO4	Explain the operation of different type's choppers.	
			CO5	Explain the operation of inverter and applications of inverters.
		CO6	Explain the working of an AC voltage controller and Cyclo-Converters for different configurations.	
		CO1	Understand the importance of power factor and analyze the different methods of power factor and voltage control.	
			CO2	Analyze the factors affecting the economic aspects of power generation and tariff, different methods of tariff.
	8A510	POWER SYSTEMS-II	CO3	Learn about components of substation and different methods of grounding.
		CO4	Learn about per unit system and symmetrical fault analysis.	
			CO5	Learn about symmetrical components, sequence impedances and unsymmetrical fault analysis.
			CO6	Analyze different types of distribution systems.
			CO1	Describe the basic functionalities and structure of the Operating System
	8EC76 OPERATING SYSTEMS CONCEPTS (OPEN ELECTIVE-I)	CO2	Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.	
	CO3	Comprehend the concepts of Synchronization and Deadlocks in the Operating System		

			CO4	Discuss the concepts of Memory Management (Physical and Virtual memory)
			CO5	Explain the concepts of File System with regard to directory and disk management algorithms.
			CO6	Students understand the concepts of I/O systems, protection and security in a case study given
			CO1	To understand the basics of Managerial Economics at Micro level
			CO2	To understand cost concept
		ECONOMICS,	CO3	To understand and identify various basic concepts of Accounting
	8ZC01	MANAGEMENT SCIENCE (FAMS)	CO4	To understand the concepts of Capital expenditure
		SCIENCE (EAWIS)	CO5	To make student understand the basics of Management
			CO6	To make student learn about various personality traits
		CYBER SECURITY	CO1	The students will be able to understand cyber- attacks, types of cybercrimes.
	8FC24		CO2	Realize the importance of cyber security and various forms of cyber attacks and countermeasures.
			CO3	Get familiar of cyber forensics.
				Get familiar with obscenity and pornography in
			CO4	cyber space and understand the violation of Right of privacy on Internet.
			CO5	Cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.
			CO6	Elucidate the various chapters of the IT Act 2008, power of Central and State Government to make rules under IT Act 2008.
			CO1	An ability to explore the applications of IC 741 OP-AMP.
		IC APPLICATIONS	CO2	An ability to design Active filters and its applications
	8CC76	LAB	CO3	An ability to understand and implement generate square and Triangular waveforms using 555 Timers
			CO4	An ability to design D to A converters and its applications
		LINEAR CONTROL	CO1	To explore the applications of control systems.
	8A575	SYSTEMS AND SIMULATION LAB	CO2	To explore the concepts of control systems.
	8A586	SUMMER INDUSTRY INTERNSHIP – I	CO1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
			CO2	Exhibit the interest in learning the modern

				tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
			CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole.
			CO4	Improve their communicative skills and team skills largely improve.
III-II & A20			CO1	Understanding the concepts of 8086 Architecture
		MICDODDOCESSOD	CO2	Understanding the concepts of Instruction set & developing skills in writing assembly language programs.
	8DC05	AND	CO3	Ability to interface keyboard, stepper motor ADC, DAC to 8086 using 8255
		MICROCONTROLLER S	CO4	Understanding the concepts of 8051 Architecture
			CO5	Exploring the concepts of instruction set of 8051
			CO6	Ability to interface LED, LCD, Keyboard DAC, ADC with 8051
		CO1	Understand about power system transients and its effects.	
		CO2	Learn about protection against over voltages.	
	SWITC	SWITCH GEAR AND	CO3	Learn about different types of circuit breakers and its importance.
	8A011	PROTECTION	CO4	Learn about different types of electromagnet relays.
			CO5	Learn about different types of static relays.
		CO6	Learn about generator, transformer and feeder protection.	
		2 MEASUREMENTS & INSTRUMENTATION	CO1	Understand the principle of operation of different types of instruments viz., PMMC, moving iron type of instruments, the required characteristics of an instrument in general. The student demonstrates the ability to compensate for the errors in the instruments and to extend the range of the instruments.
	8A612		CO2	Demonstrates the knowledge of Potential and Current transformers; the errors in them and the effect of having an open/short in the secondary circuits; Understand the principle of operation of Dynamometer and Moving-iron type of Power factor meters.
			CO3	Comprehends the principle of operation of dynamometer type of Wattmeter and Induction type of Energy meter; use the wattmeter to measure the Active and Reactive power and demonstrates the ability to extend the range of them.

			CO4	Identify and use different techniques of measurement of Resistance, Inductance and Capacitance values.
			CO5	Understand the principle of operation of Different type of digital voltmeters, wave analyzers, spectrum analyzers and Cathode ray Oscilloscope.
			CO6	Demonstrates the ability in characterizing the different types of transducers and uses them to measure Strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque and Temperature.
			CO1	To acquire the knowledge of basic concepts of thermodynamics and analyze the p-v & t-s diagrams of the different cycles.
			CO2	To acquire the knowledge two and four stroke engines, the function of components used in the steam power plant
	8BC04	ELEMENTS of MECHANICAL ENGINEERING	CO3	To identify & understand the function of components used in VCR & VAR system, & about the working of hydraulic pumps & hydraulic turbines.
			CO4	To identify & understand properties of material and engineering application
			CO5	To acquire the knowledge of various types of power transmission systems
			CO6	To acquire the knowledge the different NC and CNC machine.
			CO1	Gains exposure towards Python versions and their specifications.
	8FC22		CO2	Build programs using primitive data types.
		PYTHON PROGRAMMING CONCEPTS	CO3	Write applications that include functions, modules, and packages along with respective exceptional handling mechanism.
			CO4	Writes applications using OO features of Python
			CO5	Write applications using Files.
			CO6	Hands on exposure on NumPy/Tkinter/Plotpy modules.
	8ZC23	ADVANCED ENTREPRENEURSHIP (OPEN ELECTIVE – II)	CO1	The Students' gain knowledge on the stages of Start-up and the turbulence environment it undergoes and the stages related to growth of the Start-up.
			CO2	The Students are exposed to the various business models and critically evaluating the effectiveness of the business models and products
			CO3	The students understand the method of business traction, create roles and build their A- team
		CO4	The students understand the various channels of revenue building and exploration of new	

		-		
				revenue avenues.
			CO5	The students understand the need of sales planning and people plan and also financial modeling.
			CO6	The students are exposed to the legal implications affecting the company's prospects and identifying right mentors and advisors to support start-ups
			CO1	Learn the distinction between optimal reasoning Vs human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time and space complexities.
		ADTIFICIAI	CO2	Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.
	8E654	INTELLIGENCE	CO3	Learn different knowledge representation techniques.
			CO4	Understand the concepts of state space representation, exhaustive search, and heuristic search together with the time and space complexities.
			CO5	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks.
			CO6	Analyze Supervised Learning Vs. Learning Decision Trees
		POWER ELECTRONICS AND SIMULATION LAB	CO1	Correlate theoretical and practical analysis of AC-AC
	8A678		CO2	Also analyze the characteristics of MOSFET.
		ELECTRICAL	CO1	Understand the concepts studied in theory subject.
	8A677	MACHINES LAB – II	CO2	Understand the applications of the concepts.
			CO1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
	9 4 606	GROUP PROJECT	CO2	Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
	8A696		CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
			CO4	Improve their communicative skills and team skills largely improve.
			CO5	Work as an individual and in a team.
	8A686	COMPREHENSIVE	CO1	Assess the relevant courses they have

		VIVA- VOCE		undergone till the completion of that academic
				vear.
			CO2	Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.
IV- I A-20			CO1	Understand about importance of network matrices and usefulness in power system analysis.
			CO2	Analyze the power system under different types of faults.
	8A714	POWER SYSTEM ANALYSIS AND CONTROL	CO3	Analyze the power system under steady state condition for voltage and power flow calculations.
			CO4	Analyze the power system for maintain constant frequency in single area.
			CO5	Analyze the power system for maintain constant frequency in two area.
			CO6	Analyze the power system for maintaining steady state and transient stability.
	8A716	UTILIZATION OF ELECTRICAL ENERGY (PROFESSIONAL ELECTIVE – I)	CO1	Know the importance of different type of electric drives, selection of motor based on starting and running characteristics, required speed control, tolerance of temperature rise, Particular applications of electric drives, and understands different types of industrial loads, Continuous, Intermittent and variable loads etc
			CO2	Know the importance of advantages and methods of electric heating, and applications of resistance heating induction heating and dielectric heating.
			CO3	Identify the core areas of illumination, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, and their applications & sources of light.
			CO4	Differentiate Discharge lamps of MV and SV lamps, tungsten filament lamps and fluorescent tubes, understands basic principles of light control, Types and design of lighting and flood lighting.
			CO5	Understands System of electric traction and track electrification.
			CO6	Understand and Calculations of tractive effort, power, specific energy consumption for a given run, effect of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.
	8A715	RENEWABLE ENERGY SOURCES (PROFESSIONAL ELECTIVE – II)	CO1	Understand the role and potential of new and renewable energy sources realize the potential of solar energy, its impact on environment; define and understand the terms

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				describing the different angles that one may incur in setting up a solar panel and be able to use the instruments for measuring solar radiation.
			CO2	Demonstrates the knowledge of different techniques of solar collection and storage.
			CO3	The student becomes familiar with the different types of horizontal and vertical axis wind mills and understands the performance characteristics of the same. The student also demonstrates the knowledge of different Bio-gas digesters and factors influencing its yield.
			CO4	Aware of the potential of geothermal energy inIndia and will be able to characterize differenttypes ofgeothermal wells.
			CO5	Aware of the different methods of kinetic energy extraction from Ocean waves and tides and thermal energy extraction from Oceans.
			CO6	Demonstrates the knowledge of Direct Energy Conversion in different phenomena viz., Joule Thomson effect, Seebeck effect, Peltier effect etc. and the principle of operation of Fuel Cells.
		POWER SEMI CONDUCTOR DRIVES (PROFESSIONAL ELECTIVE – III)	CO1	Identify the necessity of drive; understand the operation of different converters connected to D.C separately excited motors and series motors derive the Speed.
			CO2	Understand four Quadrant operations of dc drives and analyze electric braking.
			CO3	Understand four Quadrant operations of Chopper fed dc drives.
	8A713		CO4	Describe the operation of Induction motor with its equivalent circuit, speed control of Induction motor with V/ F control and its speed torque Characteristics
			CO5	Explain the concept of slip power and deduce an expression for speed variation with slip power
			CO6	Analyze the working of different Synchronous Motor drives.
			CO1	Students will learn basics of databases and understand the architecture of database management systems.
	9EC22	Data Base Systems (Open	CO2	Students will learn about good database design techniques and database theories behind.
	8FC23	Elective – III)	CO3	Understand conceptual database designs, and functional dependencies and normalization.
			CO4	Students will understand the Mathematical foundation for relational databases.
			CO5	Student will be able to understand concept of

				Constraints, Views and will be able to create
				dynamic databases.
			CO6	controls.
			CO1	Develop plans with relevant people to achieve the project's goals
			CO2	Break work down into tasks and determine handover procedures
			CO3	Identify links and dependencies, and schedule to achieve deliverables
	8A779	PROJECI - I	CO4	Estimate the human and physical resources required, and make plans to obtain the necessary resources
			CO5	Allocate roles with clear lines of responsibility and accountability with team spirit.
			CO6	Design and develop the software or prototype to meet societal needs.
			CO1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
	8A787	SUMMER INDUSTRY INTERNSHIP – II	CO2	Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
			CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
			CO4	Improve their communicative skills and team skills largely improve.
			CO5	Work as an individual and in a team
			CO6	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
IV- II & A- 20		ELECTRICAL AND	CO1	Understand working of Electric Vehicles and recent trends
	8A835	HYBRID VEHICLES (PROFESSIONAL	CO2	Analyze different power converter topology used for electric vehicle application
		ELECTIVE-IV)	CO3	Develop the electric propulsion unit and its control for application of electric vehicles.
		ELECTRICAL	CO1	Know the importance of terms used in distribution system such as load factor, loss factor etc and how these are interred related.
	8A820	DISTRIBUTION SYSTEMS (PROFESSIONAL	CO2	Know the importance of different voltages in primary & secondary distribution systems and types of feeders in our country.
		ELECTIVE – V)	CO3	Identify the importance of location of optimal sub –station through theoretical methods.
			CO4	Calculate power loss and voltage drop in balanced lines and derivations connected with

		these.	
		CO5	Understand various types of protective devices and where and how these are used and the general procedure to coordinate protective devices.
		CO6	Understand the importance of power factor voltage control and how to improve it with various types of correction equipments and best location for them in a system so as to give optimum results.
8A883	PROJECT - II	CO1	Develop plans with relevant people to achieve the project's goals
		CO2	Break work down into tasks and determine handover procedures
		CO3	Identify links and dependencies, and schedule to achieve deliverables
		CO4	Estimate the human and physical resources required, and make plans to obtain the necessary resources
		CO5	Allocate roles with clear lines of responsibility and accountability with team spirit.
		CO6	Design and develop the software or prototype to meet societal needs





Course Outcomes of Mechanical Department





Department of Mechanical Engineering COs for A22-1st Year and 2nd Year, A20-3rd Year and 4th Year courses/subjects

Year and regulation	Course code	Course name	Co's		
			CO1	Explain semiconductor behavior, types and their applications	
			CO2	Differentiate the wave and particle, and its application for a particle in one dimension box	
			CO3	Explain about emission, its types, laser principle and applications of optical fibers (sensors and medical endoscopy)	
	9HC07	Engineering Physics	CO4	Reveals about the magnetism-its origin and types and its applications	
			CO5	Explain the basic concepts of dielectric materials, polarization and its types, their applications (piezo, ferro and Pyro electricity).	
			CO6	Summarize nano& bulk concepts, surface to volume ratio and its applications.	
	9FC01	Problem Solving using C	CO1	Explain basic fundamentals of Computer Systems, computing environments, Computer Languages – Machine Languages	
			CO2	Describe C language Programs, Structure of a C Program	
I-I & A22			CO3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break	
			CO4	Write programs implementing application on arrays	
			CO5	Write programs using Pointers and string handling functions	
			CO6	Write programs using Enumerated, Structure, Union types and files.	
			CO1	Check the consistency or inconsistency of a linear system and can solve the problems.	
			CO2	Find the Eigen values and Eigen vectors and can solve the problems associated with these concepts.	
	9HC11	MATRIX ALGEBRA AND	CO3	Find the nature, index and signature of the quadratic form.	
	унсп	CALCULUS	CO4	Verify the applicability of mean value theorems and also can express the givenstandardfunction in series form using Taylor's and Maclaurin series.	
			CO5	Find the solutions of first order first degree differential equations and solve the problems on Newton's law of cooling, Natural growth and decay.	

			CO6	Solve higher order ordinary differential equations with constant coefficients using some standard methods.
			CO1	Demonstrate competence with suitable accuracy in vocabulary, and language fluency.
			CO2	State the definition of nouns, verbs, adjectives, and adverbs.
	0HC01	Essential English	CO3	Identify the differences of each tense and use the tenses accurately.
	911001	(EELS)	CO4	Identify specialized reading strategies for specific types of texts
			CO5	Produce written work that is substantive, organized, and grammatically accurate.
			CO6	Demonstrate competence with suitable accuracy in vocabulary, and language fluency.
			CO1	Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering
	9BC01	Engineering Graphics	CO2	Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes
			CO3	Draw projections of different types of regular solids in various positions wrt principal planes of projection
			CO4	Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.
			CO5	Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views
			CO6	Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software
			CO1	Describe people, objects and situations using simple sentences.
		Oral Communication	CO2	Use appropriate tenses and expressions in different contexts of conversations.
	9НС61	Lab-I	CO3	Identify major areas of concern in their oral communication and address them.
			CO4	Create a SMART plan to enhance their communication skills in English
			CO1	Demonstrate the wave length of monochromatic source of light by using Newton's Rings
	9HC65	Applied Physics Lab	CO2	Analyze refractive index of a material prism and Dispersive power of a glass Prism by using spectrometer
			CO3	Determine the wave length of spectral light and laser Source of light by using Diffraction Grating
			CO4	Design and Analyze RC Circuits

			CO5	Analyze RLC Series circuit and parallel circuit
			CO6	Investigate magnetic Circuits
			CO1	To formulate the algorithms for simple problems
			CO2	To translate given algorithms to a working and correct program
			CO3	To be able to correct syntax errors as reported by the compilers
		Problem Solving	CO4	To be able to identify and correct logical errors encountered at run time
	96.01	using C Lab	CO5	To be able to write iterative as well as recursive programs
			CO6	To be able to represent data in arrays, strings and structures and manipulate them through a program
			CO7	To be able to declare pointers of different types and use them in defining self referential structures.
			CO8	To be able to create, read and write to and from simple text files.
	9НС04	ENGINEERING CHEMISTRY	CO1	To understand microscopic chemistry in terms of atomic and molecular orbitals
			CO2	To learn the preparation and applications of commercial polymers and lubricant materials
			CO3	To learn the industrial problems caused by water and municipal water treatment
			CO4	To acquire knowledge about different types of batteries and their working mechanism
			CO5	To develop the concepts and types of corrosion and the factors influence corrosion
I-II & A22			CO6	To understand the control methods and protective coatings for metals and other surfaces
			C01	Design the programs using structures, unions and enum.
			CO2	Demonstrate the concepts of Abstract data type and also applications of stacks and queues.
	9EC01	DATA	CO3	Implement basic operations on single, double and circular linked list.
		SIKUCIUKES	CO4	Solve problems involving Binary Search trees and AVL trees.
			CO5	Articulate the concepts of graphs, heaps and hashing.
			CO6	Develop algorithms for various searching and sorting techniques and analyze their performance.

			CO1	Find the limits and test for the continuity and differentiability of a function.
			CO2	Solve the problems on multiple integrals.
	9HC12	ADVANCED	CO3	Solve linear and nonlinear first order partial differential equations.
	JIIC12	CALCULUS	CO4	Find Series expansion a function defined over the intervals.
			CO5	Find directional derivative, gradient, divergence and curl of a function.
			CO6	Solve problems of line, surface and volume integrals.
			CO1	1. to analyse the system of forces, free body diagrams to solve problems dealing with forces in a plane.
			CO2	2. to analyse plane frame and solving using different methods like method of joints and method of sections friction concept and applications like wedge friction.
	9BC02	Engineering Mechanics	CO3	3. to understand the properties of surfaces and volumes and roll played by centroid and centre of gravity in different applications.
			CO4	4. to understand second moment of area and mass moment of inertia and its application strength of materials in evaluating strength.
			CO5	5. to understand analysis of rigid body rotation and kinematics and kinetics of particle & rigid body.
			CO6	6. To analyse Application of work energy method and impulse momentum method to rigid bodies
		Oral Communication	CO1	Understand the nuances of striking a great conversation in formal and informal situations.
	9HC62	Lab-II	CO2	Gain experience of facing an audience and speaking in public.
			CO3	Design a winning presentation and present it with ease.
			CO1	Preparation of Inorganic compounds
			CO2	Determination surface tension of a liquid
			CO3	Determination viscosity of lubricant
	9HC64	Engineering Chemistry Lab	CO4	Determination acid value of an oil
			CO5	Estimation hardness of water
			CO6	Analysis the amount of chloride content
			CO7	Determination of cell constant and conductance of solutions

			CO8	Determination of redox potential and emf of solutions
			CO9	Determination of the rate constant of acid
			CO1	Write programs on structures and unions.
			CO2	Implement Stacks, Queues and circular queues using arrays.
	9EC61	Data Structures Using C Lab	CO3	Write programs to implement basic operations on various types of linked list.
			CO4	Implement insertion and traversal operations on binary search tree
			CO5	Develop programs on various searching, sorting algorithms.
			CO1	Use various types of conventional manufacturing Processes
	ODC(1	Workshop/Manufact	CO2	Manufacture components from wood, MS flat, GI Sheet etc. – hands on experience
	98001	uring Processes Lab	CO3	Manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc.
			CO4	Produce small devices / products /appliances by assembling different components
	9HC15	Complex Analysis, Probability And Statistics	CO1	Basic concepts of Complex Analysis and conformal mapping and their properties.
			CO2	Series expansion of a function using Taylor's and Laurent's series. Evaluation of definite integrals and improper integrals.
			CO3	Concepts of probability and will able to solve problems on discrete and continuous probability distributions.
			CO4	Learn basic concepts of sampling distribution and able solve problems on estimation.
			CO5	Concepts of Control Charts
П-І А-22			CO6	Testing the hypothesis concerning to large size and small size samples also goodness of fit and independence of attributes using chi-square distribution.
			CO1	Gains exposure towards Python versions and their specifications.
			CO2	Build programs using primitive data types.
	9FC21	Python programming and Algorithms	CO3	Write applications that include functions, modules, packages along with respective exceptional handling mechanism.
			CO4	Writes applications using OO features of Python
			CO5	Write applications using Files.
			CO6	Hands on exposure on NumPy/Tkinter/Plotpy modules.
	9HC05	Environmental Science and Ecology	CO1	Understand about ecosystem and energy flow among the organisms.

			CO2	Know the resources available, use of them and overexploitation of the resources in the nature.
			CO3	Learn the value, use and value of biodiversity.
			CO4	Understand the causes and effect of pollution and implement measures in control of pollution.
			CO5	Understand the sustainable development and implement green technology for sustainable development
			CO6	Learn and implement policy to protect the environment.
			CO1	Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
			CO2	Helps in understanding organization behavior, personality determinants and other key aspects
	9ZC01	Economics, Accountancy and Management Science	CO3	Infers the need to understand the importance of Strategic management and Business environment in particular
		Management Serence	CO4	Enrich students with basic concepts of Financial Accounting.
			CO5	Understand basic concepts of Depreciation and need for preparing trial balance.
			CO6	Helps in preparation of Financial Statements (final accounts).
	9B306	Thermodynamics	CO1	The students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions
			CO2	Students can evaluate changes in thermodynamic properties of substances
			CO3	The students will be able to evaluate the performance of energy conversion devices
			CO4	The students will be able to differentiate between high grade and low grade energies.
			CO5	The students will be able to use property table and Mollier charts to evaluate properties of steam at different states.
			CO6	The students will be able to analyze and evaluate the performance of basic thermodynamics cycles
			CO1	identify crystal structures for various materials including metals and alloys and understand the impact of defects in such structures at atomic scale.
	9B307	Materials Science and Metallurgy	CO2	understand fracture modes in failure of the industrial components during their service and failure under fatigue conditions.
			CO3	acquire the knowledge of finding number and amounts of phases, by using Lever Rule, draw and analyze the phase diagram for different binary alloys; concept of nucleation, growth of crystals and application of some cast and wrought non-ferrous metals/alloys used in industry.

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			CO4	acquire the knowledge of industrially important Fe-Fe ₃ C phase diagram, various cast irons, steels and their applications in industry
			CO5	acquire the knowledge of different industrial heat treatment processes for steels; Surface hardening processes, how mechanical properties could be altered by implementing various heat treatment processes.
			CO1	Understand the principles and requirements of the machine drawings.
			CO2	Understand the various symbols used in machine drawing.
		Machine Drawing and	CO3	Understand the principles and requirements of various Assembly drawings.
	9B308	Computer aided	CO4	Drawing of different machine components
		Drawing Fractice	CO5	Imagine and drawing the assembly by seeing the components given.
			CO6	Ability to understand the existing geometric modeling and develop a geometric modeling for a new component in design process
		Metallurgy Lab & Mechanics of Solids Lab	CO1	acquire the knowledge of preparation of samples for metallurgical study.
	9B363		CO2	acquire the knowledge of preparation of sample for metallurgical study of a plain carbon steel, cast iron, alloy steel, heat treated steel and their interpretation.
			CO3	acquire the knowledge of preparation of sample for metallurgical study of nonferrous metal/alloy and interpretation
		Fuels and Lubricants	CO1	To determine the flash and fire point using Abels Apparatus
			CO2	To determine the flash and fire point using Pensky Martens Apparatus
	9B364		CO3	To determine the Viscosity using Saybolt Viscometer
		Lab	CO4	To determine the Calorific value using Bomb Calorimeter
			CO5	To determine viscosity using red wood viscometer
			CO6	To detremine Calorific value using Junkers Calorimeter
		Commehonsive test	CO1	Comprehend the concepts in the core and elective courses.
	9B393	and Viva-voce-III	CO2	Exhibit technical knowlegde to face interviews.
			CO3	Exhibit life long Learning skills for higher education and to persue Professional practice.
			CO1	Deliver lecture on emerging technologies.
			CO2	Explain domain knowledge to resolve real time technical issues
	9B387	Technical Seminar III	CO3	Demonstrate ability to lead and explain concepts and innovative ideas.
		[CO4	Demonstrate team leading qualities.
			CO5	Demonstrate public speaking skills.

			CO6	Exchange new information that would not have been available otherwise.
			CO1	Understand the fundamentals of electrical engineering and DC machines.
			CO2	Understand the principles of AC circuits.
	9AC48	Elements of Electrical & Electronics	CO3	Understand the principle and operation of three phase induction motor and measuring instruments.
		Engineering	CO4	Understand the principle and operation of diode
		6 6	C04	Understand the principle and operation of transistor
			CO3	Understand the principle and operation of transistor.
			00	Understand the principles of digital electromics
			CO1	constructing objects, and classes. Write programs using classes, objects, members of a class and the relationships among them needed for a specific problem.
			CO2	Identify the purpose and usage of principles of inheritance and polymorphism. Implement concepts of polymorphism, encapsulation and methodoverloading
	9EC41	Java Programming	CO3	Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifiers, automatic documentation through comments)
			CO4	Students understand and implement error exception handling and multi-threading.
II-II-A-22			CO5	Students learn to create GUI for the specificapplications.
			CO6	Write programs for event-handling using various user interface components on applets.
	9HC17	Universal Human Values	CO1	This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values.
			CO2	Understanding Harmony is designed which may be covered in their III or IV semester. During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.
			CO1	Select moulding material, pattern and calculate pattern allowances used in casting and design the gating system and Design a suitable riser for the casting and decide specific casting type for a defect free product
	9B409	Manufacturing	CO2	Distinguish between different forming processes and Analyze the forces and power consumed in rolling operation
		Processes	CO3	Decide the specific forging/ extrusion process for making a part and identify the specific defects if any in the process
			CO4	Suggest the sheet metal process for making a part and decide the processing technology for a particular type of plastic.

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			CO5	Propose the type of welding joint and specific welding process for an application and estimate the effect of process variables on arc welding
			CO6	Choose appropriate technique for making discrete parts and opt the specific plastic processing method based on type of plastic.
			CO1	understand the basic concepts of mechanism, types of mechanisms and inversions difference between machine mechanism and structure.
			CO2	understand velocity and acceleration diagram in order to evaluate the inertia forces in mechanism and machines.
	9B410	Kinematics of	CO3	understand concept of steering gear mechanism, types and Hooke's joint with respect to an automobile.
	90410	Machinery	CO4	In order to understand and design complex motions possible out of comes and followers.
			CO5	understand the concept pf toothed gears and selection different types of gear trains in order obtain required velocity ratios.
			CO6	understand transmission power by various means like belts, rope and chains and their advantages and limitations.
	9B411	Fluid Mechanics and Hydraulic Machinery	CO1	understand the fluid properties and measurement of pressure with monometers.
			CO2	Understand the classification of fluid, Bernoulli's equation, momentum equation and their applications
			CO3	understand Reynolds's experiment, major losses, minor losses
			CO4	understand velocity triangle, work done calculations, elements of Hydroelectric power plant, pump storage plant.
			CO5	Understand the classifications of turbines working principles of turbines, draft tube theory, performance of turbine.
			CO6	Understand various types of pumps working principle of reciprocating pump, centrifugal pump, performance characteristics of centrifugal pump.
			CO1	enhance oral communication skills
			CO2	develop the skill of speaking extemporaneously
	00002	G - G (1 11)	CO3	enrich their vocabulary and subsequently hone their verbal aptitude
	9HC03	SOIT SKIIIS	CO4	learn to make formal presentations both online and offline.
			CO5	learn to listen and comprehend well
			CO6	learn the nuances of the art of group discussion
			CO1	enhance oral communication skills
	9HC63	Soft Skills Lab	CO2	develop the skill of speaking extemporaneously
			CO3	enrich their vocabulary and subsequently hone their verbal aptitude

			CO4	learn to make formal presentations both online and offline.
			CO5	learn to listen and comprehend well
			CO6	learn the nuances of the art of group discussion
			CO1	Understand the fundamentals of electrical engineering and DC machines.
			CO2	Understand the principles of AC circuits.
	9AC95	Electrical & Electronics	CO3	Understand the principle and operation of three phase induction motor and measuring instruments.
		Engineering lab	CO4	Understand the principle and operation of diode.
			CO5	Understand the principle and operation of transistor.
			CO6	Understand the principles of digital electronics
		Manufacturing Processes Lab	CO1	Make a pattern preparation of sand mould and cast the part
			CO2	Perform welding operation under different conditions and test the quality of the weld
	9B465		CO3	Make use of plasma technique for accurately cutting metals and also perform brazing operation
			CO4	Identify the various press working operations and various parts of hydraulic press and perform operations
			CO5	Choose the appropriate plastic molding method to manufacture a plastic product
			CO1	compute the performance of pelton wheel under working conditions
			CO2	compute the performance of francis turbine under working conditions
	00466	Fluid Mechanics and	CO3	compute performance of reciprocating pump under working conditions
	96400	Lab	CO4	compute the Performance of centrifugal pump under working conditions
			CO5	compute the Performance of multistage pump under working conditions
			CO6	compute the coefficient of discharge of venturimeter of orifice meter under working conditions
			1	Comprehend the concepts in the core and elective courses.
	9B494	Comprehensive test and Viva-voce-IV	2	Exhibit technical knowledge to face interviews.
			3	Exhibit lifelong Learning skills for higher education and to persue Professional practice

			CO1	The students will be able to understand cyber-attacks, types of cybercrimes.
			CO2	Realize the importance of cyber security and various forms of cyber attacks and countermeasures.
			CO3	Get familiar of cyber forensics.
	9FC24	Cyber Security (Grade Award)	CO4	Get familiar with obscenity and pornography in cyber space and understand the violation of Right of privacy on Internet.
			CO5	Cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks.
			CO6	Elucidate the various chapters of the IT Act 2008, power of Central and State Government to make rules under IT Act 2008.
			CO1	Compare the air standard, actual and the fuel-air cycles of Internal Combustion Engines.
III-I-A-20	8B512	Applied Thermodynamics-I	CO2	Classify IC Engines, understand the working principles of 2-stroke and 4-stroke cycles, draw valve and port timing diagrams and explain different engine subsystems.
			CO3	Understand the combustion process in S.I and C.I Engines, the phenomenon of knocking, factors affecting knocking, and different types of combustion chambers for S.I and C.I Engines,
			CO4	Understand the performance parameters, methods of measurement of brake and friction power and Draw the heat balance diagram.
			CO5	Understand the working principles of Roots blower, vaned blower, reciprocating compressor-single stage and multi-stage compression with inter cooling.
			CO6	Understand the working principles of centrifugal and axial compressors and draw the velocity diagram and calculate the Compressor Power input and efficiency.
			CO1	Understand the phenomenon of friction and in developing different applications like, brakes, clutches and dynamometers etc. [CO1]
			CO2	Understand the effect of precession motion on the stability of moving vehicles. [CO2]
	8B513	Dynamics of Machinery	CO3	Understand and development of speed controlling devices like flywheel. [CO3]
		internition y	CO4	Understand how to control speed in engines or turbines by governors. [CO4]
			CO5	Understand how to balance different systems, machines and engines. [CO5]
			CO6	Understand how to do analysis of different vibrating systems. [CO6]

			CO1	Understand the basic metal cutting process and parameters, Forces in metal cutting, various chips, tool materials, basic relations in metal cutting [CO1]
			CO2	Understand the thermal aspects of metal cutting, tool wear, tool life, various cutting tool materials and economic analysis of machining [CO2]
	8B514	Metal Cutting and Machine Tools	CO3	Understand the principle and working of lathe, shaping, planning, slotting machines and Drilling machines and estimate the machining time [CO3]
			CO4	Understand the principle and working of Milling machine and Broaching machine [CO4]
			CO5	Understand the principle and working of Grinding machine, Lapping and Honing machine [CO5]
			CO6	Understand the principle of Jigs & Fixtures and the principles of advanced machining processes[CO6]
		Design of Machine Members -I	CO1	 Use different theories of failure for designing machine members subjected to steady loads and fatigue loads.[CO1]
			CO2	• Use different criteria of failure for designing machine members subjected to fatigue loads.[CO2]
			CO3	 Develop ability to analyze, design and select shafts, keys, couplings, cotter and knuckle joints.[CO3]
	8B515		CO4	• Able to analyze and design the helical coiled and leaf springs.[CO4]
			CO5	· Identify the applications where Temporary (threaded and bolted) joint and permanent (riveted) joints are used for various applications - with attention to design requirements.[CO5]
			CO6	• able to design and analyze various Welded joints [CO6]
			CO1	Co1: Understand the types of Fluid Power Systems
			CO2	Co2: Understandthegain knowledge of Hydraulic System
	8B516	Fluid Power System(FPS)	CO3	Co3: Demonstrate varies control valves of Fluid Power Systems
		(Professional Elective-	CO4	Co4:Demonstrate Fluid Power Circuits
		- /	CO5	Co5: Understand the pneumatic Systems
			CO6	Co6: Understandthe typical Hydro-pneumatic Circuits for Industrial Applications
	8R517	Power Plant	CO1	Co1: Acquire the basics of sources of Energy and combustion processes
	8B517	Engineering(PPE)	CO2	Co2: Evaluate the details of Internal combustion engine Plants

			CO3	Co3: Demonstrate hydro Electric Power Plant
			CO4	Co4: Realize the significance of Non Conventional Energy plants
			CO5	Co5: Understand the working o nuclear power plant
			CO6	Co6: Explain the economics and environmental issues of various power plants
			CO1	CO1: Learns various OR methods and modeling of Job allocation with Linear program
		Operation	CO2	CO2: Analyze the transportation and Assignment models
	8 B 518	Research((OR)	CO3	CO3: Lear sequencing and Replacement models
	00010	(Professional Elective-I)	CO4	CO4: Understand theory of gaming and inventory model
			CO5	CO5: Demonstrate various waiting models and their limitations
			CO6	CO6: Understand the basics of dynamic programming
			CO1	CO-1: Understand the vehicle lay-out and body types
			CO2	CO-2: Comprehend the working of Clutch and gearing system
		Automotive Chassis (Professional Elective- I)	CO3	CO-3: Acquire the knowledge of Automatic transmission
	8B519		CO4	CO-4: Comprehend the working of driveline system
			CO5	CO-5: learn principles and types of steering and suspension system
			CO6	CO-6: Demonstrate the construction and working of brake, wheel and tyre assembly
	8ZC22	Basics of Entrepreneurship (Open Elective-I)	CO1	1. The students' will acquire basic knowledge on Skills of Entrepreneurship.
			CO2	2. The students' will understand the techniques of selecting the customers through the process of customer segmentation and Targeting
			CO3	3. Business Models and their validity are understood by the students'.
			CO4	4. The basic cost structure, Revenue Streams and the pricing strategies are understood by the students'.
			CO5	5. The students' will acquire knowledge about the project management and its techniques.
			CO6	6. The students' get exposure on marketing strategies and business regulations for the Start up.
			CO1	1. Gain knowledge relating to Economics, various sectors and its growth
		Basics of Indian	CO2	2. Will gain knowledge relating to various concepts of National income and related aggregates
	02023	Elective-I)	CO3	3. Students will learn about Indian Industrial policy and benefits of LPG to India
			CO4	4. Comprehend knowledge relating to Fiscal policy & Taxation system in India

			CO5	5. Learn about inflation & business cycles.
			CO6	6. Know about the BoP and its influence on economy.
			CO1	1. The students gain the knowledge on the inputs required for design thinking and also gain familiarity on concepts related to design thinking.
			CO2	2. The students learn the techniques of idea generation
	8ZC08	Design literacy and Design Thinking(Open	CO3	3. The students gain knowledge on different phases of design thinking
		Elective-I)	CO4	4. The students realize the product design process.
			CO5	5. The students gain familiarity on design thinking for service design.
			CO6	6. The students gain knowledge on various cases related to design thinking.
			CO1	1. Describe the new dimensions and products served by the banking system in INDIA.
		Banking Operations, Insurance and Risk Management(Open Elective-I)	CO2	2. Explain the credit control system and create awareness on NPA's
	8ZC05		CO3	3. Apply the knowledge of Insurance concepts in real life scenarios
			CO4	4. Recognize the importance of regulatory and legal frame work of IRDA
			CO5	5. Identify the risk management process and methods.
			CO6	6. Calculate the diversity of risk and return
	8DC42	Fundamental of Digital Circuits and Microprocessors(Open Elective-I)	CO1	1. To understand number systems and apply the rules of Boolean algebra to simplify Boolean expressions using theorems and K-maps.
			CO2	2. To design combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters etc.
			CO3	3. To design basic memory units (latches and flip- flops) and sequential circuits
			CO4	4. To understand Architecture of 8086 and analyzing in single mode and in multi processor mode.
			CO5	5. To understand instructions of 8086 and to write Assembly Language Programs
			CO6	6. To interface I/0 devices with 8086.
			CO1	1. Students will learn basics of databases and understand the architecture of database management systems.
	8EC74	Database systems Concepts(Open	CO2	2. Students will learn about good database design techniques and database theories behind.
	oler1	Elective-I)	CO3	3. Understand conceptual database designs, and functional dependencies and normalization.
			CO4	4. Students will understand the Mathematical foundation for relational databases.

			CO5	5. Student will be able to understand concept of Constraints, Views and will be able to create dynamic databases.
			CO6	6. Learn transaction management, concurrency controls.
			CO1	1. Learn basic concepts of control systems.
			CO2	2. Study about time response analysis.
	84.646	Control System	CO3	3. Learn basic concepts of stability and root locus method.
	8AC46	Engineering(Open Elective-L)	CO4	4. Study about frequency response analysis.
			CO5	5. Learn basic concepts stability analysis in frequency domain.
			CO6	6. Learn fundamentals of state space analysis.
			CO1	1. Performance test on air compressor will make the student to analyze the performance of the compressor(CO1)
		Applied Thermodynamics Lab	CO2	2. Disassembly and assembly of I.C engine and Valve timing diagram will make the student understand the internal components and their functionality and study of boilers(CO2)
	8B568		CO3	3. Heat balance test and performance of four stroke single cylinder diesel engine and will make the student understand have the energy supplied to the engine (CO3)
			CO4	4. Vapour compression Refrigeration system and Air conditioning system will make the student understand the components and working of a refrigeration cycle(CO4)
			CO5	5. computerized IC engine and variable compression ratio engine performance will make the student understand have the energy supplied to the engine in distributed in a cycle.(CO5)
			CO6	6. Performance of four stroke petrol engine and Morse test will make the student understand have the energy supplied to the engine.(CO6)
		Machine Tools Lab	CO1	:Make simple products using lathe and covering various machining operations as per drawing
			CO2	Produce jobs as per drawing using shaper, PlanerandSlotter machines
	8B569		CO3	Understand the principle and working of Drilling machine and conduct various machining operations as per drawing
			CO4	Work on Tool & Cutter Grinding, Milling machine and conduct various machining operations as per drawing
			CO5	:Perform surface grinding operation and conduct alignment test on lathe and drilling machines
	8B570	KOM & DOM Lab	CO1	1) Understand the concept of vibrations, able to calculate the acceleration due to gravity and stiffness

			CO2	Understand concept of radius of gyration
			CO3	Draw the displacement diagram of cam and follower and study the characteristics of governor
			CO4	Understand the tensional vibrations
			CO5	Understand the gyroscopic effects and balancing of rotating masses
			CO6	Understand the pressure distribution in a journal bearing and critical speeds of shafts.
			CO1	Understand the concepts of state space representation and calculate time and space complexities of exhaustive search and heuristic search together.
			CO2	Apply AI techniques to solve problems of advanced searching techniques.
	95075	Artificial Intelligence(Grade Award)	CO3	Distinguish different knowledge representation techniques.
	8EC75		CO4	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks.
			CO5	Analyze different learning techniques and decision trees.
			CO6	Use techniques to represent domain knowledge of the expert systems.
III-II-A-20	8B62	Applied Thermodynamics-II	CO1	Understand steam power plants and the Rankine cycle on p-v, T-S and h-s diagrams
			CO2	Understand the working principles and basic design parameters of different types boilers.
			CO3	Understand the function of steam nozzle, Wilson line
			CO4	Understand the difference between impulse and reaction turbines, draw velocity diagrams and understand the Principle of operation of reaction turbine, features of Parsons reaction turbine and to draw the velocity diagrams for the same
			CO5	Understand the working principles of different condensers and understand the gas turbine power plants
			CO6	Understand the working principle of jet propulsion and rocket engines
	8B621	CAD/CAM	CO1	To apply geometric transformation techniques in CAD.

			CO2	2.Develop mathematical models to represent curves and surfaces and model engineering components using solid modelling techniques.
			CO3	3.Develop programs for CNC to manufacture industrial components.
			CO4	4. Learn group technologies concepts
			CO5	5. Demonstrate the FMS and computer quality control
			CO6	6. Address CIM and computer Aided manufacturing Resources Plans
			CO1	Design bearings and select appropriate bearings using bearing catalogs.[CO1]
			CO2	design parts of internal combustion engine[CO2]
	8B622	Design of Machine	CO3	derive design expression for spur and bevel gears [CO3]
		Members -II	CO4	design helical and worm gears [CO4]
			CO5	gain skills to design various pressure vessels.[CO5]
			CO6	Learn the application of statistical mathematics for machine design subject.[CO6]
	8B623	Heat Transfer	CO1	1. To demonstrate basic knowledge of heat transfer by understanding: differences between conduction, convection and radiation; Students shall be able to formulate basic differential equations for heat transfer; Students must able to understand the importance of thermal conductivity of materials.
			CO2	2. To deal with problems like conduction through walls and composite walls; critical radius of insulation; heat transfer in fins; Transient heat transfer.
			CO3	3. To Calculate of heat transfer coefficient; overall heat transfer coefficient; log-mean temperature differences.
			CO4	4. To differentiate forced and natural convection problems correlations; and demonstrate the use of Biot, Nusselt, Reynolds, Grashof, Rayleigh and Prandtl numbers; basic radiative heat transfer, basic principles of mass transfer.
			CO5	5. To make the students capable of employing the heat transfer principles during phase change processes in heat exchangers; To bring in confidence to apply the principles in industrial appliances and machinery like Power Plants, Heat Exchangers, coolers etc
			CO6	6. To understand basic principles of radiation heat transfer and radiation heat exchange between surfaces.
		Mechanical	CO1	1.Understand the causes and effects of vibration in mechanical systems & single degree freedom vibrations.
	8B624	VIDrations(MV)	CO2	2. learn methods to implement on SDF Vibrations
		CO3	3.Develop schematic models for physical systems and formulate governing equations of motion for two degree freedom system	

			CO4	4. Understand the role of multi degree in mechanical systems
		-	CO5	5. Analyze and design continuous vibration system
			CO6	6.Analyze rotating and reciprocating systems and compute critical speeds.
			CO1	CO1: Understand the Principle and applications of Air Refrigeration system
		PAC(Pefrigeration &	CO2	CO2: Demonstrate working of vapour compression Refrigeration System
	8B625	Air Conditioning)	CO3	CO3: Understand the various components of Refrigeration system
			CO4	CO4: Illustrate the vapour Absorption system
			CO5	CO5: Learn Principle and methods of basic Air conditioning system
			CO6	CO6: Gain knowledge Air conditioning Equipment's
		Unconventional Machining(UM) (Professional Elective- II)	CO1	Student will identify the problem faced in traditional metal cutting and come to an understanding of theneed for the development of Unconventional machining processes
	8B626		CO2	. Gain the knowledge of basic mechanism of various Unconventional machine processes namely UM and AJM related equipment, variables, advantages, limitations, applications.Given a set of physical, electrical and other parameters. Student can identify a suitable Unconventionalmachining process.
			CO3	Understand the learn various Thermal material Removing processes
			CO4	4. Understand the Acquire Knowledge in chemical Remaining processes
			CO5	5. Understand the demonstrate working of chemical material remaining process
			CO6	6. Understand the significance of micro machine
			CO1	CO-1: Understand the constructional details and combustion in automotive engines
		Automotive Engines (Professional Elective- II)	CO2	CO-2: Describe the principle and functions of an automotive fuel engine systems
	8B627		CO3	CO-3: Understand the role of senses and Activations inAutomotives
			CO4	CO-4: Analyze engine measurements and performance characteristics for Engines with cooling and vibration
			CO5	CO-5: Discuss the concepts and working of charging
		CO6	CO-6: learns types and working of unconventional Engines	

			CO1	The Students' gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
			CO2	The Students are exposed to the various business models and critically evaluating the effectiveness of the business models and products
	87(23	Advanced Entrepreneurship	CO3	The students understand the method of business traction, create roles and build their A- team
	02023	(Open Elective-II)	CO4	The students understand the various channels of revenue building and exploration of new revenue avenues.
			CO5	The students understand the need of sales planning and people plan and also financial modeling
			CO6	The students are exposed to the legal implications affecting the company's prospects and identifying right mentors and advisors to support start ups
		Basics of Polity (Open Elective-II)	CO1	1. Gain knowledge relating to the Indian Constitution and the Preamble to the Constitution.
	8ZC26		CO2	2. Gain knowledge relating to the fundamental rights and duties of the Indian citizens and the directive principles of state policy.
			CO3	3. Students will learn about the federal structure and judiciary of India.
	8ZC09	Co-Creation and Product Design (Open Elective-II)	CO1	1. The students gain the knowledge on the inputs required for human centric design thinking the students learn the techniques of idea generation.
			CO2	2. The students gain knowledge on exploring the different phases of Ideation process.
			CO3	3. The students grasp the awareness on emerging technologies and understand 3d printing in manufacturing.
			CO4	4. The students gain familiarity on development of prototypes.
			CO5	5. The students understand reverse engineering methods in product development.
			CO6	6. The students have access to information on IPR, and patent application.
			CO1	1. Students will understand the nature of Entrepreneurship andits importance
		Entrepreneurship	CO2	2. Will gain knowledge regarding project, its life cycle and organization
	8ZC19	Project Management and Structured Finance	CO3	3. Will gain knowledge relating to project formulation and implementation
		(Open Elective-II)	CO4	4. Comprehend the components of structured finance
			CO5	5. Establish a framework of CMBS
			CO6	6. Students will gain knowledge relating to the CRE Servicing

		Introduction to VLSI Design (Open Elective- II)	CO1	i. Design and verify basic logic gates
	8DC43		CO2	ii. Draw layouts for a digital circuit for a specified technology and verify design rules and validate them.
			CO3	iii. Design schematics for the digital sub systems.
			CO1	1. Describe the basic functionalities and structure of the OperatingSystem
			CO2	2. Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.
	8EC76	Operating Systems Concepts (Open	CO3	3. Comprehend the concepts of Synchronization and Deadlocks in the Operating System
		Elective-II)	CO4	4. Discuss the concepts of Memory Management (Physical and Virtualmemory)
			CO5	5. Explain the concepts of File System with regard to directory and disk management algorithms.
			CO6	6. Students understand the concepts of I/O systems, protection and security in a case study
	8AC36	Special Machine s (Open Elective-II)	CO1	1. To impart knowledge on Construction, principle of operation and performance of synchronous reluctance motors.
			CO2	2. To impart knowledge on the Construction, principle of operation, control and performance of stepping motors.
			CO3	3. To impart knowledge on the Construction, principle of operation, control and performance of switched reluctance motors.
			CO4	4. To impart knowledge on the Construction, principle of operation, control and performance of permanent magnet brushless D.C. motors.
			CO5	5. To impart knowledge on the Construction, principle of operation and performance of permanent magnet synchronous motors.
			CO1	Draw computer Aided 2D drawings to solve design and manufacturing problems using CAD CAM principles.
			CO2	2. Acquire skills of developing geometric modelingof 3D components
	8B671	CAD/CAM Lab	CO3	3. Developing assemblies different machine elements and import and export CAD models one software to anther software
			CO4	4. Learn skills of writing CNC part programming.
			CO5	5. Understand how to machine simple components on CNC lathe and CNC mill
		CO6	Understand how to simulate the articulated robot and Fabricate simple components on 3D printing machine	

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			CO1	1. Compute the thermal conductivity of a given material rod and composite wall understand the physical significance of the thermal conductivity of the given material.(CO1)
			CO2	2. To calculate thermal conductivity of lagged pipe and insulating powder under given conditions.(CO2)
			CO3	3. To Understand the forced ad free convection heat transfer coefficients under given conditions from fundamentals.(CO3)
	8B672	Heat Transfer Lab	CO4	4. Understand the LMTD for parallel flow and counter flow heat exchangers and overall heat transfer coefficient.and pinfin apparatus. (CO4)
			CO5	Understand theemissivity of a given surface and to calculate Stefan-Boltzmann's constant experimentally.(CO5)
			CO6	Understand the phenomena of pool boiling and to draw the boiling curve by showing different phases of boiling.and study the heat pipe (CO6)
	8B673	Group Project	CO1	• Students use the concepts learned in the courses, so far, in conceptualizing, designing and executing the projects.
			CO2	• Enables to apply modern tools and technologies for project works
			CO3	• Inculcates an enthusiasm to use the creative ideas to execute projects to meet the current needs of the society.
			CO4	• Enhances communicative skills and team work
			CO5	• The students learn the ability to work as an individual with multidisciplinary approach
			CO6	
			CO1	1. Perform well in Technical interviews
	8B695	Comprehensive Viva-	CO2	2. Apply knowledge in building their career in particular fields.
		voce-II	CO3	3. Enhance their communication skills and interactive- ness.
			CO1	Student demonstrate the basic knowledge in robotic systems their classification and application areas
			CO2	Student demonstrate the Robotic Kinematic Models and its importance
IV-I-A-20	8B722	ROBOTICS	CO3	Student demonstrate the Robotic dynamically models
			CO4	Student demonstrate the ability to plan trajectories in the presence/absence of obstacles
			CO5	Student learn the control system concepts and their application in robotics through linear and nonlinear control schemes

			CO6	Student understand commonly used sensory and vision systems used in robotics
			CO1	Understand the Additive manufacturing processes and their relationship with subtractive manufacturing
			CO2	Demonstrate comprehensive knowledge of the broad range of liquid based rapid proto type processes, devices, capabilities and materials that are available
			CO3	Demonstrate comprehensive knowledge of the broad range of liquid based rapid proto type processes, devices, capabilities and materials that are available
	8B723	MANUFACTURING PROCESSES	CO4	apply the principles of casting in Additive manufacturing systems
			CO5	Articulate the various tradeoffs of Additive manufacturing softwares / data format that must be made in selecting advanced/additive manufacturing processes, devices and materials to suit particular product requirements
			CO6	Learn various applications of additive manufacturing, such as in architecture, art, health care direct part production and mass customization
	8B724	MECHATRONICS(Profe ssional Elective-I)	CO1	able to understands the significance of integration of mechanical, electronics, control and computer engineering and also focuses the role of sensors
			CO2	able to learn the complete theory of various sensors
			CO3	be able to get skill to select appropriate actuators for different applications
			CO4	become proficient in building linear models of mechatronics
			CO5	become proficient in the programming of microcontrollers
		DESIGN AND ANALYSIS OF	006	able to demonstrate PLCprogramming
			CO1	Demonstrate history, role, principle and steps of experimentation
	00705		CO2	Apply concepts of Probability and statistics in design of experiments
	88725	EXPERIMENTS(Profess	CO3	learn various DOE techniques
		ional Elective-I)	CO4	Develops experiment design based on Taguchi method
			CO5	Analyses the experimental data of various experiments
			CO6	Solve multi response problems using DOE approaches
		OPERATIONS	CO1	Formulate and solve mathematical model (linear programming problem) for a physical situations like production, distribution of goods and economics.
	8B726 (Professiona I)	(Professional Elective- I)	CO2	Recognize and solve the problem of transportation involving a large number of shipping routes with least transportation cost and generate optimal assignment strategy for different situations

		CO3	Use Johnson's rule to create the optimal sequencing schedule for a sequencing problem and make decisions about replacing an item using replacement policy
		CO4	Design and analyze different optimal strategies to win the game, justify the games using minimax or maximin principle to compute the value of the game using various rules.
		CO5	Analyze the performance measures of Queuing system and calculate the EOQ for minimizing the total inventory cost
		CO6	Apply simulation techniques for solving various types of problems and general idea development about Markov chains
		CO1	Explain the compressible flow phenomena in turbomachine components
		CO2	Understand the steady and unsteady flow phenomena in tucts
8B727	MACHINERY(Professio	CO3	Perform simple aerodynamic designs using eulers equations etc
		CO4	Explain the working steam turbines
		CO5	Understand gas turbine combustor principles and challenges
		CO6	Discuss jet propulsion technologies
		CO1	Know the different approaches of synthesis of nanomaterials, gain in depth of knowledge which will be helpful to them in their career to go forward successfully in the field of nano science and nanotechnology
		CO2	Learn about different physical and chemical methods for synthesis of nanomaterials
8B728	rofessional Elective-I)	CO3	Characterization of nanomaterials by using SEM, TEM, AFM, STM
		CO4	Characterization of nanomaterials by using XRD, FTIR, UV visible spectroscopy, Rama spectroscopy.
		CO5	Applications of carbon based nanomaterials
		CO6	Applications of nanomaterials in electronics, medicine, mechanical engineering.
		CO1	to understand the history of AI and uninformed search Method
Artificial Intelligences	CO2	to demonstrate informed search graphs, rule and pruning & Evaluation methods	
8B729	(AI) for Mechanical 8729 Engineering (Professional Elective- II)	CO3	to demonstrate KR and KR&R through propositional logics and FOL
		CO4	To learn how to use BN, BNN, MDN in decision making
		CO5	Learn various techniques for planning and sequential decision problem
		CO6	brief out the basics of ML, SL,RL and CNN

	8 B 730	POWER PLANT ENGINEERING	CO1	Understand and describe the various available sources of energy, and the basic Steam power plant layout including the coal and ash handling equipments.
			CO2	Discuss and classify the types of coals, coal feeding stokers and other accessories.
			CO3	Define and elaborate the understanding of the previously learn concepts to basics of Diesel Power Plant, Gas turbine plant and their auxiliaries.
		(Professional Elective- IV)	CO4	Gain the knowledge regarding Equipment, Plant layout, working principle of Hydroelectric Power plants, and able to draw hydrological cycle, Hydrographs etc.
			CO5	Familiarize with the Concepts of various nuclear reactors.
			CO6	Apply the established models of Economics in Power plant engineering.
	8B731	Production Planning and Control (Professional Elective- II)	CO1	Understand production systems and their characteristics to evaluate MRP and JIT systems against traditional inventory control systems
			CO2	Analyze aggregate planning strategies
			CO3	Apply forecasting and scheduling techniques to production systems. Understand theory of constraints for effective management of production systems
			CO4	Understand production systems and their characteristics to evaluate MRP and JIT systems against traditional inventory control systems
			CO5	Analyze aggregate planning strategies
			CO6	Apply forecasting and scheduling techniques to production systems. Understand theory of constraints for effective management of production systems
		ADVANCED MATERIALS AND PROCESSING(Professio nal Elective-II)	CO1	Classify manufacturing processes
			CO2	Understand principles of casting and solidification
			CO3	Understand manufacturing of porous powder metallurgical products
	8B732		CO4	Utilize forming and processing technologies to shape metals and ceramics
			CO5	Understand the role of ceramics and composites in industrial applications
			CO6	Analyse the processing and defects of ceramics and polymers
			C01	Classify Non-Destructive Testing (NDT) methods
		TESTING OF	CO2	Understand principles of various NDT methods
	8B733	MATERIALS (Professional Elective- III)	CO3	Understand TECHNIQUES OF ULTROSONIC and thermography
			CO4	Gain knowledge in radiography
			CO5	Demonstrate the Acoustic methods
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			CO6	Learn now to interpret the various techniques used in various case studies
			CO1	Attain the basic techniques of quality assessment, fundamental knowledge of statistics and probability and Use control charts
		QUALITY AND	CO2	learn principles of DOQ design for quality
	8B734	RELIABILTY ENGINEERING (Brofossional Elective	CO3	Use reliability concepts to analyze for improving the process quality
		(Professional Elective-	CO4	Describe various methods to asses reliability determination
			CO5	Acquire basic knowledge of reliability management
			CO6	Understand the concepts of risk management
			CO1	Understand of solar energy, working principle of various solar energy and hybrid wind energy systems.
		RENEWABLE ENERGY	CO2	Apply the concept of bio-energy, develop different types of biofuels, biochemical.
	8B735	AND ENERGY	CO3	Design and develop different types of Biogas Plants and its applications.
	00733	(Professional Elective- III)	CO4	Estimate wind energy and wind energy conversion system.
			CO5	Demonstrate different renewable energy sources like Geothermal, Tide and Wave Energy.
			CO6	Illustrate the knowledge on production and application of Hydrogen Energy and fuel cell.
			CO1	Apply structural approach to concept generation, selection and testing
			CO2	Understand various aspects of design such as industrial design, design for manufacture
	00720	PRODUCT DESIGN	CO3	Economic analysis and product architecture
	80/30	(Professional Elective-	CO4	Apply structural approach to concept generation, selection and testing
			CO5	Understand various aspects of design such as industrial design, design for manufacture
			CO6	Economic analysis and product architecture
			CO1	Identify the national and international standards pertaining to machine drawing
	PROD	PRODUCTION	CO2	Apply limits and tolerances to assemblies and choose appropriate fits
	8B776	DRAWING PRACTICES	CO3	Recognize machining and surface finish symbols.
		LAB	CO4	llustrate various machine components through drawings.
			CO5	Examine assembly drawing by seeing the components given
	00	INSTRUMENTATION	CO1	Experimentation on the pressure gauge and analyzing the performance of the pressure gauge
	ōð///	LAB	CO2	Examining the working of the transducer for temperature measurement.

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			CO3	Evaluate the LVDT transducer for displacement measurement and Assess displacement
			CO4	Examining the temperature by the strain gauge method.
			CO5	Testing the capacitive transducer for angular measurement.
			CO6	Evaluating the performance of loadcell and comparing experimental& theoretical values
			CO1	<i>Apply</i> finite element method to <i>solve</i> static and dynamic analysis problems
			CO2	of 1D,2D trusses, beams with different boundary conditions
	8B778	CAE LAB	CO3	Develop finite element method to solve plane stress, axi-symmetric solids three dimensional problems with different boundary in solid mechanics.
			CO4	<i>Generate</i> finite element method to <i>solve</i> steady state heat transfer analysis of a composite wall and a Fin with different boundary conditions.
			CO1	Students use the concepts learned in the courses, so far, in conceptualizing, designing and executing the projects
	8B779 PROJECT-I		CO2	Enables to apply modern tools and technologies for project works
		8B779 PROJECT-I	CO3	Inculcates an enthusiasm to use the creative ideas to execute projects to meet the current needs of the society
			CO4	Enhances communicative skills and team work
			CO5	The students learn the ability to work as an individual with multidisciplinary approach
			CO1	Understand the concepts and applications of composite materials
		Mechanics Manufacturing	CO2	Analyze micro mechanical behaviour of a lamina
	8B837	Methods of Composite Materials	CO3	Learn matrix tranformation for stress and strain in composites
		(Professional Elective-	CO4	Analyze Elastic behavior of composites
		(· · · · · · · · · · · · · · · · · · ·	CO5	Develop governing equations for bending strength evaluation in laminated plates
IV-II A-20			CO6	Gains knowledge of manufacture of composites
10-11 A-20		DESIGN AND	CO1	Understand the principles of materials selection and design
	00000	ANALYSIS OF ENGINEERING	CO2	Design components using appropriate attribute limits and material indices
	00000	MATERIALS (Professional Elective-	CO3	Establish the criteria for material qualification and acceptance.
		IV)	CO4	Apply design principles for manufacturing of different engineering components
	8B839	AUTOMOBILE	C01	dentify front wheel drive, rear wheel drive and four wheel drive

	ENGINEERING (Professional Elective-		CO2	Outline the fuel systems like petrol injection system and diesel injection system
		IV)	CO3	Classify the thermo, water, forced circulation system and Understand the ignition system
			CO4	Understand the various emission standards and Outline various Electrical starting systems
			CO5	Understand about clutches and Distinguish single plate clutch, multi plate clutch, wheels, tyres and differential gear box
			CO6	Know the steering geometry – Ackerman steering mechanism and Davis steering mechanism toe-in, and to know the objects of suspension system
			CO1	Understand abrasive and electrical discharge machining processes
		Advanced	CO2	list the advances in casting
	8B840	Manufacturing Processes	CO3	learn principles and applications of electron beam, ion beam and laser hybrid welding processes
		(Professional Elective- IV)	CO4	apply advanced forming processes to manufacture mechanical products
			CO5	Understand the advantageous of micro fabrication
			CO6	realize the importance of nano fabrication
			CO1	Understand Evaluation and applications of FMS
	FLEXIBLE MANUFACTUR 8B841 VISION	FI FXIBI F	CO2	Understand Machining centers and FMS layouts
		MANUFACTURING	CO3	Design and analyze FMS material handling systems
		SYSTEMS & MACHINE VISION (Professional Elective- V)	CO4	Understand tool management and scheduling tools in FMS
			CO5	Identify the role of computers in FMS and machine vision and evaluate the performance of FMS
			CO6	Analyze case studies a typical FMS
			CO1	Basics of optimization, considerations relevant to mechanical / structural systems
		DESIGN	CO2	Concepts and methods for single-variable unconstrained and constrained optimisation
	8B842	(Professional Elective- V)	CO3	Concepts and methods for multi-variable unconstrained and constrained optimization
		- /	CO4	Techniques for nonlinear optimization
			CO5	Advanced optimization techniques
			CO6	Optimisation of complex mechanical elements
			CO1	Derive the thermal efficiency of gas turbine cycle and working of gas turbine plant.
	8B843	JET PROPULSION and ROCKET ENGINEERING		Determine the performance evaluation, thrust augmentation Of turbo jet engines.
	(Professional Elective- V)	(Protessional Elective- V)	CO3	DISCUSS the plant layout of Ramjet , principle of operation
		CO4	understand liquid propellant Rocket engines, compassion of propulsion systems.	

			CO5	Describe the flight mechanics and applications of trust profiles, analyze the rocket heat transfer and ablative to cooling
			CO6	APPLY the concepts in criogenics, advanced propulsion systems, elementary treatment of Electrical Nuclear and Plasma Arc propulsion
			CO1	gain knowledge on using numerical techniques
			CO2	Understand various applied numerical methods to solve fluid flow problems
	888 <i>44</i>	COMPUTATIONAL FLUID DYANAMICS	CO3	understand and apply finite volume method to solve heat transfer problems
	00044	(Professional Elective- V)	CO4	know application of finite volume method and fundamentals of fluid flow modeling
			CO5	right fluid flow governing equations, momentum and energy equations apply to fluid flow problems
			CO6	gain knowledge about different algorithms
		CARBON BASED NANOSTRUCTURES AND THEIR ABBLICATIONS	CO1	To investigate and formulate method to use carbon nanotubes as active components in organic electronic devices
			CO2	To explore methods of synthesis to obtain SWNT with desired characteristics
	8B845		CO3	To understand the dependence of the performance of the nanotubes based transistors on the nanotube bundle geometry
	(Professional Elective-	(Professional Elective- V)	CO4	Apply the knowledge acquired for synthesis of CNTs by various methods.
			CO5	Carry out research in the areas of lithium, hydrogen adsorption and energy storage
			CO6	Pursue research on nano-chip, applications leading to communications and aerospace
			CO1	Students use the concepts learned in the courses, so far, in conceptualizing, designing and executing the projects
	8B881 PROJECT -II	CO2	Enables to apply modern tools and technologies for project works	
		PROJECT -II	CO3	Inculcates an enthusiasm to use the creative ideas to execute projects to meet the current needs of the society
			CO4	Enhances communicative skills and team work
		CO5	The students learn the ability to work as an individual with multidisciplinary approach	





Course Outcomes of ECE Department





Department of Electrical & Communication Engineering

COs for A22-1st Year and 2nd Year, A20-3rd year and 4th Year courses/subjects

Year and regulation	Course code	Course name	Co's		
			CO1	Explain semiconductor behavior, types and their applications	
			CO2	Differentiate the wave and particle, and its application for a particle	
			02	in one dimension box	
			CO3	Explain about emission, its types, laser principle and applications of	
		Engineering		optical fibers (sensors and medical endoscopy)	
	9HC07	Physics	CO4	Reveals about the magnetism-its origin and types and its	
				Explain the basic concepts of dielectric materials polarization and	
			CO5	its types, their applications (piezo, ferro and Pyro electricity).	
			001	Summarize nano& bulk concepts, surface to volume ratio and its	
			006	applications.	
			CO1	Explain basic fundamentals of Computer Systems , computing	
			001	environments, Computer Languages – Machine Languages	
			CO2	Describe C language Programs, Structure of a C Program	
	9FC01	Problem Solving	CO3	Describe write programs using control structures such as Pre-test	
		using C	<u> </u>	Write programs implementing application on arrows	
		_	C04	Write programs using Pointers and string handling functions	
			CO6	Write programs using Founters and string handling runctions	
			G01	Check the consistency or inconsistency of a linear system and can	
			COI	solve the problems.	
		MATRIX ALGEBRA AND CALCULUS	CO2	Find the Eigen values and Eigen vectors and can solve the problems	
I-I & A22 9E			002	associated with these concepts.	
			CO3	Find the nature, index and signature of the quadratic form.	
	011C11		CO4	Verify the applicability of mean value theorems and also can	
	90011		C04	and Maclaurin series	
			CO5	Find the solutions of first order first degree differential equations	
				and solve the problems on Newton's law of cooling, Natural growth	
				and decay.	
			CO6	Solve higher order ordinary differential equations with constant	
				coefficients using some standard methods.	
			CO1	language fluency	
			CO2	State the definition of nouns verbs adjectives and adverbs	
		Essential English	CO3	Identify the differences of each tense and use the tenses accurately.	
	9HC01	Language Skills	CO4	Identify specialized reading strategies for specific types of texts	
		(FFLS)	CO5	Produce written work that is substantive, organized, and	
		(LLLS)	005	grammatically accurate.	
			CO6	Demonstrate competence with suitable accuracy in vocabulary, and	
			-	Insugage fluency.	
			CO1	and draw various type of curves used in engineering	
				Understand and Implement Orthographic projections and draw	
	9BC01		CO2	projections of simple drawing entities such as points Lines, and	
				Planes	
		Engineering	CO3	Draw projections of different types of regular solids in various	
		Engineering	COS	positions wrt principal planes of projection	

		C		Drow Castions of vorious Calida in Indian O lind
		Graphics	CO4	braw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.
			CO5	Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views
			CO6	Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software
			CO1	Describe people, objects and situations using simple sentences.
		Oral	CO2	Use appropriate tenses and expressions in different contexts of conversations.
	9HC61	C 61 Communication Lab-I	CO3	Identify major areas of concern in their oral communication and address them.
			CO4	Create a SMART plan to enhance their communication skills in English
			CO1	Demonstrate the wave length of monochromatic source of light by using Newton's Rings
		Engineering	CO2	Analyze refractive index of a material prism and Dispersive power of a glass Prism by using spectrometer
	9HC66	Physics Lab	CO3	Determine the wave length of spectral light and laser Source of light by using Diffraction Grating
			CO4	Design and Analyze RC Circuits
			CO5	Analyze RLC Series circuit and parallel circuit
		9FC61 Problem Solving using C Lab	CO6	Investigate magnetic Circuits
			COI	To formulate the algorithms for simple problems
			CO2	To translate given algorithms to a working and correct program
			CO3	To be able to correct syntax errors as reported by the compilers
			CO4	To be able to identify and correct logical errors encountered at run time
	9FC61		CO5	To be able to write iterative as well as recursive programs
			CO6	To be able to represent data in arrays, strings and structures and manipulate them through a program
			CO7	To be able to declare pointers of different types and use them in defining self referential structures.
			CO8	To be able to create, read and write to and from simple text files.
			CO1	To understand microscopic chemistry in terms of atomic and molecular orbitals
		ENGINEERING	CO2	To learn the preparation and applications of commercial polymers and lubricant materials
91 I-II& A22	90004	CHEMISTRY	CO3	To learn the industrial problems caused by water and municipal water treatment
			CO4	To acquire knowledge about different types of batteries and their working mechanism
			CO5	To develop the concepts and types of corrosion and the factors influence corrosion
			CO6	To understand the control methods and protective coatings for metals and other surfaces
			CO1	Design the programs using structures, unions and enum.
	9EC01	DATA	CO2	Demonstrate the concepts of Abstract data type and also applications of stacks and queues.
		STRUCTURES	CO3	Implement basic operations on single, double and circular linked list.

		CO4	Solve problems involving Binary Search trees and AVL trees.
		CO5	Articulate the concepts of graphs, heaps and hashing.
		CO6	Develop algorithms for various searching and sorting techniques and analyze their performance.
		CO1	Find the limits and test for the continuity and differentiability of a function.
		CO2	Solve the problems on multiple integrals.
	ADVANCED	CO3	Solve linear and nonlinear first order partial differential equations.
	CALCULUS	CO4	Find Series expansion a function defined over the intervals.
9HC12		CO5	Find directional derivative, gradient, divergence and curl of a function.
		CO6	Solve problems of line, surface and volume integrals.
		CO1	Understand the principle of different methods of electrical circuit reduction.
	Electrical Circuits	CO2	Understand the principle of single phase A.C circuits
	& Networks	CO3	Understand the principle of magnetic circuits
9AC42	Analysis	CO4	applications
		CO5	applications
		CO6	excitation
	Oral	CO1	Understand the nuances of striking a great conversation in formal and informal situations.
9HC62	9HC62 Communication Lab-II	CO2	Gain experience of facing an audience and speaking in public.
		CO3	Design a winning presentation and present it with ease.
		CO1	Preparation of Inorganic compounds
		CO2	Determination surface tension of a liquid
		CO3	Determination viscosity of lubricant
		CO4	Determination acid value of an oil
9HC64	Engineering	CO5	Estimation hardness of water
	Chemistry Lab	CO6	Analysis the amount of chloride content
		CO7	Determination of cell constant and conductance of solutions
		CO8	Determination of redox potential and emf of solutions
		CO9	Determination of the rate constant of acid
		CO1	Write programs on structures and unions.
	Data Structures	002	Implement Stacks, Queues and circular queues using arrays. Write programs to implement basic operations on various types of
9EC61	9EC61 Using C Lab	CO3	linked list.
		CO4	Implement insertion and traversal operations on binary search tree
		CO5	Develop programs on various searching, sorting algorithms.
	CO1	Use various types of conventional manufacturing Processes	
AD CIT	Workshon/Manuf	CO2	on experience
9BC61	acturing	CO3	Manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc.
	Processes Lab	CO4	Produce small devices / products /appliances by assembling different components

			CO1	Understand the operation of semiconductor diode
			CO2	Understand the Fundamentals of BJT operation,
			CO3	Understand the Fundamentals of SCR, JFET operation
II-I & A22	9CC01	Electronic Devices and	CO4	Onderstand the Analysis and design of Amplifier and
		Circuits		Understand the Basic regulator circuits and voltage
			CO5	multipliers
		-	CO6	Explore the vericus number systems
			00	An ability to understand number systems and apply the rules
			CO1	of Boolean algebra
		-	CO2	An ability to simplify of Boolean expressions using K-man
			CO3	An ability to design MSI combinational circuits
	9CC02	Digital Logic Design	CO4	An ability to design basic memory units
			CO5	An ability to design digital design using PLD's such as
			005	ROM's, PLA' s, PAL s.
			CO6	An ability to design digital controllers using Algorithmic
			<u> </u>	State Machine Charts.
		-	COI	Apply the orthogonality properties to understand Fouries
			CO2	series and Fourier Transforms.
			G02	Understand the concepts of systems, their characterization in
	90003	Circulture 1 Courterere	CO3	the Time as well as Transformed domains
	90003	Signals and Systems	CO4	Understand and apply the mathematical tools
			CO5	the sampling frequency for any low pass and band pass
			000	signals applying the sampling theorem.
			CO6	Distinguish between continuous and Discrete time signals
				Understand the concepts of Probability Understand concepts
	9C304	Probability Theory and Stochastic Process	CO1	of multiple random variables
			CO2	Understand concents of Discrete Random Variables
			<u> </u>	Understand concepts of multiple random variables
			005	Understand concepts of hiddiple random variables
			CO4	covariance and Auto-correlation
				Understand the concepts of Power Spectral Density Function
			CO5	of Random Process,
			GO 4	Understand the concepts of Random Signal Response of
			CO6	Linear Systems
			CO1	Use the Laplace transforms techniques for solving ODE's
			C03	Use the Z- Tranforms technique for solving Difference
			02	equations
		Transform Techniques	CO3	Form partial differential equations and find the solution to
	9HC14	and Numerical Methods		first order linear and nonlinear partial differential equations
			<u> </u>	Find the root of a given equation
			<u> </u>	Find the numerical solutions for a given ODE's
			000	This course also discusses their role in their family. It
				very briefly, touches issues related to their role in the
			CO1	society and the nature, which needs to be discussed at
				length in one more semester for which
		TT ' 1 TT		the foundation course named as "H-102 Universal Human
	9HC17	Universal Human		Values.
		values		in their III or IV semester. During the Induction Program.
			CO2	students would get an initial exposure to human values
				through Universal Human Values – I. This exposure is to be
				augmented by this compulsory full semester foundation
			CO1	course.
			COI	Assess themselves using SWO1 analysis
			CO2	management and goal setting
			<u> </u>	Improve their verbal ability to handle the competitive
			03	exams.
	9HC03	Soft Skills	CO4	Enhance their team skills and design thinking capabilities
				for effective problem solving and decision making
			CO5	Know their emotional quotient which guides their thinking,
				Equip themselves with the prerequisites and relevant
			C06	techniques to effectively attend corporate interviews
	90071		CO1	Identify, Specify and test R, L, C Components (Colour
	<i>J</i> (C/1		001	Codes),

				Potentiometers, Switches, Coils, Relays
		Electronic	CO2	Identify, Specify and test Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs.
		Devices and Circuits Lab	CO3	Describe operation of Multimeters, Function Generator and Regulated Power Supplies
			CO4	Explain and use CRO for experiments
			005	Explain and demonstrate working of PN Junction diode
			C05	characteristics
			CO6	Explain and demonstrate working Half and Full wave Rectifier with and without filters
		Basic Simulation	CO1	Perform basic operations on Matrices, 1D signals and sequences
		Lab	CON	Understand convolution correlation of signals and sequences in
	9CC72		002	time and frequency domains
			CO3	compute the response of LTI system for unit impulse and step
			CO4	verify the sampling theorem and Gibbs Phenomenon
	9CC73	Digital Logic Design Lab	CO1	Verify the operations of digital circuits using IC s
				Assess the relevant courses they have undergone till the completion
				of that academic year. Comprehend the concepts in the core subjects
		Comprehensive		and the elective subjects, to make them ready to face technical
		Test and		interviews which improve their employability skills. They are asked
	9C364	Viva –Voce – III	CO1	to comprehend the concepts in the core subjects and the elective
				subjects, to make them ready to face technical interviews which
				improve their employability skills. Assessment is done in the
				academic year.
		Technical	CO1	Identify current General, political and technology related topics
		Seminar – III	CO2	Arrange and present seminar in a effective manner.
			CO3	Collect, survey and organize content in presentable manner.
	9C365		CO4	Demonstrate oratory skills with the aid of Power Point
			005	Presentations and also submit the report of the Technical seminar
			005	Exhibit interview facing skills and team leading qualities
			CO1	Distinguish between small and large signal amplifiers.
		5 Analog Circuits	CO2	Analyze and Design tuned and RF amplifiers
			CO3	Understand linear and non-linear wave shapingmethods
II-II &∆22	9CC05		CO4	Understand analyze and design various types of multivibrators,
II II GALL				their analysis, designing and applications
			CO5	Explain different sweep generators and their applications
			C06	Analyze various types of Logic gates and Sampling gates
			CO1	Analyze and design of various continuous wave and angle
				modulation and demodulation techniques
			CO2	Understand the effect of noise present in continuous wave and angle
		Analog & Digital		modulation techniques.
	90006	Communications	CO3	Attain the knowledge about AM, FM Transmitters and Receivers
			CO4	Analyze and design the various Pulse Modulation Techniques
			CO5	Understand the concepts of Digital Modulation Techniques and
			Baseband transmission, source coding and channel coding	
			CO1	Demonstrate the concepts of Differential Amplifier and Operational
			<u> </u>	Amplifier and their characteristics.
	00007		02	Design the basic circuits using Operational Amplifiers.
	90007		CO3	Explore, design and analyze Filters, Timers, Voltage Controlled
		IC Applications		Demonstrate the design and analyze Oscillators D/A Converters
			CO4	and A/D Converters.
		i i		

			COF	Classify and showstoring the various Lasis Families
			C05	Classify and characterize the various Logic Families.
			C06	Explore the design of various logic gates using CMOS logic
				Apply the Maxwell's equations in propagation of EM waves
			02	Demonstrate the behavior of EM waves in different media
			CO3	Understand the property of EM energy at different boundary
		Electromagnetic		
		Waves and Transmission Lines	CO4	Understand the impossibility of TEM waves in rectangular wave
	9C408	Transmission Lines	CO5	guides
		05	Design different transmission lines	
			C06	Understand the concepts of high frequency dissipation less and
				To understand the basics of Managarial Economics at Miars level. Demond
			CO1	analysis and production analysis in particular
			CO2	To understand cost concept Revenues and Market structure
			002	To understand and identify various basic concepts of Accounting Double
		Economics	CO3	entry system and Book keeping
		Accountancy and		To understand the concepts of Capital expenditure. Revenue expenditure
	9ZC01	Management	CO4	and Final accounts.
		Science	005	To make student understand the basics of Management, its principles and
			COS	various functions performed in organization.
			C06	To make student learn about various personality traits, perception, attitudes
			C06	of individuals working in organization.
			COL	Gains exposure towards Python versions and their specifications and
			COI	build programs using primitive data types
			CO2	Write applications that include functions, modules, packages along
			002	with respective exceptional handling mechanism.
			CO3	Writes applications using features of Python and applications using
			005	Files
			CO4	Hands on exposure on NumPy/Tkinter/Plotpy modules
				Analyze worst-case running times of algorithms using asymptotic
		Python		analysis. Describe the divide-and-conquer paradigm and explain when
			CO5	an algorithmic design situation calls for it. Recite algorithms that
	9FC27	Programming		employ this paradigm. Synthesize divide and-conquer
		concepts		algorithms
			C06	Describe the dynamic-programming paradigm and the greedy paradigm
				and explain when an algorithmic design situation calls for it. Synthesize
				dynamic programming and greedy algorithms and
			COL	Linderstand about accounting and anarray flow among the arranjama
			COI	Understand about ecosystem and energy now among the organisms
			CO2	the resources in the nature
			CO3	Learn the value, use and value of biodiversity
			005	Understand the causes and effect of pollution and implement
	011005	Environmental	CO4	measures in control of pollution
	9HC05	Science and		Understand the sustainable development and implement green
		Leology	CO5	technology for sustainable development
			C06	Learn and implement policy to protect the environment
				To understand the design and working of various linear and non-
			CO1	linear wave shaping circuits.
				To demonstrate the working principle of various multivibrators and
		CO2	functionalities of various logic gates	
	9CC74 Analog Circuits Lab	Analas Cinquita		To perform and verify the working of oscillators, feedback
		CO3	amplifiers and voltage regulators.	
			To perform laboratory experiment to verify the conversion	
		C04	efficiency of various power amplifiers.	
		CO1	Demonstrate the modulation and demodulation of few analog and	
		01	digital modulation techniques.	
		Analog & Distal	CO2	Verifying the spectral components of AM and FM&the concepts of
	90075	Communication	02	frequencyand time division multiplexing techniques
	20010	Lab	CO3	Demonstrate the modulation and demodulation of few pulse analog,
	Lau	0.05	and pulse digital modulation techniques &Verifying sampling	

				•
				theorem
			CO4	Demonstrate the modulation and demodulation of digital modulation technique&Generation of line coding techniques
			CO1	To explore the operating modes of IC 7/1 OP-AMP
	9CC76	IC Applications	001	To design applications using 7/10n-Amp
		Lab	CO2	To design appreations using (410p-Amp
		Luo	CO3	To understand and implement applications using 555 Timers
			CO4	To design D to A converters and IC voltage regulators
		Comprehensive		Assess the relevant courses they have undergone till the completion of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. They are asked to
	9C466	Viva –Voce – IV	CO1	comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
			CO1	Identifycurrentgeneral, political and technologyrelated topics.
			CO2	Arrange and presentseminar in a effective manner
	00467	Technical	CO3	Collect, survey and organize content in presentablemanner
	90407	Seminar - IV	C04	Demonstrateoratoryskills with the aid of Power Point resentations
			04	and also submit the report of the Technical seminar
			CO5	Exhibit interview facingskills and team leadingqualities
			C01	Select the real-time problem in the industry.
			CO2	Analyze the requirements with respect to the problem statement
		Summer Break - Internship–I	CO3	Design the optimal solution for the problem.
			C04	Implement the solution using the apropriate modern tools
111 1 8 4 2 0			005	Distinguish between CT and DT signals and systems and understand
III-I &A20		Digital Signal	CO1	the growing need of DSP and study the concepts of discrete time signals and systems.
			CO2	Represent periodic DT signals as a Fourier series; non-periodic DT signals as a Fourier Transform and use a powerful mathematical tool called DFT
	8CC09		CO3	Compute the Fourier Transform of DT signals using the FFT algorithms.
			CO4	Realize a digital filter in several forms and structures for a given transfer function $H(z)$.
			CO5	Distinguish IIR and FIR filters; Design each type by several methods once the desired specifications are given.
			CO6	Understand the need and implement the multirate sampling techniques.
			CO1	Understand the existing device technologies and IC fabrication process
	8C510	VLSI Technology	CO2	Explore and analyze the electrical properties of the devices of CMMOS device.
		and Design	CO3	Design basic logic gates, combinational and sequential circuits using CMOS logic.
			CO4	Analyze the effects of parasitic on IC power and performance.
		CO5	Design memory cells and basic data path units.	

			CO6	Explore the need for testing and design verification of VLSI circuits.
			CO1	Understands the Architecture of 8086.
			C02	Understand instructions of 8086 and to write Assembly Language Programs
	9D.C0 7	Microprocessors	CO3	Interface I/0 devices with 8086
	8DC05	and Microcontrollers	CO4	Understand Architecture of 8051 microcontroller
			CO5	Understand instructions of 8051 and to Interface I/0 devices with 8051
			C06	Understand the need of advanced processors
			CO1	Understand the working principle and limitations/advancements of conventional mobile telephone systems, cellular mobile systems and Advanced generations of cellular wireless systems
			CO2	Analyze Frequency reuse concept and avoidance of Co-channel interference.
	80511	Cellular and Mobile	CO3	Explore the concepts of adjacent channel interference, its effects and avoidance mechanism.
	00011	Communication	CO4	Analyze signal reflections, path loss, propagation delay/loss, near and long distance propagation loss under different conditions, Merits of Lee model
			CO5	Analyze frequency allocation of cellular systems
			CO6	Demonstrate the concept of handoff mechanism and dropped calls.
			CO1	Learning the radiation mechanism of antenna and antenna parameters
			CO2	Design and analyze wire antennas and antenna arrays
		Antennas and	CO3	Evaluate knowledge on Horn, Parabolic and Lens antennas.
	8C512	Wave	CO4	Analysis of Horizontal Polarized antennas, Helical antennas, Patch
	00012	Propagations		antennas etc.
			CO5	Understand the propagation mechanisms of ground wave, sky wave and space wave concepts.
			CO6	Analyzetheconcepts of sky wave propagation.
			CO1	Understand levels of design description, concurrency, simulation and synthesis.
			CO2	Apply language constructs, data types, operators available in verilog HDL.
	8C517	Digital Design Through Verilog	CO3	Design combinational logic and sequential logic in gate level modeling.
			CO4	Explain Gate and Switch level modeling.
			CO5	Use system tasks, functions and UDPs.
			CO6	Demonstrate SM charts and realize digital design using SM charts.
			CO1	To analyze the internal architecture of the computer
	90019	Advanced	CO2	Understand the different data types and instruction set, of the computer
	80018	Computer Architecture	CO3	Understand the memory structure of the computer and learn CISC & RISC
			CO4	Understand processor structure and function and know the input output interfacings
	8C519	Digital Image &	CO1	Gets the knowledge of the basic step in image processing system, Discrete cosine transforms and discrete wave let transforms.

	Video Processing	CO2	Differentiate image enhancement methods, different types of spatial domain and frequency domain methods.
		CO3	Get the knowledge of point, line and edge detection, thresholding, Region based segmentation.
		CO4	Differentiate different types of redundancies, lossy and lossy less image compression, different types of coding techniques.
		CO5	Know the difference between analog video and digital video, different types of image formation and sampling of video signals
		CO6	Study the different types of motion estimation techniques and application of motion estimation in video coding.
		CO1	Explain different kind of networking models
		CO2	Define different addressing schemes for networks.
0.0500	Information Theory and	CO3	Detailed idea of data link layer protocol and medium access protocol
80520	Coding Techniques	CO4	Gain the knowledge of router configuration and network layer protocols and their working.
	-	CO5	Differentiate the IPv4 and IPv6 addressing schemes for different networks.
		CO6	Gain the knowledge of application layer protocols like DHCP, DNS.
	8C521 Digital Image Processing	CO1	Describe basic concepts of image processing system.
		CO2	Summarize and compare various digital image transform techniques.
8C521		CO3	Demonstrate and survey digital image enhancement in practical applications
		CO4	Analyze the case study related to various techniques of image restoration
		CO5	Apply compression techniques on digital image.
Microprocessors		CO1	Explore to write the Assembly Language Programs using Arithmetic instructions of 8086
	CO2	Explore to write the Assembly Language Programs using String instructions of 8086	
8DC71	and Microcontrollers	CO3	Explore to write the Assembly Language Programs for I/O interface with 8086
	Lab	CO4	Explore to write the Assembly Language Programs using Arithmetic instructions of 8051
		CO5	Explore to write the Assembly Language Programs using Timers and interrupts of 8051
		CO1	An ability to use VLSI CAD Tools (NGSPICE, Xilinx, and Cadence).
		CO2	An ability to understand and implement digital logic gates and circuits using SPICE and Verilog HDL.
8C577	VLSI Technology	CO3	An ability to perform physical design- layouts using Cadence EDA Tool.
	and Design Lab	CO4	An ability to implement combinatorial and sequential designs on FPGA boards (SPARTAN 3) using Xilinx tools.
		CO5	An ability to use VLSI CAD Tools (NGSPICE, Xilinx, and Cadence).

			CO1	Apply knowledge for computer assembling and software installation and ability to solve the trouble shooting problems
	CO2	Apply the tools for preparation of PPT, Documentation and budget sheet etc		
			CO3	Install and run the Python interpreter, Create and execute Python programs
	8FC72	Python Programming Lab	CO4	Apply the best features of mathematics, engineering and natural sciences to program real life problems
			CO5	Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python, Express different Decision Making statements and Functions, Interpret Object oriented programming in Python
			CO6	Understand and summarize different File handling operations, explain how to design GUI Applications in Python
			CO1	Select the real-time problem in the industry.
			CO2	Analyze the requirements with respect to the problem statement
	8C591 Summer Industry Internship-I	CO3	Design the optimal solution for the problem.	
		CO4	Implement the solution using the apropriate modern tools	
			CO5	Present and submit the report
		CO1	The students will be able to understand cyber-attacks, types of cybercrimes.	
		CO2	Realize the importance of cyber security and various forms of cyber attacks and countermeasures	
	8FC24 Cyber Security	CO3	Get familiar of cyber forensics	
		CO4	Get familiar with obscenity and pornography in cyber space and understand the violation of Right of privacy on Internet	
			CO5	Cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks
			CO6	Elucidate the various chapters of the IT Act 2008, power of Central and State Government to make rules under IT Act 2008
- & A20			CO1	Classify network topologies and apply the same to different networks with the knowledge acquired from the network reference models and fundamentals of computer networks
			CO2	Illustrate the design issues of data link layer and detect the transmission errors and flow control problems
8EC47	8EC47	Computer Networks	CO3	Categorize the Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA/CD and MAC addresses with IEEE 802.X and wireless LAN
		CO4	Distinguish the knowledge of the several routing algorithms and Internetworking concepts	
		CO5	Obtain and use the skills of subnetting and routing mechanisms	

			CO6	Distinguish the knowledge of the functions of transport and application layer
			CO1	Distinguish microwave frequencies and analyze Rectangular and circular wave guides.
			CO2	Formulate various passive components with the help of scattering
		Microwave and	CO3	matrix Explore different linear beam tubes
	8C613	Optical	CO4	Analyze Cross field tubes and slow wave structures.
		Communications	CO5	Analyze the propagation of light in optical fibers and to characterize various optical sources.
			CO6	Understand the principle of various Losses, Dispersion and to characterize various Optical Detectors.
			CO1	Learn the distinction between optimal reasoning Vs human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time and space complexities.
			CO2	Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.
	8EC45	Artificial Intelligence	CO3	Learn different knowledge representation techniques.
8AC07			CO4	Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and spacecomplexities.
			CO5	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks
			CO6	Analyze Supervised Learning Vs. Learning DecisionTrees
			CO1	Learn basic concepts of control systems.
			CO2	Study about time response analysis.
	94 (207	Linear Control	CO3	Learn basic concepts of stability and root locus method.
	ðACU/	system	CO4	Study about frequency response analysis.
			CO5	Learn basic concepts stability analysis in frequency domain.
			CO6	Learn fundamentals of state space analysis.
			CO1	Understand the concepts of Switched capacitors Circuits
			CO2	know the concepts of PLLS
8C62.			CO3	study concepts of Data Converter Fundamentals
	8C623	Analog and Mixed Signal Design (PE- II)	CO4	Explore the concepts of Nyquist Rate A/D Converters and develop its applications
			CO5	Understand concepts of the Oversampling Converters and Continuous-Time Filters
			CO6	Understand concepts of concepts of Continuous-Time Filters, CMOS Trans conductors
	8C624	Embedded C	CO1	Demonstrate the use of development software for a particular application and choosing appropriate OS.

		r	
	Programming	CO2	Understanding and building basic embedded system using
	(PE-II)		8051.Understanding its design
		CO3	Design of embedded systems and implementation of switch reading.
		CO4	Demonstrate the concepts of OOP's theory inheritance and
			functions in embedded C to support modular programming.
		CO5	Learning the need for realtime implementation in Embedded C
		CO6	Case study of 'Intruder Alarm' toachihye real time hands on.
		CO1	Use the Lordon temperature techniques for solving ODE's
			Use the Laplace transforms techniques for solving ODE s
		CO2	Use the Z- Tranforms technique for solving Difference equations
8C625	Transform Techniques (PE-	CO3	Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations
	II)	CO4	Find the root of a given equation
		CO5	Estimate the value for the given data using interpolation
		CO6	Find the numerical solutions for a given ODE's
		CO1	An ability to make system-level decisions for software-defined radio technology and products
		CO2	An ability to implement smart antenna algorithms
8C626	Software Defined Radio(PE-II)	CO3	Knowledge of digital hardware architectures and understanding of development methods
		CO4	An understanding of middleware in SDR
		CO5	Understanding of analog RF components
		CO6	Understand the basic principles of Cognitive Radio
		CO1	Understand the concepts of Artificial Intelligence
		CO2	Illustrate the concepts of Artificial Neural system
80627	Artificial Neural	CO3	Illustrate computer vision
00027	Networks (PE-II)	CO4	Explain Probabilistic models and neural networks
		CO5	Illustrate concept Neural language
		CO6	Explain applications of Neural networks
		CO1	Demonstrate the orbital mechanics.
		CO2	Design the satellite subsystem.
0.0720	Satellite	CO3	Estimate the C/N and able to measure the relevant values.
80628	(PE-II)	CO4	Evaluate the satellite link.
		CO5	Recall Multiple access concepts and discuss earth station technology
		CO6	Apply the knowledge of GPS in real time applications.
		CO1	Define the characteristics and analyze the errors of measurement systems
8CC51	Electronics and Instrumentation(O E-I)	CO2	Select the appropriate passive or active transducers for measurement of physical phenomenon
	~ *)	CO3	Relate and apply the appropriate measuring techniques to real time applications

			CO4	Interpret the usage of DVM, Spectrum Analyzer and DSO instruments for appropriate measurements
			CO5	Develop an understanding of construction and working of different AC and DC bridges and their applications
			CO1	To understand number systems and apply the rules of Boolean algebra to simplify Boolean expressions using theorems and K-maps.
			CO2	To design combinational circuits such as full adders, multiplexers, decoders, encoders. Code convertersetc
	8CC56	Fundamentals of digital circuits &	CO3	To design basic memory units (latches and flip-flops) and sequential circuits
		witcroprocessors	CO4	To understand Architecture of 8086 and analyzing in single mode and in multi processor mode.
			CO5	To understand instructions of 8086 and to write Assembly Language Programs.
			CO6	To understand instructions of 8086 and to write Assembly Language Programs
			CO1	Understand the design of dipole antenna for various frequencies.
			CO2	Understand the design of monopole antenna for variation in radius
		Antonno		of the wire
	8C678	Simulation Lab	CO3	Design of Microstrip patch antenna in different shapes
			CO4	Understand the design of standard horn antenna
			CO5	Analyze the characteristics of yagi-uda antenna
			CO6	Verify the radiation pattern of different types of antenna
81		Computer Networks Lab	CO1	Implement and analyze framing methods of data link layer
			CO2	Implement and analyze framing methods of data link layer.
	8EC65		CO3	Illustrate and implement error detection & correction techniques
			CO4	Implement different Routing Algorithm
			CO5	Understand basic Network Commands
			CO6	Use of Wireshark and NS-2 tools
			CO1	To Understand the frequency response of a given systems
			CO2	Design of FIR & Butterworth and chebyshev approximations and converting them to IIR filters
	8CC79	Digital Signal	CO3	Transforming an analog filter to its digital equivalent
	00017	Processing Lab	CO4	Sampling rate conversion Interpolation and decimation
			CO5	An ability to use TMS320c6713 for different algorithms
			CO1	To Understand the frequency response of a given systems
			CO1	Use the concepts, in conceptualizing, designing and executing the modules of the projects
	8C692		CO2	Exhibit the interest in learning the modern tools and technologies.
		Group Project	CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects
			CO4	Improve communicative skills and team working skills

			CO1	Assess the relevant courses they have undergone till the completion
	8C668	Comprehensive Viva Voce		of that academic year. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills. Assessment is done in the relevant courses they have undergone till the completion of that academic year.
			CO1	Classify network topologies and apply the same to different networks with the knowledge acquired from the network reference models and fundamentals of computer networks
IV-I &	8EC05	Computer	CO2	Illustrate the design issues of data link layer and detect the transmission errors and flow control problems
A20		networks	CO3	Categorize the Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA/CD and MAC addresses with IEEE 802.X and wireless LAN.
			CO4	Distinguish the knowledge of the several routing algorithms and Internetworking concepts
			CO5	Obtain and use the skills of subnetting and routing mechanisms
			CO1	Distinguish the knowledge of the functions of transport and application layer
			CO1	Distinguish microwave frequencies and analyze Rectangular and circular wave guides.
l	Microwave and	CO2	Formulate various passive components with the help of scattering matrix	
		Optical	CO3	Explore different linear beam tubes
Communications	Communications	CO4	Analyze Cross field tubes and slow wave structures.	
	CO5	Analyze the propagation of light in optical fibers and to characterize various optical sources.		
			CO6	Understand the principle of various Losses, Dispersion and to characterize various Optical Detectors.
		Entrepreneur -	CO1	Students will understand the nature of Entrepreneurship and its importance
	8ZC19	ship, project	CO2	Will gain knowledge regarding project, its life cycle and organization
		structured	CO3	Will gain knowledge relating to project formulation and implementation
		mance	CO4	Comprehend the components of structured finance
			CO5	Establish a framework of CMBS
			CO6	Students will gain knowledge relating to the CRE Servicing
			CO1	Students will learn basics of databases and understand the architecture of database management systems.
	8FC23	Database	CO2	Students will learn about good database design techniques and database theories behind.
		systems	CO3	Understand conceptual database designs, and functional dependencies and normalization.
			CO4	Students will understand the Mathematical foundation for relational databases.
			CO5	Student will be able to understand concept of Constraints, Views and will be able to create dynamic databases.
			CO6	Learn transaction management, concurrency controls.
	8ZC30	Advanced	CO1	The Students' gain knowledge on the stages of Startup and the
				turbulence environment it undergoes and the stages related to

	T (
	Entrepreneur -		growth of the Startup.
	ship	CO2	The Students are exposed to the various business models and
	~ F		critically evaluating the effectiveness of the business models and
			products
		001	
		CO3	The students understand the method of business traction, create
			roles and build their A- team
		CO4	The students understand the various channels of revenue building
			and exploration of new revenue avenues
		COS	The students understand the need of sales planning and people plan
		COS	The students understand the need of sales planning and people plan
			and also financial modeling
		CO6	The students are exposed to the legal implications affecting the
			company's prospects and identifying right mentors and advisors to
			support startups
		CO1	Comprehend knowledge relating to the conservation of the
		COI	Comprehend knowledge relating to the conservation of the
			environment.
8ZC26	Ecology and	CO2	Learn about bio-diversity and climatic changes occurring in the
	disastar		environment.
	uisastei	CO3	Know about the international treaties conventions and organizations
	management	005	active in the field of environmental protection
		GO (
		CO4	To provide students an exposure to disasters, their significance and
			types.
		CO5	To enhance awareness of institutional processes in the country
		C06	To gain a preliminary understanding of approaches of Disaster Risk
		000	Peduation (DDD)
00000	~	001	
80038	Communications	COI	Demonstrate the principle of converting analog signal to digital by
	Theory		using PCM, DM, ADM systems.
	č	CO2	Explore baseband transmission and optimal reception of digital
			signals using different filters and M-ary Error Probabilities.
		CO3	Design and compare ASK PSK FSK DPSK OPSK modulators and
		005	dema delater
		~~ .	
		CO4	Demonstrate the concepts of information theory, source coding
			techniques ,channel capacity and can find channel capacity and
			coding efficiency.
		CO5	Demonstrate encoding and decoding techniques of different
		000	channel coding techniques like block codes cyclic codes
			control county terminques like ,olock coues, cyclic coues,
		G O (
		CO6	Explore the knowledge on different types of spread sprectrum
			modulation techniques, DSSS, FHSS, CDMA and PN sequence. and
			OFDM
8AC44	Fundamentals of	CO1	Understand the principle of operation of different types of
			instruments viz PMMC moving iron type of instruments the
	measurements&		required characteristics of an instrument in general. The student
	instrumentation		demonstrates the shility to commence for the surger in the
			demonstrates the ability to compensate for the errors in the
			instruments and to extend the range of the instruments.
		CO2	Demonstrates the knowledge of Potential and Current transformers;
			the errors in them and the effect of having an open/short in the
			secondary circuits. Understand the principle of operation of
			Dynamometer and Moving iron type of Power factor meters
		001	Dynamometer and woving-non type of Power factor meters.
		CO3	Comprehends the principle of operation of dynamometer type of
			Wattmeter and Induction type of Energy meter; use the wattmeter to
			measure the Active and Reactive power and demonstrates the ability
			to extend the range of them.
		CO4	Identify and use different techniques of measurement of Resistance
		207	Inductance and Canacitance values
		007	Inductance and capacitance values.
		005	Understand the principle of operation of Different type of digital
			voltmeters, wave analyzers, spectrum analyzers and Cathode ray
			Uscilloscope.

		CO6	Demonstrates the ability in characterizing the different types of transducers and uses them to measure Strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque and Temperature.
	DDINCIDI ES	CO1	Formulate and solve mathematical model (linear programming problem) for a physical situations like production, distribution of goods and economics.
8BC53	OF OF OPERATIONS	CO2	Recognize and Solve the problem of transportation involving a large number of shipping routes with least transportation cost and generate optimal assignment strategy for different situations
	RESEARCH	CO3	Use Johnson's rule to create the optimal sequencing schedule for a sequencing problem and make decisions about replacing an item using replacement policy
		CO4	Analyze the performance measures of Queing system and Calculate the EOO for minimizing the total inventory cost
		CO5	Apply simulation techniques for solving various types of problems and general idea development about Markov chains
		CO1	Ability to understand the need for manufacturing processes and various material properties
	PRINCIPALS	CO2	Ability to understand the principle of casting, Patterns used, Pattern allowance and Gating systems used in casting, and various casting methods
8BC52	MANUFACTUR	CO3	Ability to understand the basic principle of welding and distinguish between various welding types and their applications
ING PROCESSES	ING PROCESSES	CO4	Ability to understand the principles of metal working, various types of metal working techniques, Knowledge of hot working and cold working, Ability to understand the bulk deformation processes of
		CO5	Ability to understand the bulk deformation processes of extrusion and forging, their applications and forces involved in these operations
		CO6	Ability to understand and distinguish the various press working operations with respect to their applications, advantages and disadvantages, understand the various types of plastics and their processing techniques
		CO1	Demonstrate advanced knowledge in the MOS Design
80719	CMOS Digital IC	CO2	Static and dynamic characteristics of CMOS to design and to develop the Digital Integrated Circuits for different Applications. • The concepts of Semiconductor Memories, Flash Memory, RAM array organization.
00717	Design	CO3	Analyze complex engineering problems critically in the domain of CMOSDigital Integrated Circuits for conducting research.
		CO4	Solve engineering problems for feasible and optimal solutions in the corearea of CMOS Digital ICs.
		CO5	Apply the CMOS Digital IC concepts for usage of modern CAD tools andtheir Limitations.
		CO6	The student will be able to understand the MOS Design. • In this course, students can study Combinational MOS Logic Circuits and Sequential MOS Logic Circuits. • Another main object of this course is to motivate the graduate students to design and to develop the Digital Integrated Circuits for different Applications.
		CO1	Gains exposure towards Python versions and their specifications.
	Embedded	CO2	Build programs using primitive data types.
8C720	Python	CO3	Construct and use data structures for various applications
	Programming	CO4	Write applications that include functions, modules, packages along with respectiveexceptional handling mechanism.

		CO5	Write applications using Files – access and mnipulate
		CO6	Write applications using OO features of Python
		CO1	Understand the concepts of DFT,FFT digital filters
		CO2	Illustrate the concepts of Computational Accuracy in DSP
			Implementations
	DSP	CO3	Explain the Architectures for Programmable DSP Devices:
80721	Processors	CO4	Explain Programmable Digital Signal Processors
0C/21	and	CO5	Distinguish Analog Devices Family of DSP Devices .
	Architectures	CO6	Illustrate Interfacing Memory and I/O Peripherals to Programmable DSP Devices
		CO1	Explain wireless communication systems and Modern wireless communication systems with examples.
	Wireless	CO2	Characterize Multiple Access Techniques for Wireless
8CC22	Communications		Communication and calculate capacity of cellular systems.
00011	and Networks	CO3	Explain Traffic routing in wireless networks, Wireless data services,
			Common channel signaling.
		CO4	Describe about Mobile IP And Wireless Access Protocol
		CO5	Develop different Wireless LAN protocols
		CO6	Define About Fundamentals Of 3G Services, Its Protocols And
			Applications.
		CO1	Understand the UVM concepts
		CO2	Explore the class instances and functions
8C723	Digital Design	CO3	Comprehend the UVM Configurations
	and Verification	CO4	Analyzing UVM sequences and Modeling in UVM
	with System	CO5	Developing Reusable Test benches using UVM
	Verilog	CO6	Analyzing the Case studies of Layered test bench for SPI, APB and AXI.
		CO1	Understand the basic architecture of Embedded System and their classification.
8C724	Embedded	CO2	Explore the architecture of ARM processor.
	System Design	CO3	Understand the addressing modes and data processing instructions
	System Design		of ARM processor.
		CO4	Understand the ARM thumb instruction set and its capabilities.
		CO5	Use both assembly and C language based ARM programming.
		CO6	Explore the memory management techniques in ARM.
8C725	Artificial Neural	CO1	Understand the concepts of Artificial Intelligence
	Networks	CO2	Illustrate the concepts of Artificial Neural system
		CO3	Lustrate computer vision
		CO4	Explain Probabilistic models and neural networks
		CO5	Illustrate concept Neural language
		CO6	Explain applications of Neural networks
		CO1	An ability to make system-level decisions for software-defined radio
		001	technology and products
80726		CO2	An ability to implement smart antenna algorithms
00/20	Software defined	CO3	Knowledge of digital hardware architectures and understanding of
	radio		development methods
	Tuulo	CO4	An understanding of middleware in SDR
		CO5	Understanding of analog RF components
		C06	Understand the basic principles of Cognitive Radio
		CO1	Implement and analyse framing methods of data link laver
	COMPLITER	CO2	Implement and analyse framing methods of data link layer
8EC75	NETWORKS	CO3	Illustrate and implement error detection & correction techniques
JLC/J	IAR	CO4	implement different Routing Algorithm
		CO4	Understand basic Network Commands
1		005	Charlistand Dusie Herwork Commands.

				-
			CO6	Use of Wireshark and NS-2 tools
			CO1	Understand the design of dipole antenna for various frequencies.
		ANTENNA	CO2	Understand the design of monopole antenna for variation in radius
	8C781	SIMULATION		of the wire
		LAB	CO3	Design of Microstrip patch antenna in different shapes
			CO4	Understand the design of standard horn antenna
			CO5	Analyze the characteristics of yagi-uda antenna
			CO6	Verify the radiation pattern of different types of antenna
			CO1	Analyze the characteristics of RKO and GUNN diode
		Micro Wave and	CO2	Understand the principles governing attenuation and working of DC
	8C782	Optical	CO3	Measure the K, S, Z and f at microwave frequencies.
		Communications	CO4	Analyze the design principles of circulator and magic Tee
		Lab	CO5	Understand the basic characteristics of LED and LASER
		Luo	CO6	Measure the DR NA and Losses for Digital and Analog Links
			CO1	Students identify vast application areas for mobile / wireless
			001	communication / computing.
	80764	Project I	CO2	They also understand the working principle of GSM technology.
	00704	110jett -1	CO3	Students understand various media access control methods that are
			000	meant for wireless communication, each methods' pros and cons
			CO4	Understand the issues in the Network layer in the wireless
				communication and identifying suitable solutions for the same
			CO5	Understand the issues in the Transport layer in the wireless
				communication and identifying suitable solutions for the same
			CO6	Understand MANETs with an example like Bluetooth technology.
			CO7	Understand Security Issues related to mobile computing and various
				solutions to mitigate the security problems.
			CO8	Prepare for the Project Phase_II
			CO1	Select the real-time problem in the industry.
			CO2	Analyze the requirements with respect to the problem statement
	80662	Summer Industry	CO3	Design the optimal solution for the problem.
	00002	Internship – II	CO4	Implement the solution using the appropriate modern tools.
			CO5	Present and submit the report
			CO6	Select the real-time problem in the industry.
			CO1	Learn the distinction between optimal reasoning Vs human like
				reasoning and formulate an efficient problem space for a problem
	95020	ARTIFICIAL		expressed in natural language. Also select a search algorithm for a
	0EC20	INTELLIGENCE		problem and estimate its time and space complexities.
			CO2	Apply AI techniques to solve problems of game playing, theorem
			CO 2	proving, and machine learning.
			03	Learn different knowledge representation techniques.
			CO4	Understand the concepts of state space representation, exhaustive
				search, heuristic search together with the time and space
			C05	Comprehend the applications of Probabilistic Personing and
			COS	Reversion Networks
			C06	Analyze Supervised Learning Vs. Learning DecisionTrees
11/-11	87C15	FINANCIAI	C01	This unit enables the students to understand the financial structure
0	021013	INSTITUTIONS	001	and the financial sector reforms after 1991.
Q 4.30		MADET	CO2	The unit gives the exposure on the role of RBI and the Regulating
A20				and credit policies adopted by the RBI.
		SERVICES	CO3	The students get awareness on the role of Non-Banking financial
		SERVICES		institutions and the role of financial institutions in India.
			CO4	The unit educates the students to know the role of regulatory bodies
				like SEBI and also to know the capital and money market

			instruments
		CO5	The unit equips the students to understand about the asset fund
			based financial services
		CO6	The students will get exposure about the investment banking and merchant banking.
8EC67	OPERATING	CO1	Describe the basic functionalities and structure of the Operating
	SYSTEMS	COL	System
	CONCEPTS	02	Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.
		CO3	Comprehend the concepts of Synchronization and Deadlocks in the Operating System
		CO4	Discuss the concepts of Memory Management(Physical and Virtual memory)
		CO5	Explain the concepts of File System with regard to directory and disk management algorithms.
		CO6	Students understand the concepts of I/O systems, protection and security in a case study given
8ZC24	INNOVATION & DESIGN	CO1	The students gain the knowledge on the inputs required for innovation and also gain familiarity on Entrepreneurship.
	THINKING	CO2	The students will get exposure on creative methods of ideation and the importance of protecting the ideas.
		CO3	The students gain knowledge on design thinking and types of thinking.
		CO4	The students gain familiarity on emerging technologies like Internet of things (IoT).
		CO5	The students understand the process of building the startup.
		CO6	The students gain knowledge on various startup funding and also to
			branding building for the startup.
8CC39	Introduction to	CO1	Understand levels of design description, concurrency, simulation
	VLSI and		and synthesis.
	Embedded Systems	CO2	Apply language constructs, data types, operators available in verilog HDL.
		CO3	Design combinational logic and sequential logic in gate level modeling.
		CO4	Demonstrate the use of development software for a particular application and choosing appropriate OS.
		CO5	Understanding and building basic embedded system using 8051.Understanding its design
		CO6	Design of embedded systems and implementation of switch reading.
8AC45	Fundamentals of	CO1	Understand the role and potential of new and renewable energy
	renewableenergy		sources realize the potential of solar energy, its impact on
	sources		environment; define and understand the terms describing the different angles that one may incur in setting up a solar panel and be able to use the instruments for measuring solar radiation.
		CO2	Demonstrates the knowledge of different techniques of solar
		CO3	The student becomes familiar with the different types of horizontal
		205	and vertical axis wind mills and understands the performance characteristics of the same. The student also demonstrates the knowledge of different Bio-gas digesters and factors influencing its
			yield.
		CO4	Aware of the potential of geothermal energy in India and will be able to characterize different types of geothermal wells.
		CO5	Aware of the different methods of kinetic energy extraction from Ocean waves and tides and thermal energy extraction from Oceans.

		CO6	Demonstrates the knowledge of Direct Energy Conversion in different phenomena viz., Joule Thomson effect, Seebeck effect, Peltier effect etc. and the principle of operation of Fuel Cells.
	PRINCIPALS	CO1	Understand a production system, principles of automobile
8BC55	OF	CO2	understand the methods of work part transfer mechanical buffer
02000			storage control functions
	AUTOMATION	CO3	understand the implementation of automated flow lines
	AND	CO4	know the analysis and design of material handling systems,
	ROBOTICS		automated guided vehicle system
		CO5	understand adaptive control systems and Applications.
		CO6	understanding the business process Engineering. Concept of concurrent Engineering, techniques of rapid prototype.
8C827	Digital Design	CO1	Understand the UVM concepts
	and Verification	CO2	Explore the class instances and functions
	with Universal	CO3	Comprehend the UVM Configurations
	Verification	CO4	Analyzing UVM sequences and Modeling in UVM
	Methodology	CO5	Developing Reusable Test benches using UVM
	incomo do logy	CO6	Analyzing the Case studies of Layered test bench for SPL APB and
		000	AXI.
		CO1	Understand the Basic concepts of UNIX operating Systems and
			files, commands usage.
	EMDEDDED	CO2	Understand the Real time Systems concepts and classification of
	EMBEDDED		Real time systems.
8C828	KEAL TIME	CO3	Design concepts of scheduling algorithms and its applications.
	OPERATING	CO4	Understand the Interprocess communications and its applications in
	SYSTEMS		Real time systems.
		CO5	Understand the Exceptional handling and Interrupts and Timers
		CO6	Understand the case study of RTOS.
8CC29	Artificial	CO1	Demonstrate fundamental understanding of the history of artificial
	Intelligence		intelligence(AI) and its
		CO2	foundations
		CO3	Apply basic principles of AI in solutions that require problem
			and learning.
		CO4	Demonstrate awareness and a fundamental understanding of Expert
		~~~	Systems and its applications
		CO5	Demonstrate fundamental understanding of models of machine
		COC	learning.
<u> </u>	C. 64 (11) ( -	C06	Appry basic principles of Supervised learning
00000	Satemite		Demonstrate the orbital mechanics.
	Communications	CO2	Design the satellite subsystem.
		C03	Estimate the C/N and able to measure the relevant values.
		C04	Evaluate the satellite link.
		C05	Angle the levended of CDS in real time angliactions
90921	D 1	C00	Apply the knowledge of GPS in real time applications.
80851	Radar	COI	recognise the basics of Radar systems and its applications and its
	Communications	CO2	Differentiate the Pader parameters how it affects the Pange
		002	measurement (Analyse)
		CO3	Recall the Doppler Effect and draw backs of CW radars
		205	(Remember)
		CO4	Discuss the basic concepts of Moving target indicators and evaluate
			the draw backs of MTI Radars.(Understand)
		CO5	Differentiate concept of scanning and tracking. (Analyse)
		CO6	Understand various types of displays and different phased arrays.
1		I	

8C832	Mixed Signal	CO1	Understand the concepts of Switched capacitors Circuits
	Design	CO2	know the concepts of PLLS
		CO3	study concepts of Data Converter Fundamentals
		CO4	Explore the concepts of Nyquist Rate A/D Converters and develop
			its applications
		CO5	Understand concepts of the Oversampling Converters and
			Continuous-Time Filters
		CO6	Understand concepts of concepts of Continuous-Time Filters,
0,0000		001	CMOS Trans conductors
80833	System On-chip	C01	Know basics of System Architecture
	Architecture	CO2	Understand the various types of Processors like VLIW Processors,
		CO3	Superscalar Processors.
		005	memory
		CO4	Know the Concept of Inter Connect Architectures, SOC Standard
		001	Buses and Reconfiguration Technologies.
		CO5	Know the concepts and issues related to Interconnect Configuration.
		CO6	Explore the SOC Design approach and develop its applications.
8C834	Machine Learning	CO1	introduce basic concepts and techniques of Machine Learning
		CO2	have a thorough understanding of the Supervised and Unsupervised
			learning techniques
		CO3	study the various probability based learning techniques
		CO4	analyze the dimensionality reduction models
		CO5	Tunderstand graphical models of machine learning algorithms
		CO6	Apply analytical learning algorithms
		CO1	OFDM's transceiverarchitecture
		CO2	The problem of PAPR and how to reduce the PAPR.
8C835	5G	CO3	To understand how the OFDM receiver performs synchronization
	Communications	CO4	Channel modeling and propagation
		CO5	MIMO Capacity, space-timecoding
		CO6	Massive MIMO and mmWave MIMO technologies for 5G
		CO1	Identify vast application areas for mobile / wireless communication /
		002	computing.
		CO2	They also understand the working principle of GSM technology.
		003	Students understand various media access control methods that are
8C865	PROJECT –II	CO4	Induction the issues in the Network layer in the wireless
		04	communication and identifying suitable solutions for the same
		CO5	Understand the issues in the Transport layer in the wireless
		200	communication and identifying suitable solutions for the same
		CO6	Understand MANETs with an example like Bluetooth technology.
			Identify vast application areas for mobile / wireless communication /
			computing.



## SCIENCE AND

# Course Outcomes of CSE Department





### Department of Computer Science & Engineering

### COs for A22-1st Year and 2nd Year, A20-3rd Year and 4th Year Courses/subjects

Year and Regulation	Course Code	Course Name		Co's
			C01	Explain the fundamental aspects of atomic, molecular orbitals and metal complexes.
			C02	List general properties of polymers, lubricants and engineering materials.
	9HC04	ENGINEERING	C03	Outline basic properties of water and its usage in domestic and industrial purposes.
		CHEMISTRY	CO4	Summarize electrochemical procedures related to corrosion.
			C <b>O</b> 5	Interpret potential applications of chemistry and practical utility of various organic reactions and drug molecules.
		PROBLEM SOLVING USING C	C01	Explain the basic computer concepts and Illustrate programming principles of C language.
	9FC01		C02	Develop C programs to solve simple mathematical and engineering problems using decision control, loop statements, arrays and strings.
			C03	Apply modular programming using functions to develop reusable code.
I-I & A22			C <b>O</b> 4	Analyze memory oriented concepts using pointers to implement inter function, function communication, pointer arithmetic.
			CO5	Describe file handling concepts using C.
	9HC11	MATRIX ALGEBRA AND CALCULUS	C01	Solve the linear system of equations.
			C02	Determine the Eigen values and Eigenvectors of the matrix and apply Cayley Hamilton Theorem to obtain the higher powers of a matrix.
			C03	Identify the nature of the quadratic form and reduction of the quadratic form to its canonical form.
			C <b>O</b> 4	Apply appropriate mean value theorems to obtain the mean values and find the power series expansion of a function.
			C05	Solve the first order and higher order ordinary differential equations with constant coefficients.
	9HC01	ENGLISH	C01	Understand and demonstrate the use of diverse

		ESSENTIAL		forms of vocabulary in their communication.
		ENGLISH		Recognize different grammatical structures and
		LANGUAGE	C02	use the appropriate ones in their
		SKILLS		communication.
				Develop affective reading skills by applying
		<b>C03</b>	develop effective feading skins by apprying	
			C03	strategies to comprehend different types of
				texts.
	011/2/1	ORAL	C01	Describe people, objects and situations using
	90001	COMMUNICAT		simple sentences with proper pronunciation.
		IONS LAB-1	C02	Use apt expressions and narrate stories in
				simple sentences.
			C01	Estimate the hardness and chloride in water.
			001	Determine strength of soil her retentioneric
	01104	ENGINEERING	C02	Determine strength of acid by potentiomeric
	90004	CHEMISTRY LAB		and conductometric methods.
			C03	Demonstrate preparation of polymer, aspirin
			000	and inorganic compound.
				Develop programs to solve simple
			C01	mathematical and engineering applications
	<b>0FC61</b>	DDODI EM COLVINC		using C language
	71 C01	PROBLEM SOLVING		Illustrate various operations on files to develop
		USING C LAB	C02	mustrate various operations on mes to develop
				programs using C language.
				Demonstrate and make use of the workshop
		WORKSHOP/MANUF	C01	tools for Fitting, Carpentry, Welding, Casting,
	0 <b>D</b> C (1	ACTURING PROCESSES LAB	CUI	Smithy, Moulding, Glass cutting and Electric
	<b>9BC61</b>			connections
				Design and Fabricate jobs with wood MS
			C02	flat GI Shoot material
				Indi, Of Sheet material.
			C01	Interpret the concept of quantum mechanics,
				Schroedinger wave equation and its application
	9HC07	ENGINEERING		for one dimensional potential box.
		PHYSICS		Explain the principle, construction and working
		THISIES	C02	of lasers and fiber optics along with their
				applications.
			<b>C03</b>	Summarize the phenomenon of magnetism and
			003	superconductivity.
				Outline the concepts of dielectrics polarization
			C04	and apply the same for Diazo Ferro and Duro
			007	and apply the same for Field, Ferro and Fyro-
			C05	Identify the nature of semiconductors and
				demonstrate the semiconductor devices.
I-II & A22			C06	Characterize the nano and bulk materials for
1-11 & A22				various applications.
				Explain different data structure and select the
			C01	appropriate data structure to develop
	9EC01			applications
		DATA STRUCTURES	CO2	Illustrate verieus Lincer Non Lincer date
		C02	mustrate various Linear, Non Linear data	

				structure in developing applications.
				Demonstrate various hashing and collision
			C03	resolution techniques for enhancing the
				performance of algorithms.
			<b>C04</b>	Asses the performance of various searching
			C04	and sorting techniques.
				Compute the Jacobian transformation, the
			C01	extreme values of a multivariable function and
	011/01/2	ADVANCED	COL	solve the first order linear and poplinear PDEs
	9HC12	CALCULUS		Solve the first order finear and nonlinear fibers.
		enlectes	<b>C03</b>	Evaluate double integrals using change of order
			C02	of integration and change of variables, triple
				integrals.
			C03	Determine Fourier series expansion of a
				function over the interval.
			C04	Find directional derivative and solve the
			UU4	problems on line, surface and volume integrals.
			C01	Apply the principles of electrical circuits and
	9AC48	BASIC ELECTRICAL AND ELECTRONICS	CUI	DC generation with basic equations.
			<b>G</b> 0.	Illustrate the working principles of DC and
		ENGINEERING	C02	three phase AC motors.
				Analyse the construction and working
			C03	principles of diode, various transistors with
				applications.
			C04	Use numbering systems to solve Boolean
			C04	expressions.
			C01	Outline the basics of the Engineering Graphics,
			COI	Curves and Auto Cad.
	9BC01	ENGINEERING		Interpret the concepts of orthographic and
	12002	GRAPHICS	C02	isometric projections of lines, planes and
				solids.
			C03	Draw the sections of solids and development of
			0.05	surfaces.
			C04	Develop orthographic views from isometric
			~~~	views and vice versa.
				Use appropriate language in varied real-world
		ORAL	C01	scenarios Practice effectively the speaking
	9HC62	COMMUNICATION		skills with the apt body language.
		LAB – II		Develop a winning presentation and present
			C02	themselves with ease in various competitive
				situations.
			C A i	Demonstrate the concepts of photo electric
			C01	effect, total internal reflection, diffraction and
	9HC66	ENGINEERING		dispersion of light.
		PHYSICS LAB	C02	Demonstrate the concepts of rigidity modulus,
				periodicity and oscillations.

			C03	Compare and contrast the Biot-Savart law with Oersted law and explain the concept of Magnetostriction.
			C04	Analyze the electrical resonance, time constant, band gap and forward resistance of a semiconductor diode.
			C01	Develop programs to illustrate various linear and nonlinear data structures using C language.
	9EC61	DATA STRUCTURES Lab Using C	CO2	Develop programs to assess the performance of various searching and sorting techniques using C language.
			CO1	Understand and apply the principles of electrical engineering to solve basic equations.
			CO2	Apply the knowledge gained to explain the principles of single and three phase AC circuits.
	9AC41	BASIC ELECTRICAL ENGINEERING	CO3	Apply the knowledge gained to explain the principle and operation of DC machine along with its applications.
			CO4	Use the principles of single phase transformer along with its applications and solve the equations.
			CO5	Realize the principle and operation of three phase induction motor with its applications.
			CO6	Understand the operation of different measuring instruments along with its applications.
	9CC54	ANALOG ELECTRONIC CIRCUITS	CO1	Understand the Fundamentals of diode & BJT operation, Characteristics, diode application as rectifiers.
			CO2	Comprehend different biasing circuits of BJT amplifiers.
			CO3	Analyze small signal model of BJT with h- parameters.
II-I & A22			CO4	Describe the working and construction of FETs and characteristics & biasing of FET and Analyze the small signal model of FET.
			CO5	Understand the fundamentals of JFET and its operation and characteristics.
			CO6	Determine the feedback and analysis of oscillators.
		02 OBJECT ORIENTED	C01	Comprehend the fundamentals of Java, Classes, Objects and design the java programs using constructors and String handling methods.
	9EC02		CO2	Design the programs using inheritance, polymorphism and interface.
	PR TH	PROGRAMMING THROUGH JAVA	CO3	Develop programs using Packages, I/O Streams and collections.
			CO4	Apply the concepts of Exception handling and

				Multithreading for various scenarios.
			CO5	Create programs using AWT, Swings and develop
				applications using event handling.
			CO6	Develop applications using Applets and client
				server programs using networking concepts.
			CO1	Define the syntax and semantics of propositional
				logic.
			CO2	Translate statements from a natural language into
				its symbolic structures in logic.
				Prove elementary properties of modular arithmetic
		DISCRETE	CO3	and explain their applications in Computer Science,
		MATHEMATICS		for example, in cryptography and hashing
	9F303			algorithms.
			CO4	Apply the notion of relations on some finite
				structures, like strings and databases.
			CO5	Analyze algorithms using the concept of functions
				and function complexity.
				Apply graph theory models of data structures and
			CO6	state machines to solve problems of connectivity
				and constraint satisfaction, for example,
				scheduling.
		COMPUTER ORGANIZATION	CO1	Perceive basic operational concept of computer and
				data processing.
			CO2	Use data types with instruction set of specified
				architecture.
	9DC12		CO3	for various operations
			CO4	Flaborate basic architecture of 8086 processor
			004	Write assembly language programming and debug
			CO5	to 8086
			CO6	Interface devices to 8086 processor.
			C01	Assess themselves using SWOT analysis.
			CO2	Appraise the importance of certain soft skills like
		SOFT SKILLS		time management and goal setting.
			CO3	Improve their verbal ability to handle the
			0.00	competitive exams.
				Enhance their team skills and design thinking
	011003		CO4	capabilities for effective problem solving and
	711003			decision making.
			007	Know their emotional quotient which guides their
			005	thinking, behavior and helps them manage stress
				efficiently.
			CO6	Equip themselves with the prerequisites, and
				relevant techniques to effectively attend corporate
				interviews.

9НС17	UNIVERSAL HUMAN VALUES	CO1	This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values.
		CO2	Understanding Harmony is designed which may be covered in their III or IV semester. During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.
		CO1	Evaluate programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series. Implement small application such as banking
	OBJECT ORIENTED	CO2 CO3	system. Compare programs on operator, function
9EC62	PROGRAMMING THROUGH JAVA LAB	CO4	Evaluate programs to implement interface and packages.
		C05	Explain and write programs to implement threads. Illustrate programs to implement applets and event
		CO6	handling.
			server scenario.
		CO1	Understand the working of single-phase transformer under different conditions, the performance of three phase induction motor, different speed control methods of DC motor with and without loading with its performance.
	BASIC ELECTRICAL ENGINEERING AND ANALOG ELECTRONICS CIRCUITS LAB	CO2	Understand the applications of Thevenin's Theorem in circuit analysis.
9AC91		CO3	Identify, Specify and test R, L, C Components (Colour Codes), Potentiometers, Switches, Coils, Relays.
		CO4	Identify, Specify and test Active Devices, Diodes, BJTs, Low power JFETs.
		CO5	Explain and demonstrate working of PN Junction and Zener diode.
		CO6	Explain and demonstrate working Half and Full wave Rectifier without filters.
		C07	Demonstrate working of CE characteristics and its application as an amplifier.
		CO1	Familiarize the architecture of 8086 processor, assembling language programming and interfacing

	9DC62	COMPLITER		with various modules
	10002	ORGANIZATION LAB		Experiment with Arithmetic energians of hinery
			CO2	Experiment with Arithmetic operations of binary
				number system.
				Simulate any type of VLSI, embedded systems,
			CO3	industrial and real time applications by knowing
			000	the concepts of Microprocessor and
				Microcontrollers.
			CO1	Assessed the knowledge of the students in the Core
	9E378	COMPREHENSIVE TEST AND VIVA-		and Elective subjects that they have studied till the
				completion of that academic year.
		VOCE		
			001	Identify topics related to Computer Scienec and
		TECHNICAL	COI	Engineering domain.
	9E386	SEMINAR - III	CO2	Collect, survey and organize content in PPT form.
			CO3	Present seminar in an effective manner
			000	resent seminar in an errective manier.
			CO1	Solve the random variable problems and
		PROBABILITY AND STATISTICS		probability distributions.
			CO2	Estimate the parameters and solve the problems
				using central limit theorem.
			CO3	Test the hypothesis related to samples concerning
				to the means and proportions of large size samples.
			CO4	Apply and solve the problems using t-test, Chi-
	9HC16			square test also testing the hypothesis problems on
				small size samples, goodness of fit and
				independence of attributes.
II-II &			CO5	Solve the problems on measures of central
A22				tendency, Correlation.
N44			C06	Classify and differentiate various regression
				models.
			CO1	Apply the rules of Boolean algebra to simplify
	9CC55	DIGITAL ELECTRONICS		Boolean expressions.
			CO2	Simplify of Boolean expressions using K-map.
				Design MSI combinational circuits such as full
			CO3	adders multiplexers decoders encoders Code
			000	converters
				Design basic memory units (latches and flip flops)
			CO4	and sequential circuits such as counters and
			004	registers
				Create digital design using DLD's such as DOM's
			CO5	DI A'e DAT e
				Design the digital controllers using Algorithmic
			CO6	State Machine Charts
				Analyze worst age muning times of algorithms
			CO1	Anaryze worst-case running times of argorithms
			000	using asymptotic analysis.
			CO2	Synthesize divide and-conquer algorithms. Derive

			and solve recurrences describing the performance of divide-and-conquer algorithms.
9FC05	DESIGN AND ANALYSIS OF ALGORITHMS	CO3	Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
		CO4	Comprehend the concept of dynamic programming algorithms, their applications and analyze them.
		CO5	Analyze the Backtracking and Branch and Bound algorithms and also identify the scenarios for its applicability.
		CO6	Comprehend the concept of P and NP Problems and its usage in the applications.
		CO1	Analyze importance and significance of models, Database languages, architecture and design of Data Base Systems.
		CO2	Understand Relational Model – Integrity Constraints, Logic.
		CO3	Analyse data base Design and Views of databases, queries using Relational Algebra and Relational Calculus.
9EC03	DATABASE MANAGEMENT SYSTEMS	CO4	Solve Queries with Comparison Operators, Aggregative Operators and nested queries. Queries with joins.
		CO5	Apply Schema refinement through all forms of Normalization to eliminate database redundancy.
		CO6	Apply ACID properties in transaction. Ensuring serializability in concurrent transactions. Concurrent control methods and recovery of transaction.
		CO7	Analyze External Storage Organization mechanisms and apply Indexing in databases for query optimization to enhance system performance.
	SOFTWARE ENGINEERING AND	CO1	Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish lifecycles for developing software product.
9F404	OOAD	CO2	Describe the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving.
		CO3	Define and design models for the requirements stated in the software project.
		CO4	Comprehend what and how to gather the requirements for a project.
		CO5	Design class, object and interactive diagrams and know their significance of an application.

			CO6	Design advanced behavioral and architectural modeling and work on case studies.
			CO1	Acquire the basics of Managerial Economics at Micro level, Demand analysis and production analysis in particular.
			CO2	Expose on Cost concept, Revenues and Market structure and describe the concepts.
	9ZC01	ACCOUNTANCY AND MANAGEMENT	CO3	Understand the basic concepts of Accounting, Double entry system and Bookkeeping.
		SCIENCE	CO4	Interpret the concepts of Capital expenditure, Revenue expenditure and Final accounts ad their significance.
			CO5	Identify knowledge and elaborate the basics of Management, its principles and various functions performed in organization.
			CO6	Recognize various personality traits, perception, attitudes of individuals working in organization.
	9HC05	ENVIRONMENTAL SCIENCE AND	CO1	Understand about ecosystem and energy flow among the organisms.
		ECOLOGY	CO2	Know the resources available, use of them and overexploitation of the resources in the nature.
			CO3	Learn the value, use and value of biodiversity
			CO4	Understand the causes and effect of pollution and implement measures in control of pollution.
			CO5	Understand the sustainable development and implement green technology for sustainable development.
			CO6	Learn and implement policy to protect the environment
	DATABASE MANAGEMENT 9EC63 SYSTEMS LAB	DATABASE	CO1	Understand how to create tables for a database and apply Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
		CO2	Explore Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a given application.	
		CO3	Learn and demonstrate write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block	
			CO4	Gain knowledge in implementing programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT– IN Exceptions and Implement Procedures.
			CO5	Understand Programs for stored functions invoke functions in SQL Statement and Implement programs for packages specification.
			CO6	Know the significance and Implement programs using features of CURSORs and its variables and
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				develop Programs implementing Triggers.
			CO1	Identify software process and software engineering
				practices to select and
			000	Justify approaches for a given project and its
			02	constraints and distinguish life cycles for
				developing software product.
		COMPUTER AIDED	CO 2	Understand the importance and principles of
		SOFTWARE	05	Unified Modeling Language, its building blocks
	9F463	ENGINEERING		and to relate UNIL paradigm for problem solving.
		(CASE) TOOLS LAB	CO4	Define and design models for the requirements
				stated in the software project.
			CO5	Design class, object and interactive diagrams and
				know their significance.
			CO6	medaling and work on assa
				Indefining and work on case
			COL	implement werge soft algorithm for softing a list of integers in according order. Dijkstra's algorithm
			COI	for the single source shortest path problem
				Implement Prim's algorithm to generate minimum
		DESIGN AND ANALYSIS OF ALGORITHMS LAB	CO2	cost spanning tree
			CO3	Solve the job sequencing with deadlines problem
	9FC64			using greedy algorithm
				Design the solution for the $0/1$ knapsack problem
			CO4	using implement Dynamic Programming and
				implement.
			CO5	Using Dynamic programming approach solve the
			005	Optimal Binary search Tree problem.
			C06	Design and implement n-queens problem using
		~~~~~~	000	backtracking approach.
	9E479	COMPREHENSIVE	CO1	Asses the knowledge of the students in the Core
		TEST AND VIVA		and Elective subjects that they have studied till the
		VOCE - IV		completion of that academic year.
			CO1	Identify topics related to Computer Scienec and
		TECHNICAL SEMINAR IV		Engineering domain or disruptive technologies.
	9E487		CO2	Collect, survey and organize content in PPT form.
			CO3	Present seminar in an effective manner.
	9E491	SUMMER BREAK		
		INTERNSHIP – I		
			CO1	The students will acquire basic knowledge on
				Skills of Entrepreneurship.
				The students will understand the techniques of
			CO2	selecting the customers through the process of
				customer segmentation and Targeting.
			CO3	Business Models and their validity are understood

	8ZC22	BASICS OF		by the students.
		ENIKEPKENEUKSHIP	CO4	The basic cost structure, Revenue Streams and the
111-1 &				pricing strategies are understood by the students.
A20			CO5	The students will acquire knowledge about the
			005	project management and its techniques.
			COG	The students get exposure on marketing strategies
				and business regulations for the Start up.
			CO1	Gain knowledge relating to Economics, various
			CUI	sectors and its growth.
			000	Will gain knowledge relating to various concepts
			002	of National income and related aggregates.
	8ZC25	BASICS OF INDIAN		Students will learn about Indian Industrial policy
		ECONOMY	CO3	and benefits of LPG to India.
			~ ~ ~ ~	Comprehend knowledge relating to Fiscal policy &
			CO4	Taxation system in India
			CO5	Learn about inflation & business cycles
			CO6	Know about the BoP and its influence on economy
			000	Now about the Dor and its influence of economy.
			CO1	by the banking system in INDIA
	8ZC05	BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT		by the banking system in INDIA.
			CO2	Explain the credit control system and create
				awareness on NFA s.
			CO3	Apply the knowledge of insurance concepts in real
				Descentions.
			CO4	Recognize the importance of regulatory and legal
			CO5	Irame work of IRDA.
				Identify the risk management process and methods.
			CO6	Calculate the diversity of risk and return.
			001	Understand the Additive manufacturing processes
			CO1	and their relationship with subtractive
			manufacturing.	
				Demonstrate comprehensive knowledge of the
			CO2	broad range of liquid based rapid prototype
		INTRODUCTION TO		processes, devices, capabilities and materials that
		ADDITIVE		are available.
	8BC51	MANUFACTURING	CO3	Apply the principles of casting in Additive
		PROCESS		manufacturing processes.
				Articulate the various tradeoffs of Additive
			~~ .	manufacturing software's/data format that must be
			CO4	made in selecting advanced/additive manufacturing
				processes, devices and materials to suit particular
				product requirements.
				Learn various applications of additive
			CO5	manufacturing, such as in architecture art, health
				care direct part production and mass customization.
		CONTROL SYSTEM	CO1	Understand basic concepts of control systems.
		ENGINEERING	CO2	Study about time response analysis.

8AC46		CO3	Understand basic concepts of stability and root locus method.
		CO4	Study about frequency response analysis.
		CO5	Learn basic concepts stability analysis in frequency domain.
		CO6	Outline fundamentals of state space analysis.
		CO1	Classify embedded systems and their applications.
		CO2	Write ALP for 8051 architecture.
		CO3	Implement interfaces for Embedded System using various protocols and hardware modules.
PDC42	FMBEDDED	CO4	Understand the principles of Communication Interface, Wireless and Mobile Systems Protocols
<b>6DC42</b>	SYSTEMS	CO5	Design the interrupt routines for variois OS concepts and Memory Management techniques in an RTOS Environment.
		CO6	Recognize the issues and design of basic Real- Time Operating System principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations.
		CO1	Gain the knowledge on the inputs required for design thinking and also gain familiarity on concepts related to design thinking.
		CO2	Understand the techniques of idea generation.
8ZC08	8ZC08 DESIGN LITERACY AND DESIGN THINKING	CO3	Classify different phases of design thinking.
AND DESIGN THINKING		CO4	Realize the product design process.
		CO5	Understand design thinking for service design.
		CO6	Gain knowledge on various cases related to design thinking.
		CO1	Appraise the role of the Web, its need and Intelligence.
8EC11	SEMANTIC WEB & SOCIAL NETWORKS	CO2	Outline the concepts of Machine Intelligence Ontology, Inference engines, Software Agents, Berners-Lee www and Semantic Road Map.
		CO3	Conceptualize Knowledge Representation for the Semantic Web with Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML and XML Schema.
		CO4	Apply Ontology Engineering using Ontology Development Tools/ Methods, Ontology Libraries, Ontology Mapping Logic and Inference Engines
		CO5	Illustrate Semantic Web Applications, Services and Technology.
		CO6	Apply Social Network Analysis, Semantic web networks analysis and describe Building of

			Semantic Web Applications with social network features.
		CO1	Explain Architecture Business Cycle, Architectural patterns, reference models, reference architectures, and architecture structures.
		CO2	Describe architecture, Quality Attributes, styles, patterns and design of Architecture along with the Documentation of architecture.
8FC12	SOFTWARE ARCHITECTURE AND DESIGN PATTERNS	CO3	Discuss Software Architecture evaluation, Architecture design decision making, SAAM, ATAM and CBAM. And plan software architecture in future.
		CO4	Plan and use Creational patterns and Structural patterns application development.
		CO5	Solving problems using Induction learning, Decision Tree, Statistical learning methods, learning with hidden variables, EM algorithm, Instance based learning and Neural Networks.
		CO6	Explain Behavioral patterns using Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template method and Visitor.
		CO1	Understand basic terms related to Big Data, Data Science and Analysis of Data. Learn Statistical Inference, Probability Distributions and Fitting a model.
8EC16	INTRODUCTION TO DATA SCIENCE	CO2	Implement Data analysis techniques for solving practical problems.
		CO3	Perform Data analysis on variety of data using R.
		CO4	Exercise appropriate manipulation techniques on lists and vectors using operators in R. Comprehend the significance and use the iterative programming and functions in R.
		CO5	Learn and describe the various Dimensionality Reduction techniques available.
		CO6	Apply the suitable visualization techniques to output analytical results.
		CO1	Understand fundamental terms in Computer Graphics, various visible surface determination algorithms and midpoint and line segment analysis.
		CO2	Explore 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations.
8FC17	COMPUTER	CO3	Apply functions 2D viewing and apply clipping algorithms.
01'01'	GRAPHICS	CO4	Understand the concepts and techniques used in 3D computer graphics, including viewing

			transformations, hierarchical modeling, color, lighting and texture mapping.
		CO5	Apply single and multiple 3-D viewing techniques like viewing coordinates etc and also back-face detection, depth-buffer, and scan-line methods.
		CO6	Analyze the animation production pipeline and Produce a short animation.
		CO1	Understand the fundamental concepts of Security Attacks and security standards with the model for network Security.
		CO2	Review and analyze conventional cryptographic techniques and authentication.
8FC06	INFORMATION SECURITY	CO3	Review and analyze public cryptographic techniques and outline the concepts of Kerberos and email privacy.
		CO4	Recognize architecture, key management and header formats of IPSEC.
		CO5	Outline the various web security threats and protocols.
		CO6	Understand Intrusion Detection System and Design principles of Firewalls.
	DATA	CO1	Understand the fundamentals of Data Mining and Identify the techniques used in data preprocessing.
8EC04	WAREHOUSING AND DATA MINING	CO2	Understand the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP
		CO3	Learn insights of Data Mining Primitives and Infer
		CO4	Apply the algorithms for mining association rules in large databases.
		CO5	Discuss and apply the models of classification and use those models for the prediction of the new samples.
		CO6	Apply various clustering techniques available for numerous applications. Identify the optimal clustering technique for a particular application.
		CO1	Understand concepts of different networks, network models and transmission medias.
		CO2	Classify various data conversion techniques and Multiplexing, Demultiplexing techniques.
	рата	CO3	Summarize the design issues of Datalink layer and solve problems on Error and Flow control.
8EC05	COMMUNICATIONS AND NETWORKS	CO4	Infer MAC layer protocols, various connecting devices, IP addressing concepts and design a network (using subnetting and supernetting techniques).

		CO5	Analyze various routing algorithms and outline the concepts of Internet control protocols and
		CO6	Recognize services and protocols of transport layer, application layer along with network security
		CO1	Work with the ETL and Mining tools.
	рата	CO2	Demonstrate the classification, clustering techniques on the data sets.
8EC64	WAREHOUSING AND DATA MINING LAB	CO3	Comprehend the results obtained in the clustering, Association and Classification techniques applied on the data sets with varied input parameters.
		CO4	Ability to apply mining techniques for realistic data.
8EC65	COMPUTER NETWORKS LAB	CO1	Implement and analyze framing methods of the data link layer.
		CO2	Implement and analyze framing methods of the data link layer.
		CO3	Illustrate and implement error detection & correction techniques.
		<b>CO4</b>	Implement different Routing Algorithms.
		CO5	Understand basic Network Commands.
		CO6	Use of Wireshark and NS-2 tools.
8FC65	INFORMATION SECURITY LAB	CO1	Understanding of Symmetric Encryption Algorithms, Asymmetric Encryption Algorithms, Hash and Key Exchange, Digital Signature and Digital Envelope, Demonstration of NS3 Tool.
		CO1	Demonstrate a breadth of knowledge in Intellectual property.
05040	ΙΝΤΕΊ Ι ΕΩΤΙΙΑΙ	CO2	Overview of Patents, Searching, filling and drafting of Patents.
8EC49	PROPERTY RIGHTS	CO3	Overview of copyright & GI.
		CO4	Overview of Trade Mark & Trade Secret,
		CO5	Overview of Integrated Circuit and Industrial Design.
		CO6	Knowledge about different national and international: Conventions and Treaties Governing the IPRs.
		CO1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
		CO2	Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and

	8E491	SUMMER INDUSTRY		hence developing the software.
		INTERNSHIP-I		Inculcate an enthusiasm to use the creative ideas to
			CO3	build the innovative projects and prototypes which
				are meeting the current needs of the market and
				society as a whole
				Improve their communicative skills and team
			CO4	al-illa
				SKIIIS.
			~~ 1	Gain knowledge on the stages of Startup and the
			COI	turbulence environment it undergoes and the stages
				related to growth of the Startup.
	07.000	ADVANCED		Exposed to the various business models and
	8ZC23	ENTREPRENEURSHIP	CO2	critically evaluating the effectiveness of the
III-II &				business models and products.
A 20			CO3	Understand the method of business traction, create
A20			005	roles and build their A- team.
			CO4	Understand the various channels of revenue
			CO4	building and exploration of new revenue avenues.
				Understand the need of sales planning and people
			C05	plan and also financial modeling.
				Exposed to the legal implications affecting the
			CO6	company's prospects and identifying right mentors
				and advisors to support startups
				Outline knowledge relating to the Indian
		CO1	Constitution and the Preamble to the Constitution	
				Relate to the fundamental rights and duties of the
			CO2	Indian citizens and the directive principles of state
				nolicy
				Identify about the federal structure and judiciary of
	8ZC26	BASICS OF POLITY	CO3	India
		AND ECOLOGY		Understand knowledge relating to the conservation
			CO4	of the environment
				Analyse about his diversity and climatic changes
			CO5	Analyse about bio-diversity and enhance enanges
				Discuss about the international tractice
			CO6	Discuss about the international field of
			000	conventions and organizations active in the field of
				Students will understand the nature of
			CO1	Students will understand the nature of
				Entrepreneurship and its importance.
			<b>CO2</b>	Will gain knowledge regarding project, its life
	8ZC19	ENTREPRENEURSHIP		cycle and organization.
		PROJECT MANAGEMENTAND	<b>CO3</b>	will gain knowledge relating to project formulation
			004	and implementation.
		STRUCTURED	CO4	Comprehend the components of structured finance.
		FINANCE	CO5	Establish a framework of CMBS.
			CO6	Students will gain knowledge relating to the CRE
			200	Servicing.

	PRINCIPLES OF OPERATIONS	C01	Formulate and solve mathematical model (linear programming problem) for a physical situations like production, distribution of goods and economics.
8BC52	RESEARCH	CO2	Recognize and Solve the problem of transportation involving a large number of shipping routes with least transportation cost and generate optimal assignment strategy for different situations.
		CO3	Use Johnson's rule to create the optimal sequencing schedule for a sequencing problem and make decisions about replacing an item using replacement policy.
		CO4	Analyze the performance measures of Queing system and Calculate the EOQ for minimizing the total inventory cost.
		CO5	Apply simulation techniques for solving various types of problems and general idea development about Markov chains.
		C01	Understand the principle of operation of different types of instruments viz., PMMC, moving iron type of instruments, the required characteristics of an instrument in general. The student demonstrates the ability to compensate for the errors in the instruments and to extend the range of the instruments.
8AC44	FUNDAMENTALS OF MEASUREMENTS AND INSTRUMENTATION	CO2	Demonstrates the knowledge of Potential and Current transformers; the errors in them and the effect of having an open/short in the secondary circuits; Understand the principle of operation of Dynamometer and Moving-iron type of Power factor meters.
		CO3	Understand the principle of operation of dynamometer type of Wattmeter and Induction type of Energy meter; use the wattmeter to measure the Active and Reactive power and demonstrates the ability to extend the range of them.
		CO4	Identify and use different techniques of measurement of Resistance, Inductance and Capacitance values.
		CO5	Understand the principle of operation of Different type of digital voltmeters, wave analyzers, spectrum analyzers and Cathode ray Oscilloscope.
		CO6	Demonstrates the ability in characterizing the different types of transducers and uses them to measure Strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque and Temperature.

			CO1	Identify the working principle of diffusion, ion
	8DC43	INTRODUCTION TO	COI	implantation, metallization and other basic
	00043	VLSI DESIGN		Comprehend basic electrical properties of various
			CO2	types of mos transistors
				Identify the significance of cmos logic gates and
			CO3	design the multiplexers.
			CO4	Draw layouts for a cmos circuit and logic design
			CO4	and validate them.
			CO5	Differentiate the various types of memories and
			000	clocking strategies.
			CO6	Design various combinational and sequential
				circuits.
			CO1	Understand the inputs required for human centric
			COI	design thinking the students learn the techniques of
			CO2	Explore the different phases of Ideation process
			002	Outline emerging technologies and understand 3d
	07.000	CO – CREATION AND	CO3	printing in manufacturing.
	8ZC09 PRODUCT DESIGN	CO4	Indicate developments of prototypes.	
		COF	Understand reverse engineering methods in product	
			05	development.
		CO6	Review the information on IPR, and patent	
			000	application.
			CO1	Appraise networking and Internet concepts and be
				familiar with OSI Model and TCP/IP model.
			CO2	Detect networking errors learn correction
			Infer the role of protocols in networking and to	
		CO3	analyze the services and features of the various	
	8EC12	ADVANCED		layers in the protocol stack.
		NETWORKS	CO4	Differentiate Internet addressing IPv4 and IPv6 and
		NET WORKS	0.04	Internet protocols.
			CO5	Conceptualize wireless networking and to Develop
			<u> </u>	new protocols in networking.
			006	Design new virtual private networks.
			CO1	Outline Forensic science and Digital Forensic
				Comprehend the technical concepts involved in
			CO2	understanding the digital forensics.
			001	Interpret the cyber pieces of evidence. Digital
	<b>OFCOO</b>		03	forensic process model.
	oec22	FORFNSICS	CO4	Familiarize the computer operating system
		TUNENDIUD	004	concepts involved in digital forensics.
			CO5	Determine the legal aspects of Digital Forensics.
			CO6	Demonstrate various forensic tools to investigate

				the cyber crime and to identify the digital pieces of evidence.
			CO1	Explain primitives of Project Planning and evolution of software economics.
			CO2	Describe software economics; reduce Software product size, improvement in software processes, improving team effectiveness, improving automation, Achieving quality.
	8EC13	SOFTWADE	CO3	Explain Life cycle phases and Artifacts of the process.
	01/013	PROJECT MANAGEMENT	CO4	Describe Model based software architectures and Work Flows.
			CO5	Apply Checkpoints for a process such as Major mile stones, Minor Milestones and apply work breakdown structures for a iterative process within cost and schedule. Describe Project Organizations and Responsibilities.
			CO6	Describe Automation and Project Control and Process instrumentation and explain Future Software Project Management such as Modern Project Profiles and Next generation project management.
	8EC17 MA		CO1	Understand the fundamental concepts of ML and Designing a Learning System.
		MACHINE LEARNING	CO2	Understand the basic concepts of MLP, RBF and SVM and their applications.
			CO3	Understand the Probability models namely supervised, unsupervised, basic statistics analyze their analysis of algorithms along with their applications.
			CO4	Understand various Dimensionality Reduction Techniques and Apply various Evolutionary Algorithms with models.
			CO5	Understand the Graphical models and their applications.
			CO6	Understanding Analytical Learning and Analyze KBANN Algorithm.
			CO1	Analyze general terminology of image processing.
			CO2	Examine various types of images, intensity transformations and spatial filtering.
	8FC18	IMAGE PROCESSING	CO3	Develop Fourier transform for image processing in frequency domain.
			CO4	Evaluate the methodologies for image segmentation, restoration etc.
			CO5	Implement image process and analysis algorithms.
			<b>CO6</b>	Apply image processing algorithms in practical

				applications.
				Introducing .Net Architecture and learn basic
			CO1	programming in C# and the object oriented
				programming concepts.
			CON	Explain advance features and enhance skills in
			02	ASP NET
	8FC26	C# AND .NET		Discuss various class libraries for different
		FRAMEWORK	CO3	applications and data manipulation functions.
				Understand the advanced concepts in data
			CO4	connectivity, WPF, WCF and WWF with C#
				and .NET 4.5.
			CO5	Evelop distributed applications using .INET
			<u> </u>	Create mobile applications using .NET compact
			CO6	Framework.
			CO1	Design the finite automata different Languages.
	8FC07	AUTOMATA THEORY AND COMPILER DESIGN		Construct finite Automata for a given regular
			<b>CO2</b>	expressions, and derive strings with suitable
				and normal forms
			<b>GO 1</b>	Design the push down automata and Turing
			CO3	Machine for complex languages.
			CO4	Understand LEX tool and relate parsing
				techniques.
			CO5	Demonstrate and solve problems on SLR, CLR, LALP, operator precedence person LP (O) LP(1)
			005	LR(K) grammar and use YACC tool.
				Understand Semantic Analysis concepts to design
			<b>CO6</b>	compiler: and describe Intermediate code
				generation such as 3-address code form.
			CO1	Understand the functional architecture of an Operating System with usage of system calls
				Analyze various process scheduling algorithms &
			<b>CO2</b>	pragmatics of scheduling algorithms used by
	8EC06	OPERATING Systems		various Operating Systems.
		5151EM5	CO3	Solve issues related to process synchronization and
			<u>CO4</u>	Deadlocks in the Operating System.
			CO4	Outling the directory structure & analyze diale
			CO5	scheduling algorithms.
			<u>CO(</u>	Summarize the aspects of Protection and Security,
				and understand the concepts of I/O systems.
			CO1	Demonstrate the use of HTML tags. Apply Styles
			COA	using CSS and Bootstrap.
			CO2	Develop dynamic programs using Javascript and

				Typescript.
			CO3	Develop scripts using XML and validate using
				parsers.
			CO4	Design a data-interchange format using JSON.
			CO5	Appraise the Expressions, Filters, Directives,
9E C07	WED	005	Controller, and Modules of Angular.	
	8EC07 WEB TECHNOLOGIES		Design responsive web applications with Forms,	
		TECHNOLOGIES	CO6	Scope, Dependency Injection & Services, and
				Single Page Application (SPA) of Angular.
			C07	Comprehend the uses of Web servers and design
			007	the server-side scripts using Servlets.
		C08	Design and develop server-side scripts and	
			000	components using PHP.
			CO1	Familiarize the cryptographic procedures and
				Understand its primitives.
				Outline Security policy in Legislation and
			CO2	Comprehend E-Commerce. frame work, models
				and its associated threats.
			~~~	Justify the role of electronic signatures in E-
		CYBER SECURITY	CO3	Commerce and summarize the various laws
	8FC08	AND CYBER LAWS		relating to it.
			CO4	Categorize international cyber laws and cyber
				crimes.
			CO5	Explore Penalties, Compensation and Adjunction
				Of violations of provisions of 11 Act 2000.
			CO6	Chassing and Outline the Oriences under the
	8FC66	COMPILER DESIGN		Implementation of DEA for a given Languages/
	01 000	LAB	CO1	Regular Expression
				Usage LEX of tool to implement lexical analyzer in
			CO2	compiler design and implementation of Top-Down
				Parser.
			002	Usage of YACC tools for implementing bottom
			003	up parser.
	8EC66	OPERATING	CO1	Implement scheduling algorithms, Deadlocks, File
		SYSTEMS LAB		allocation and Memory management techniques.
				Understand the basic fundamentals of computer
			CO1	vision and diversity of computer vision
				applications.
				Explore the various camera models, multi view
			CO2	geometry, structures and generate 3D model from
				images.
			000	Analyze and apply image preprocessing,
	8FC19	COMPUTER VISION	003	continuous and discrete representation methods and
			004	teature extraction techniques.
			CO4	Apply regularization theory, optical

				communication, stereo vision, and motion estimation techniques to detect moving objects in a
				video.
				Illustrate different image shape representations and
			CO5	understand Fourier and wavelet descriptors and
				segmentation methods.
			CO6	Understand various object recognition methods,
				Hough transforms and illustrate shape matching.
				Demonstrate the use of HTML tags and be able to
			CO1	design web pages.Develop dynamic programs
				involving Java scripts, popup windows in
				JavaScript along Event Handling.
				Develop scripts using XML and XSLT and read
			CO2	XML documents using parsers, DOM parser, and
				SAX parser. Develop JSON files and access them
	8EC67	WEB		via HTML pages.
		TECHNOLOGIES LAB	CO3	Implement Angular with Expressions, Filters,
				Directives, Controller, and Modules.
			CO4	Develop a Single Page Application with
				Implementation of Scope and Form.
			CO5	Server for User outbartisetions
				Develop on application in DUD with Database
			CO6	connectivity
				Use the concepts learned in the courses so far in
			CO1	concentualizing designing and executing the
				modules of the projects.
				Exhibit the interest in learning the modern tools
			CO3	and technologies through the bridge courses
			002	arranged in the college, beyond the curriculum, and
				hence developing the software.
	8E604	CROUP PROJECT		Inculcate an enthusiasm to use the creative ideas to
	0E094	UNUUT INUSECT	CO3	build the innovative projects which are meeting the
				current needs of the market and society as a whole.
			CO4	Improve their communicative skills and team skills
				largely improve.
8E681 CC			CO5	Work as an individual and in a team.
	COMPREHENSIVE	CO1	Assessed the knowledge of the students in the Core	
		VIVA VOCE		and Elective subjects that they have studied till the
	0.0.0			completion of that academic year.
	8E692	SUMMER		
		INDUSTRÝ		
		INTERNSHIP-II		
	8FC12	DATARASE	C01	Comprehend the various access control rules
		SECURITY	C01	available to assign privileges and protect data in
				rest and r

				databases.
			C02	Describe and compare the popular Security
				Models.
			C03	Categorize the security mechanisms and their
				functions.
			CO4	Identify the Security Software Design principles to
				protect data in databases.
			CO5	Classify and compare the Statistical Database
				Protection & Intrusion Detection Systems.
			CO6	Learn the new models of database systems and the
				models of protection.
			C01	Explain need, practices and Risk issues in Software
		SOFTWARE		requirements.
		REQUIREMENTS	C02	Describe Software Requirements Engineering
		AND ESTIMATION	<u> </u>	Even as review, quanty and priorities.
IV-I & A20	9EC11		C03	Explain software modeling and Requirements
	огсп			Apply Estimation methods for size using Mark II
			CO4	FPA Full Function Points I OC Estimation
				Apply Cost and Schedule estimation factors during
			CO5	software development
				Apply tools for Requirements Management and
			CO6	Estimation.
			C01	Discuss the importance of big data.
		BIG DATA ANALYTICS		Interpret the challenges with big data; elaborate the
			C02	knowledge about the technological developments
				in big data environment.
	8EC18		C03	Assess about NOSQL data environment.
	02010		CO4	Capability of understanding the usage of big data
				in context to cloud and other technologies.
			CO5	Justify about map reduce work flows.
			CO6	Implement Data Analysis with HADOOP and
		DLOCK CHAIN		related tools.
		BLOCK CHAIN TECHNOLOGIES	C01	Understand basic principles of HDFS and digital
				Signature.
			C02	Payment Verification protocol and its life cycle
				Explain the Nakamoto consensus and List and
	8FC16		C03	describe differences between proof-of-work and
				proof-of-stake consensus.
			CO4	Understand Bitcoin and Ethereum.
			COF	Learn about the legal issues of Blockchain through
			105	some applications.
			CO6	Discuss new trends in Blockchain technologies.
	QEC14		C01	Understand the Security Issues and Measures.
	olu14		C02	Know the KEY Elements and Logical Elements of

	INFORMATION		Networks.
	SECURITY.	C03	Understand the Data Leakage, its Threats and
	MANAGEMENT AND	005	Mitigation.
	STANDARDS	CO4	Understand the Database Security.
		COS	Understand the Policies, Guideline and Framework
		005	of Information Security.
		CO6	Understand the Ethics, Roles and Responsibilities of ISM.
		C01	To understand the essence of agile development methods.
9EC12	AGILE SOFTWARE	C02	To apply the principles and practices of extreme programming in real world problems.
or C12	DEVELOPMENT	C03	To incorporate proper coding standards and guidelines in an agile process.
		CO4	To optimize an agile process by exploring the possible risks and threats in the software process.
	CO5	To improve the process by eliminating waste.	
		CO6	To design an agile process for a business
			application and deal with appropriate tradeoff.
		C01	Elaborate the fundamentals of business
8EC19 BUSINESS INTELLIGENCE		C02	Link data mining with husiness intelligence
	BUGINESS	C02	A pply various modeling techniques
	INTELLIGENCE	0.05	Perform the data analysis and knowledge delivery
	CO4	stages.	
	CO5	Apply business intelligence methods to various situations.	
		CO6	Decide on appropriate technique for the given model.
	AUGMENTED AND	C01	Understand the fundamentals of Virtual Reality.
	VIRTUAL REALITY	C02	Comprehend multiple Models of Input and Output Interface in Virtual Reality like Gloves, Video- based Input, 3D Menus & 3DScanner etc.
		C03	Describe the fundamentals or Advanced topics of Computer Graphics.
8FC17		CO4	Explain the Interactive Techniques on VR in respect of Body Track, Hand Gesture, 3D Manus, Object Grasp.
		CO5	Know about the developments Tools of VR and describe.
		CO6	Familiarize the Conceptual idea on Augmented Reality and relate the illustrations.
		C01	Describe concepts of Software testing.
		C02	Describe and apply the concepts Flow graphs, Path testing and Data Flow Testing.

			-	
				Practice Software testing strategy and Environment
			C03	with economics and apply Software Metrics useful
				in software development and maintenance.
				Software Testing Methodology, finding defects
				hard to find, Verification and validation,
		SOFTWARE	CO4	Functional and structural, Workbench concept,
		AUTOMATION AND	004	Eight Consideration of software testing
	8F719	TESTING		methodology, checklist. Describe Agile computing
				with agile testing.
				Demonstrate Software Testing Techniques such as
			COS	JADs, Pareto Analysis ,Regression Testing,
			005	Structured walkthroughs, Thread testing,
				Performance testing and White box testing.
				Describe Graph matrices and applications, and
			CO6	practice and apply automated testing tools such
				load Runner LIFT and OTP
				Get familiarized with the fundamental concents of
			C01	security attacks, security services
				Implement the conventional cryptographic
	IN 8EC08		C02	techniques
			C03	Simulate the Public key cryptography techniques
		INFORMATION	005	Comprehend ID security Architecture and its role
		SECURITY	CO4	in security fremowork
			CO5	Implement SSL and TLS for Web Security
			CO5	Design Intrusion Detection Systems and Firewall
	8F708	I INUV	C00	Design initiation Detection Systems and Thewait.
	01 / 00	PROGRAMMING		Weite Chall Carinta
			C02	Enlist various System Colla in Linux
			005	Ennst various System Calls in Linux.
			CO4	Classify various system calls to handle the
			CO5	Processes and signal the process.
			105	Elaborate the working of IPC.
			001	Demonstrate the significance of Semaphores for
			C06	Kernel support and simulate program using the
				same.
				Learn the distinction between optimal reasoning
				vs numan like reasoning and formulate an efficient
			C01	problem space for a problem expressed in natural
				nanguage. Also select a search algorithm lot a
				complexities
				Apply AI techniques to solve problems of game
		AKTIFICIAL INTELLICENCE	C02	playing theorem proving and machine learning
	8EC20	INTELLIGENCE		Learn different knowledge representation
			C03	techniques
				Understand the concents of state space
			CO4	representation exhaustive search heuristic search
				representation, exhaustive search, neuristic search

			together with the time and space complexities.
		COF	Comprehend the applications of Probabilistic
		005	Reasoning and Bayesian Networks.
		000	Analyze Supervised Learning Vs. Learning
		C06	Decision Trees.
		C01	Understand cyber-attacks, types of cybercrimes.
			Realize the importance of cyber security and
		C02	various forms of cyber attacks and counter
		002	manufactor and counter manufactor
		C03	Get familiarity of other forancies
	CYDED SECUDITY	0.05	Cet familiar with choosity and normography in
8FC20	CIBER SECURITY	CO4	Get familiar with obscenity and pornography in
		04	cyber space and understand the violation of right of
			privacy on internet.
		005	Appraise Cyber laws and also how to protect them
		COS	self and ultimately the entire Internet community
			from such attacks.
		COC	Elucidate the various chapters of the IT Act 2008,
		CO6	power of Central and State Government to make
			rules under IT Act 2008.
	SOFTWARE		Prepare Test Plan document and write Test Cases
	AUTOMATION AND	~ ~ ~	for Small scale Project (Like for their B.Tech IV
8F778	78 TESTING LAB	C01	Year Project or Post-Graduate Projects), they are
			learn how to Analyze SRS document in order to
			prepare Test Plan Document.
			Demonstrate skills to use modern software testing
			tools (EX: UFT, TestLink, Bugzilla, Selenium,
		C02	Test Director and Quality Center) and test
			application (web, Window application) by using
			the tools.
			Demonstrate the ability to differentiate between
			different Testing tools present in the market (like
			functional testing tools. Test Management Tools.
		C03	Bug Tracking Tools and Performance Testing
			Tools) and prepare Test Dian document and write
			Test Grass for Small and D is ((1) for the
			Test Cases for Small scale Project (Like for their
			B.Tech IV Year Project or Post-Graduate Projects).
			To understand how to work with Linux commands
		C01	for handling files, processes, text utilities, backup
			and network utilities.
		C02	To explore basics of building shell scripts gain
		002	knowledge to compose various Shell Scripts.
	LINUX		To learn and demonstrate the I/O functions, low-
	PROGRAMMING LAB	C03	level system calls System Calls available for file
8F777			and directory handling.
		CO4	To gain knowledge in implementing processes

				aspects, mastering the process APIs.
			To understand how to implement pipes, FIFO, how	
			C05	to use for communication purpose in IPC
				To understand the significance of Semaphores for
			CO6	Kernel support and simulate program using the
				same.
				Design and Implement symmetric key encryption
			C01	algorithms.
			C02	Simulate asymmetric key encryption algorithms.
			C03	Implement hashing and key exchange algorithms.
	8FC76	INFORMATION	CO4	Simulate and execute Digital Signature and Digital
	OLC/U	SECURITY LAB	04	envelope.
			CO5	Install and execute various projects in NS3.
			C01	Develop plans with relevant people to achieve the
			COI	project's goals.
			C02	Break work down into tasks and determine
	8E784	PROJECT - I		handover procedures.
			C03	Identify links and dependencies, and schedule to
				achieve deliverables.
			CO4	Estimate the human and physical resources
			04	required, and make plans to obtain the necessary
				Allocate roles with clear lines of responsibility and
			CO5	accountability with team spirit
				Design and develop the software or prototype to
			CO6	meet societal needs.
				Use the concepts learned in the courses, so far.
			C01	conceptualizing, designing and executing the
				modules of the projects.
				Exhibit the interest in learning the modern tools
			C02	and technologies through the bridge courses
			002	arranged in the college, beyond the curriculum, and
		SUMMER INDUSTRY		hence developing the software.
	00.00	INTERNSHIP-II	C03	Inculcate an enthusiasm to use the creative ideas to
	8E682		C03	build the innovative projects which are meeting the
				current needs of the market and society as a whole.
			CO4	largely improve
			CO5	Work as an individual and in a team
				The students gain the knowledge on the inputs
			C01	required for innovation and also gain familiarity on
				Entrepreneurship.
				The students will get exposure on creative methods
			C02	of ideation and the importance of protecting the
				ideas.

		INNOVATION AND		The students as Imprulades on design thinking
	07.004	DESIGN THINKING	C03	The students gain knowledge on design uniking
	8ZC24			and types of thinking.
			CO4	The students gain familiarity on emerging
				technologies like Internet of things (IOT).
			CO5	The students understand the process of building the
IV-II &			000	startup.
A20				The students gain knowledge on various startup
			CO6	funding and also to branding building for the
				startun
	87(27)	NDIAN HISTOPV		To appropriate and understand our Indian History
		CULTURE AND	C01	Culture and Indian haritage
		GEOGRAPHY	C02	The last state of the last sta
			C02	To understand secularism of our country.
				To appreciate and understand the social reformers
			C03	who brought revolutionary changes in Indian
				society.
			CO4	To understand earth evolution and world climatic
				change.
				To understand India Oceanography, Able to
			CO5	enhance and understand Indian monsoons, Indian
				agriculture.
				This unit enables the students to understand the
			C01	financial structure and the financial sector reforms
				after 1991.
				The unit gives the exposure on the role of RBI and
			C02	the Regulating and credit policies adopted by the
				RBI.
				The students get awareness on the role of Non-
		FINANCIAL INSTITUTIONS, MARKETS AND SERVICES	C03	Banking financial institutions and the role of
				financial institutions in India
	87C15			The unit educates the students to know the role of
	02013		CO4	regulatory bodies like SEBI and also to know the
				capital and money market instruments
				The unit equips the students to understand about
			CO5	the asset fund based financial services
			CO6	The students will get exposure about the
			000	investment harking and marshart harking
				investment banking and inerchant banking.
			C01	Understand the need for manufacturing processes
				and various material properties.
				Understand the principle of casting, Patterns used,
			C02	Pattern allowance and Gating systems used in
				casting, and various casting methods.
				Understand the basic principle of welding and
			C03	distinguish between various welding types and
				their applications.
		PRINCIPLES OF	CO4	Understand the principles of metal working,

	MANUFACTURING PROCESSES		various types of metal working techniques, Knowledge of hot working and cold working,
8BC52			Ability to understand the bulk deformation
		CO5	Understand the bulk deformation processes of extrusion and forging, their applications and forces involved in these operations
		CO6	Understand and distinguish the various press
			working operations with respect to their
			applications, advantages and disadvantages,
			understand the various types of plastics and their
			processing techniques.
8AC45	FUNDAMENTALS OF RENEWABLE ENERGY SOURCES	C01	Understand the role and potential of new and renewable energy sources realize the potential of solar energy, its impact on environment; define and understand the terms describing the different angles that one may incur in setting up a solar panel and be able to use the instruments for measuring solar radiation.
		C02	Demonstrates the knowledge of different
		C03	techniques of solar collection and storage. The student becomes familiar with the different types of horizontal and vertical axis wind mills and understands the performance characteristics of the same. The student also demonstrates the knowledge of different Bio-gas digesters and factors influencing its yield.
		CO4	Aware of the potential of geothermal energy in India and will be able to characterize different types of geothermal wells.
		CO5	Aware of the different methods of kinetic energy extraction from Ocean waves and tides and thermal energy extraction from Oceans.
		CO6	Demonstrates the knowledge of Direct Energy
			Conversion in different phenomena viz., Joule
			Thomson effect, Seebeck effect, Peltier effect etc.
		CO1	and the principle of operation of Fuel Cells.
			multistage amplifiers at low and high frequencies.
		C02	Analyse and Design JFET and MOSFET amplifiers.
90044	ELECTRONICS CIRCUIT DESIGN	C03	Design different types of Feedback Amplifier, Oscillators and their analysis.
ðUU44	AND ANALYSIS	CO4	Analyse and Design power amplifiers. Understand distortions.

				Analyse and Design tuned and RF amplifiers such
			CO5	as single tuned, double tuned, stagger tuned and
				wide band amplifier.
			CO6	Understand the stability of oscillators and tuned
				amplifiers
			CO1	Descentize of the minimize of mobile of here
			COI	Recognize of the principles of mobile ad noc
		MOBILE ADHOC AND		networks (MANEIS) and what distinguishes them
		SENSOR NETWORKS		from infrastructure-based networks.
	8EC15		C02	Comprehend the characteristics of wireless sensor networks (WSNs)
				Penort how proactive protocols function and their
			C03	implications on data transmission dalay and
			0.05	handwidth consumption
				Assess how reactive routing materials function and
			COA	Assess now reactive routing protocols function and
			04	their implications on data transmission delay and
				bandwidth consumption.
			COF	Analyze the functioning of proactive routing
			COS	protocols and their implications on data
			a c c	transmission delay and bandwidth consumption.
			CO6	Analyze the functioning of reactive routing
				protocols and their implications on data
				transmission delay and bandwidth consumption.
				And become familiar with the mechanisms for
				implementing security and trust mechanisms in
				MANETs and WSNs.
			CO1	Understand the issues affecting the organization,
				planning, and development of large and complex
				software systems.
			C02	Understand the concepts of software metrics and
		ADVANCED		reuse-based software engineering.
	8FC13	SOFTWARE	C03	Apply software engineering principles in the
	01 013	ENGINEERING		development of distributed software systems.
			CO4	Design and implement service-oriented software
				systems.
			CO5	Understand the design and development of aspect-
				oriented software systems.
			CO6	Understand software re-engineering process model.
			CO1	Describe the characteristics of cloud.
			C02	Describe the cloud services.
				Understand different architectures for cloud
			C03	applications, Creation and running of python
	8EC21	CLOUD		programs, running amazon ec2 instance
		COMPLITING		Understand Data Intensive applications and future
			CO4	trends of Internet Clouds supporting Mobile
				Computing, Ubiquitious Computing and Social
				Networking.

			CO5	Discuss mapreduce and image processing app on
				cloud.
			CO6	Discuss cloud security architecture.
			CO1	Get familiar with terminology, technology and
				applications of IoT.
	8DC55	INTERNET OF		Understand and explain IoT system management
	00000	THINCS	C02	using M2M (machine to machine) with necessary
		THINGS		protocols.
			C02	Design and develop Python Scripting Language
			C03	programs preferred for many IoT applications.
			CO4	Use Raspberry PI as a hardware platform for
			04	designing the IoT sensor interfacing.
			CO5	Implement web based services for IoT.
			CO6	Understand and analyze the case studies
				illustrating IoT Design.
			CO1	Develop plans with relevant people to achieve the
				project's goals. Break work down into tasks and determine handover procedures.
			C02	
			02	
			C03	Identify links and dependencies, and schedule to
	0005		0.05	achieve deliverables.
	9F992	PROJECT - II		Estimate the human and physical resources
			CO4	required, and make plans to obtain the necessary
				resources.
			CO5	Allocate roles with clear lines of responsibility and
				accountability with team spirit.
			CO6	Design and develop the software or prototype
				using modern software tools wherever applicable
				to meet societal needs.





Course Outcomes of IT Department





Department of Information Technology

COs for A22-1st Year and 2nd Year, A20-3rd Year and 4th Year courses/subjects

Year and	Course	Course Name		Co's
Regulation	Code			
			C01	Understand and analyze microscopic chemistry in terms of atomic orbital's, molecular orbital's and intermolecular forces.
			C02	thermosetting plastics and various lubricants.
	9НС04	Engineering	C03	Recognize and select the domestic and industrial problems caused by hardwater and also learn about the municipal water treatment using various methods.
		Chemistry	C04	Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
			C05	Differentiate the types of corrosion and methods used to prevent the corrosion, surface coating techniques.
I-I & A22			C06	Understand the synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.
	9FC01	Problem Solving using C	C01	Formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs (in C language).
			C02	Execute and test the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion.
			C03	Distinguish a problem into functions and synthesize a complete program using divide and conquer approach.
			C04	Understand arrays, pointers and structures to formulate algorithms and programs.
			C05	Analyse programming to solve matrix addition and multiplication problems and searching and sorting problems.
			C06	Understand programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.
		Matrix Algebra and	C01	Check the consistency or inconsistency of a linear system and can solve the problems.
	9HC11	Calculus	C02	Find the Eigen values and Eigen vectors and can solve the problems associated with these concepts.
			C03	Find the nature, index and signature of the quadratic

				lubricant, acid value of an oil.
			C03	Estimate hardness of water.
			C04	Analyze the amount of chloride content.
			C05	Determine cell constant and conductance of solutions, redox potential and emf of solutions, the rate constant of acid.
			C06	Synthesize a polymer (Thiakol rubber / Urea- Farmaldehyde resin), a drug- Aspirin.
			C07	Estimate of Mn+7 by Colorimetry method.
			C01	Understand various types of conventional manufacturing Processes
			C02	Describe manufacturing components from wood, MS flat GI Sheet etc. – hands on experience
	9BC61	Workshop/ Manufacturing Process Lab	C03	Illustrate Manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc.
			C04	Produce small devices / products /appliances by assembling different components.
I-II & A22	9НС07	Engineering Physics	C01	Differentiate the wave and particle, de-Broglie matter waves-its experimental evidence, Schroedinger's wave concept and its application for a particle in one dimension box.
			C02	Explain about emission, its types, laser principle, types, working and its applications and to reveals about TIR principle, optical fiber-types and signal propagation, attenuation, communication system and applications of optical fibers (sensors and medical endoscopy).
			C03	Classify magnetism types, Hysteresis, domain theory, Anti-ferro and ferri-magnetism, Superconductivity, experimental facts, theoretical analysis, types of superconductors and its applications.
			C04	Explain the basic concepts of dielectric materials, polarization and its types, local fields, frequency and temperature effect on dielectrics and their applications (piezo, ferro and Pyro electricity).
			CO 5	Elaborate semiconductor behavior, types, carrier concentration, Hall effect, Thermistor, demonstrate and analyze semiconductor devices like a PN- junction, I-V characteristics, LED, solar cell, photo
			<u> </u>	diode and their applications.
				summarize Nano & DUIK concepts, surface to volume ratio quantum confinement CNTs and
			0	preparation methods (physical & chemical)
				analysis the techniques like XRD, SEM, TEM and

			form.
		C04	Verify the applicability of mean value theorems and
			also can express the given standard function in
			series form using Taylor's and Maclaurin series.
			Find the solutions of first order first degree
		C05	differential equations and solve the problems on
		005	Newton's law of cooling, Natural growth and
l			decay.
			Solve higher order ordinary differential equations
		C06	with constant coefficients using some standard
			methods.
		C01	Demonstrate competence with suitable accuracy in
			vocabulary, and language fluency.
	English-Essential	C02	State the definition of nouns, verbs, adjectives, and
HC01	English Language		adverbs.
	Skills	C03	Identify the differences of each tense and use the
			tenses accurately.
		C04	Identify specialized reading strategies for specific
			types of texts.
		C05	Produce written work that is substantive, organized,
			and grammatically accurate.
		C01	Describe people, objects and situations using simple
			sentences.
		C02	Use appropriate tenses and expressions in different
9HC61	Oral Communications		contexts of conversations.
	Lab-1	C03	Identify major areas of concern in their oral
			communication and address them.
		C04	Create a SMART plan to enhance their
		001	communication skills in English.
		C01	Enumerate the algorithms for simple problems.
		C02	Classify the given algorithms to a working and
			correct program.
		C03	Correct the syntax errors as reported by the
			compilers.
	Problem Solving using	C04	Identify and correct logical errors encountered at
)FC41	C Lab	- • -	run time.
7 F UUI		C05	Write iterative as well as recursive programs.
		C04	Represent data in arrays, strings and structures and
		000	manipulate them through a program.
		C07	Declare pointers of different types and use them in
			defining self referential structures.
	CO	Create, read and write to and from simple text files.	
	8	-	
	Engineering	C01	Prepare the Inorganic compounds
9HC64	9HC64 Chemistry Lab		Determine surface tension of a liquid viscosity of
Chemistry Lab	C04	Determine surface tension of a figure, viscosity of	

			also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications.
		C01	Demonstrate the concepts of Abstract data type and also applications of stack and Queues.
		C02	Select the data structures that efficiently model the information in a problem.
	Data	C03	Design programs using variety of data structures including Trees, AVL Trees and Graphs and their applications.
9EC01	Structures	C04	Solve problems and also assess efficiency trade off among searching and sorting using time complexity of each algorithm and also the applications of hashing and hash tables.
		CO 5	Describe the concepts of OOPs and implement programs using objects, classes, constructors and destructors.
		CO 6	Apply concepts of OOPs to write program on over loading functions and concepts of Inheritance.
		C01	Find the limits and test for the continuity and differentiability of a function.
		C02	Solve the problems on multiple integrals.
9HC12	ADVANCED	C03	Solve linear and nonlinear first order partial differential equations.
<i>J</i> ICI2	CALCULUS	C04	Find Series expansion a function defined over the intervals.
		CO 5	Find directional derivative, gradient, divergence and curl of a function.
		CO 6	Solve problems of line, surface and volume integrals.
		C01	Understand and apply the principles of electrical engineering to solve basic equations.
9AC48	BASIC ELECTRICAL AND	C02	Apply the knowledge gained to explain the principles of single and three phase AC circuits.
	ELECTRONICS ENGINEERING	C03	Apply the knowledge gained to explain the principle and operation of DC machine along with its applications.
		C04	Use the principles of single phase transformer along with its applications and solve the equations.
		CO	Realize the principle and operation of three phase
		5	induction motor with its applications.
		CO 6	Understand the operation of different measuring instruments along with its applications.
9BC01	ENGINEERING GRAPHICS	C01	Understand the instruments to solve the engineering problem and draw various type of curves used in

			engineering.
			Implement Orthographic projections and draw
		C02	projections of simple drawing entities such as points
			Lines, and Planes.
			Draw projections of different types of regular solids
		C03	in various positions wrt principal planes of
			projection.
			Draw Sections of various Solids including
		C04	Cylinders, cones, prisms and pyramids and draw the
			developments of these solids and their sections.
		CO	Construct Isometric Scale, Isometric Projections
		5	and Views and convert 3D views to 2D
		-	orthographic views.
		CO	Understand from basic sketching through 2D and 3-
		6	D solid modeling using computer aided design
		_	(CAD) software.
		C01	Understand, Analyse and respond to the audience
			by listening effectively.
		C02	Practice effectively the speaking skills with the apt
	ODAL		body language.
9HC62	COMMUNICATION	C03	Develop strategies to improve speaking skills.
>11\U#	LAB – II	C04	Plan, prepare and present effectively to meet the
		0.04	standards of corporate and real world in a group.
		CO	Comprehend the reading skills through note taking
		5	and other study skills.
		CO	Express the opinions effectively on the given topic
		6	through role play and situational dialogues in group
			discussions.
			Understand the concepts of photo electric effect,
		C01	importance, photo current, colour filters, optical
			sensors.
		CO2	Know about the light properties-dispersion, prism,
		02	spectrometer and minimum deviation arrangement.
		C03	Recognize the difference between the interference
		0.05	and diffraction, grating, laser characteristics.
9HC66	ENGINEERING		Analyze the concepts of fiber optics, fundamentals,
'	PHYSICS LAB	C04	numerical aperture its importance, attenuation in
			fiber and applications.
		CO	Understand and search to apply the fundamentals of
		5	magnetic induction, Ampere's law, Oersted's law
			and the Biot-Savart law.
		CO	Know the difference between AC and DC
		6	fundamentals, Magnetostriction, resonance, air
			column vibrations.
		C07	Analyze the LCR circuit combination, parallel,
			series electrical resonance, inductance, reactance,

				capacitance and electrical and electronic fundamentals
			C08	Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law.
			C09	Analyze the concept a semiconductors, types, calculation of energy gap of a semiconductor diode and importance.
			C01 0	Analyze the difference between normal diode & LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors.
			CO 11	Characterize the RC network, time constant, capacitor functioning and its application.
			C01	Implement Stacks, Queues and circular queues.
		DATA STRUCTURES	C02	Write programs using tree traversals. Inorder, Preorder and Postorder.
	9EC61	Lab Using C	C03	Program searching, sorting and hashing operations.
			C04	Write programs on Binary trees.
			C05	Implement classes and operator overloading.
			C01	Understand and apply the principles of electrical engineering to solve basic equations.
			CO2	Apply the knowledge gained to explain the principles of single and three phase AC circuits.
	9AC41 BASIC ELECTRICAL ENGINEERING	CO3	Apply the knowledge gained to explain the principle and operation of DC machine along with its applications.	
			CO4	Use the principles of single phase transformer along with its applications and solve the equations.
			CO5	Realize the principle and operation of three phase induction motor with its applications.
			CO6	Understand the operation of different measuring instruments along with its applications.
			CO1	Understand the Fundamentals of diode & BJT operation, Characteristics, diode application as rectifiers.
			CO2	Comprehend different biasing circuits of BJT amplifiers.
	9CC54	ANALOG	CO3	Analyze small signal model of BJT with h-parameters.
II-I & A22	II-I & A22	CIRCUITS	CO4	Describe the working and construction of FETs and characteristics & biasing of FET and Analyze the small signal model of FET.
			C05	Understand the fundamentals of JFET and its operation and characteristics.
			CO6	Determine the feedback and analysis of oscillators.

			CO1	Comprehend the fundamentals of Java, Classes,Objects and design the java programs using constructors and String handling methods
			<u> </u>	Design the programs using inheritance
		OBJECT ORIENTED	02	polymorphism and interface.
		PROGRAMMING	CO3	Develop programs using Packages, I/O Streams
	9EC02	THROUGH JAVA		and collections.
			CO4	Apply the concepts of Exception handling and
				Multithreading for various scenarios.
			CO5	Create programs using AWT, Swings and develop
				applications using event handling.
			CO6	Develop applications using Applets and client
			CO1	Define the syntax and semantics of propositional
			COI	logic
			CO2	Translate statements from a natural language into
			002	its symbolic structures in logic.
				Prove elementary properties of modular arithmetic
		DISCRETE	CO3	and explain their applications in Computer Science,
		MATHEMATICS		for example, in cryptography and hashing
	9F303		algorithms.	
			CO4	Apply the notion of relations on some finite
				structures, like strings and databases.
			CO5	Analyze algorithms using the concept of functions
				Apply graph theory models of data structures and
			CO6	state machines to solve problems of connectivity
				and constraint satisfaction, for example,
				scheduling.
			CO1	Perceive basic operational concept of computer and
			COI	data processing.
		COMPUTER	CO2	Use data types with instruction set of specified
		ORGANIZATION		architecture.
	9DC12		CO3	Justify different control unit design and algorithms
			CO4	Flaborate basic architecture of 8086 processor
			0.04	Write assembly language programming and debug
	CO5	to 8086.		
		CO6	Interface devices to 8086 processor.	
			CO1	Assess themselves using SWOT analysis.
			CO2	Appraise the importance of certain soft skills like
				time management and goal setting.
	9HC03	SOFT SKILLS	CO3	Improve their verbal ability to handle the
				competitive exams.
			CO4	Enhance their team skills and design thinking
		capabilities for effective problem solving and		

				decision making.
				Know their emotional quotient which guides their
			CO5	thinking behavior and helps them manage stress
				efficiently.
				Equip themselves with the prerequisites and
			CO6	relevant techniques to effectively attend corporate
				interviews
				This course also discusses their role in their femily
		UNIVERSAL HUMAN		It want briefly touches issues related to their role
		VALUES	0.04	it, very briefly, touches issues related to their role
		VALUES	COI	in the society and the nature, which needs to be
				discussed at length in one more semester for which
	9HC17			the foundation course named as "H-102 Universal
	JIICI			Human Values.
				Understanding Harmony is designed which may be
				covered in their III or IV semester. During the
			CO2	Induction Program, students would get an initial
			02	exposure to human values through Universal
				Human Values – I. This exposure is to be
				augmented by this compulsory full semester
				foundation course.
			CO1	Evaluate programs to generate Prime numbers,
			COI	Roots of quadratic equation and Fibonacci series.
			CON	Implement small application such as banking
			02	system.
			COL	Compare programs on operator, function
	9EC62 OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB	OBJECT ORIENTED	COS	overloading and dynamic method dispatch.
		004	Evaluate programs to implement interface and	
		I HKOUGH JAVA LAB	C04	packages.
			CO5	Explain and write programs to implement threads.
			<i></i>	Illustrate programs to implement applets and event
			CO6	handling.
			CO7	Illustrate an application to implement client and
				server scenario.
				Understand the working of single-phase
				transformer under different conditions the
			CO1	performance of three phase induction motor
				different speed control methods of DC motor with
				and without loading with its performance
				Understand the annlications of Thevenin's
		BASIC ELECTRICAL	CO2	Theorem in circuit analysis
		ENGINEERING AND		Identify Specify and test D I C Components
	9AC91	ANALOG	CO3	(Colour Codes) Potentiometers, Switches, Colla
		ELECTRONICS		Colour Coues), rolenuometers, Switches, Colls,
		CIRCUITS LAB		Notayo. Identify Specify and test Active Devices Distance
			CO4	DITE Low power LETE
			<u> </u>	BJ18, LOW power JFE18.
			005	Explain and demonstrate working of PN Junction

				1.77 1' 1
				and Zener diode.
			CO6	Explain and demonstrate working Half and Full
			000	wave Rectifier without filters.
			CO7	Demonstrate working of CE characteristics and its
				application as an amplifier.
				Familiarize the architecture of 8086 processor.
			CO1	assembling language programming and interfacing
	9DC62	COMPUTER	CO1	with various modules
	12002	ORGANIZATION LAB		Empriment with Arithmetic energians of himme
				Experiment with Arithmetic operations of binary
				number system.
				Simulate any type of VLSI, embedded systems,
			CO3	industrial and real time applications by knowing
			005	the concepts of Microprocessor and
				Microcontrollers.
			CO1	Assessed the knowledge of the students in the Core
	QF378	COMPREHENSIVE		and Elective subjects that they have studied till the
	JE570	TEST AND VIVA-		completion of that academic year
		VOCE		completion of that academic year.
				Identify tonics related to Computer Science and
		TECHNICAI	CO1	Engineering domain
	0E386	SEMINAR - III		
	9E386 SEMINAR - III	CO2	Collect, survey and organize content in PP1 form.	
			CO3	Present seminar in an effective manner.
				Solve the random variable problems and
		PROBABILITY AND	CO1	probability distributions
				Estimate the peremeters and solve the problems
			CO2	using control limit theorem
			CO3	lest the hypothesis related to samples concerning
				to the means and proportions of large size samples.
				Apply and solve the problems using t-test, Chi-
	9HC16		CO4	square test also testing the hypothesis problems on
		STATISTICS	CO4	
				small size samples, goodness of fit and
				small size samples, goodness of fit and independence of attributes.
II_II& A 22				small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central
II-II& A22			CO5	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation.
II-II& A22			CO5	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation.
II-II& A22			CO5 CO6	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models
II-II& A22			CO5 CO6	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models.
ІІ-ІІ& А22			CO5 CO6 CO1	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models. Apply the rules of Boolean algebra to simplify
П-П& А22	00055	DICITAI	CO5 CO6 CO1	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models. Apply the rules of Boolean algebra to simplify Boolean expressions.
ІІ-ІІ& А22	9CC55	DIGITAL	CO5 CO6 CO1 CO2	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models. Apply the rules of Boolean algebra to simplify Boolean expressions. Simplify of Boolean expressions using K-map.
П-П& А22	9CC55	DIGITAL ELECTRONICS	CO5 CO6 CO1 CO2	 small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models. Apply the rules of Boolean algebra to simplify Boolean expressions. Simplify of Boolean expressions using K-map. Design MSI combinational circuits such as full
П-П& А22	9CC55	DIGITAL ELECTRONICS	CO5 CO6 CO1 CO2 CO3	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models. Apply the rules of Boolean algebra to simplify Boolean expressions. Simplify of Boolean expressions using K-map. Design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code
П-П& А22	9CC55	DIGITAL ELECTRONICS	CO5 CO6 CO1 CO2 CO3	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models. Apply the rules of Boolean algebra to simplify Boolean expressions. Simplify of Boolean expressions using K-map. Design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters.
П-П& А22	9CC55	DIGITAL ELECTRONICS	CO5 CO6 CO1 CO2 CO3	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models. Apply the rules of Boolean algebra to simplify Boolean expressions. Simplify of Boolean expressions using K-map. Design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters.
П-П& А22	9CC55	DIGITAL ELECTRONICS	CO5 CO6 CO1 CO2 CO3 CO4	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models. Apply the rules of Boolean algebra to simplify Boolean expressions. Simplify of Boolean expressions using K-map. Design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters. Design basic memory units (latches and flip-flops) and sequential circuits such as counters and
П-П& А22	9CC55	DIGITAL ELECTRONICS	CO5 CO6 CO1 CO2 CO3 CO4	small size samples, goodness of fit and independence of attributes. Solve the problems on measures of central tendency, Correlation. Classify and differentiate various regression models. Apply the rules of Boolean algebra to simplify Boolean expressions. Simplify of Boolean expressions using K-map. Design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters. Design basic memory units (latches and flip-flops) and sequential circuits such as counters and registers

		CO5	Create digital design using PLD's such as ROM's, PLA's, PAL s.
		CO6	Design the digital controllers using Algorithmic State Machine Charts.
		CO1	Analyze worst-case running times of algorithms using asymptotic analysis.
		CO2	Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms
9FC05	DESIGN AND ANALYSIS OF ALGORITHMS	CO3	Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them
		CO4	Comprehend the concept of dynamic programming algorithms, their applications and analyze them.
		CO5	Analyze the Backtracking and Branch and Bound algorithms and also identify the scenarios for its applicability.
		CO6	Comprehend the concept of P and NP Problems and its usage in the applications.
		CO1	Analyze importance and significance of models, Database languages, architecture and design of Data Base Systems
		CO2	Understand Relational Model – Integrity Constraints, Logic.
		CO3	Analyse data base Design and Views of databases, queries using Relational Algebra and Relational Calculus.
		CO4	Solve Queries with Comparison Operators, Aggregative Operators and nested queries. Queries with joins.
9EC03	DA I ABASE MANA GEMENT SVSTEMS	CO5	Apply Schema refinement through all forms of Normalization to eliminate database redundancy.
	SYSTEMS	CO6	Apply ACID properties in transaction. Ensuring serializability in concurrent transactions. Concurrent control methods and recovery of transaction.
		CO7	Analyze External Storage Organization mechanisms and apply Indexing in databases for query optimization to enhance system performance.
05404	SOFTWARE ENGINEERING AND	CO1	Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish lifecycles for developing software product.
9 F 404	UUAD	CO2	Describe the importance and principles of Unified Modeling Language, its building blocks and to

			relate UML paradigm for problem solving.
		CO3	Define and design models for the requirements
		05	stated in the software project.
		CO4	Comprehend what and how to gather the
		04	requirements for a project.
		COF	Design class, object and interactive diagrams and
		05	know their significance of an application.
		COC	Design advanced behavioral and architectural
			modeling and work on case studies.
			Acquire the basics of Managerial Economics at
		CO1	Micro level, Demand analysis and production
			analysis in particular.
		CON	Expose on Cost concept, Revenues and Market
	ECONOMICS	02	structure and describe the concepts.
	ECONOMICS,	CO2	Understand the basic concepts of Accounting,
9ZC01	MANAGEMENT	COS	Double entry system and Bookkeeping.
	SCIENCE		Interpret the concepts of Capital expenditure,
		CO4	Revenue expenditure and Final accounts ad their
			significance.
			Identify knowledge and elaborate the basics of
	ENVIRONMENTAL SCIENCE AND ECOLOGY	CO5	Management, its principles and various functions
			performed in organization.
		CO6	Recognize various personality traits, perception,
			attitudes of individuals working in organization.
9HC05		CO1	Understand about ecosystem and energy flow
			among the organisms.
		CO2	Know the resources available, use of them and
		002	overexploitation of the resources in the nature.
		CO3	Learn the value, use and value of biodiversity.
		CO4	Understand the causes and effect of pollution and
			implement measures in control of pollution.
			Understand the sustainable development and
		CO5	implement green technology for sustainable
			development.
		CO6	Learn and implement policy to protect the
			environment
			Understand how to create tables for a database and
	DATABASE MANAGEMENT SYSTEMS LAB	CO1	apply Queries using ANY, ALL, IN, EXISTS,
			NOTEXISTS, UNION, INTERSET, Constraints.
OFCO			Explore Queries using Aggregate functions such as
9EC03	SI SI ENIS LAD	CO2	[COUNT, SUM, AVG, MAX, MIN, GROUP BY,
			HAVING], Conversion functions and use string
			functions for a given application.
			Learn and demonstrate write programs using
		CO3	PL/SQL programs using exceptions, COMMIT,
			ROLLBACK and SAVEPOINT in PL/SQL block

		-	
		CO4	Gain knowledge in implementing programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT– IN Exceptions and Implement Procedures.
		CO5	Understand Programs for stored functions invoke functions in SQL Statement and Implement programs for packages specification.
		CO6	Know the significance and Implement programs using features of CURSORs and its variables and develop Programs implementing Triggers.
		CO1	Identify software process and software engineering practices to select and
		CO2	Justify approaches for a given project and its constraints and distinguish life cycles for developing software product.
05063	COMPUTER AIDED SOFTWARE ENCINEEDINC	CO3	Understand the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving.
91 (03	(CASE) TOOLS LAB	CO4	Define and design models for the requirements stated in the software project.
		CO5	Design class, object and interactive diagrams and know their significance.
		CO6	Design advanced behavioral and architectural modeling and work on case
		CO1	Implement Merge sort algorithm for sorting a list of integers in ascending order, Dijkstra's algorithm for the single source shortest path problem.
	DESIGN AND	CO2	Implement Prim's algorithm to generate minimum cost spanning tree.
9FC64	ANALYSIS OF ALGORITHMS LAB	CO3	Solve the job sequencing with deadlines problem using greedy algorithm.
		CO4	Design the solution for the 0/1 knapsack problem using implement Dynamic Programming and implement.
		CO5	Using Dynamic programming approach solve the Optimal Binary search Tree problem.
		CO6	Design and implement n-queens problem using backtracking approach.
9E479	COMPREHENSIVE TEST AND VIVA VOCE - IV	CO1	Asses the knowledge of the students in the Core and Elective subjects that they have studied till the completion of that academic year.
		CO1	Identify topics related to Computer Scienec and Engineering domain or disruptive technologies.
OF 497	TECHNICAL	CO2	Collect, survey and organize content in PPT form
ንĽ4δ7	SEMINAR – IV	CO3	Present seminar in an effective manner.

9E491 SUMMER BREAK INTERNSHIP - I III-1 & A 8ZC22 BASICS OF ENTREPRENEURSHIP C01 The students will acquire basic knowledge on Skills of Entrepreneurship. C02 The students will understand the techniques of eustomer segmentation and Targeting. C03 Business Models and their validity are understood by the students. C04 The students will acquire knowledge about the project management and its techniques. C05 The students get exposure on marketing strategies and business regulations for the Start up. RZC25 BASICS OF INDIAN ECONOMY 8ZC25 BASICS OF INDIAN ECONOMY C04 Coil students will acquire knowledge relating to existing strategies and basiness regulations for the Start up. RZC25 BASICS OF INDIAN ECONOMY C04 Coil students will learn about Infaiting to Escan policy & Taxation system in India. C05 Learn about infaiting a business cycles. C06 Know about the BoP and its influence on economy. C07 Describe the new dimensions and products served by the banking system in INDIA. RZC25 BASIKING OFFRATIONS, INSURANCE AND RISK MANAGEMENT C03 RZC05 INSURANCE AND RISK MANAGEMENT C04 Recognize the importance of regulatory and		1			
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PROCESS manufacturing processes.		8BC51	MANUFACTURING	CO3	Apply the principles of casting in Additive
Articulate the various tradeoffs of Additive			PROCESS		Articulate the various tradeoffs of Additive
CO4 Milediate are various diateons of Additive manufacturing software's/data format that must be				CO4	manufacturing software's/data format that must be
				made in selecting advanced/additive manufacturing	
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				processes, devices and materials to suit particular	
				product requirements.	
				Learn various applications of additive	
			CO5	manufacturing, such as in architecture art, health	
				care direct part production and mass customization.	
		CONTROL SYSTEM	CO1	Understand basic concepts of control systems.	
		ENGINEERING	CO2	Study about time response analysis.	
	8AC46		CO2	Understand basic concepts of stability and root	
			005	locus method.	
			CO4	Study about frequency response analysis.	
			COS	Learn basic concepts stability analysis in frequency	
			005	domain.	
			CO6	Outline fundamentals of state space analysis.	
			CO1	Classify embedded systems and their applications.	
			CO2	Write ALP for 8051 architecture.	
		EMBEDDED SYSTEMS C	CO2	Implement interfaces for Embedded System using	
	8DC42		CO3	various protocols and hardware modules.	
			004	Understand the principles of Communication	
			004	Interface, Wireless and Mobile Systems Protocols	
				Design the interrupt routines for variois OS	
			CO5	concepts and Memory Management techniques in	
				an RTOS Environment.	
				Recognize the issues and design of basic Real-	
			CO6	Time Operating System principles, Semaphores	
				and Queues, Hard Real-Time Scheduling	
				Considerations.	
		DESIGN LITERACY	~~ (Gain the knowledge on the inputs required for	
			CO1	design thinking and also gain familiarity on	
			~~~	concepts related to design thinking.	
	87.00		CO2	Understand the techniques of idea generation.	
	021000	AND DESIGN	CO3	Classify different phases of design thinking.	
		THINKING	CO4	Realize the product design process.	
			CO5	Understand design thinking for service design.	
			CO6	Gain knowledge on various cases related to design	
			000	thinking.	
			CO1	Appraise the role of the Web, its need and	
	05.014			Intelligence.	
	8EC11   SEMANTIC WEB &	~~~	Outline the concepts of Machine Intelligence		
	SUCIAL NETWORKS	CO2	Ontology, Inference engines, Software Agents,		
				Berners-Lee www and Semantic Road Map.	
				Conceptualize Knowledge Representation for the	
			000	Semantic Web with Resource Description	
			003	Framework (RDF) / RDF Schema, Ontology Web	
				Language (OWL),	
				UML and XML Schema.	

			CO4	Apply Ontology Engineering using Ontology Development Tools/ Methods, Ontology Libraries, Ontology Mapping Logic and Inference Engines
			CO5	Illustrate Semantic Web Applications, Services and Technology.
			CO6	Apply Social Network Analysis, Semantic web networks analysis and describe Building of Semantic Web Applications with social network features.
			CO1	Explain Architecture Business Cycle, Architectural patterns, reference models, reference architectures, and architecture structures.
			CO2	Describe architecture, Quality Attributes, styles, patterns and design of Architecture along with the Documentation of architecture.
	SOFTWARE ARCHITECTURE AND 8FC12 DESIGN PATTERNS	CO3	Discuss Software Architecture evaluation, Architecture design decision making, SAAM, ATAM and CBAM. And plan software architecture in future.	
		CO4	Plan and use Creational patterns and Structural patterns application development.	
			CO5	Solving problems using Induction learning, Decision Tree, Statistical learning methods, learning with hidden variables, EM algorithm, Instance based learning and Neural Networks.
			CO6	Explain Behavioral patterns using Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template method and Visitor.
			C01	Understand basic terms related to Big Data, Data Science and Analysis of Data. Learn Statistical Inference, Probability Distributions and Fitting a model.
	8EC16		CO2	Implement Data analysis techniques for solving practical problems.
	OFC10	DATA SCIENCE	CO3	Perform Data analysis on variety of data using R.
			CO4	Exercise appropriate manipulation techniques on lists and vectors using operators in R. Comprehend the significance and use the iterative programming and functions in R.
			CO5	Learn and describe the various Dimensionality Reduction techniques available.
			CO6	Apply the suitable visualization techniques to output analytical results.
			CO1	Understandfundamental terms in Computer Graphics, various visible surface determination algorithms and midpoint and line segment analysis.

			CO2	Explore 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations.
			CO3	Apply functions 2D viewing and apply clipping algorithms.
	8FC17	COMPUTER GRAPHICS	CO4	Understand the concepts and techniques used in 3D computer graphics, including viewing transformations, hierarchical modeling, color, lighting and texture mapping.
			CO5	Apply single and multiple 3-D viewing techniques like viewing coordinates etc and also back-face detection, depth-buffer, and scan-line methods.
			CO6	Analyze the animation production pipeline and Produce a short animation.
			CO1	Understand the fundamental concepts of Security Attacks and security standards with the model for network Security.
		INFORMATION SECURITY	CO2	Review and analyze conventional cryptographic techniques and authentication.
	8FC06		CO3	Review and analyze public cryptographic techniques and outline the concepts of Kerberos and email privacy.
			CO4	Recognize architecture, key management and header formats of IPSEC.
			CO5	Outline the various web security threats and protocols.
			CO6	Understand Intrusion Detection System and Design principles of Firewalls.
		BEC04 DATA WAREHOUSING AND DATA MINING	CO1	Understand the fundamentals of Data Mining and Identify the techniques used in data preprocessing.
	8EC04		CO2	Understand the fundamentals of Data Warehousing and issues of mining with respect to architectures, technologies such as OLAP.
			CO3	Learn insights of Data Mining Primitives and Infer the significance of Concept Description.
			CO4	Apply the algorithms for mining association rules in large databases.
			CO5	Discuss and apply the models of classification and use those models for the prediction of the new samples.
			CO6	Apply various clustering techniques available for numerous applications. Identify the optimal clustering technique for a particular application.
			CO1	Understand concepts of different networks, network models and transmission medias.
			CO2	Classify various data conversion techniques and

			Multiplexing, Demultiplexing techniques.
DATA		CON	Summarize the design issues of Datalink layer and
		003	solve problems on Error and Flow control.
			Infer MAC layer protocols, various connecting
	<b>GO</b> 4	devices. IP addressing concepts and design a	
	COMMUNICATIONS CO5 AND NETWORKS	CO4	network(using subnetting and supernetting
8EC05 AND NETWORKS		techniques)	
			Analyze various routing algorithms and outline the
		CO5	concepts of Internet control protocols and
		000	congestion control techniques
			Recognize services and protocols of transport
		CO6	layer application layer along with network security
		000	issues
		CO1	Work with the ETL and Mining tools
			Demonstrate the classification clustering
		CO2	techniques on the data sets
DATA		Comprehend the results obtained in the elustoring	
8EC64	WAKEHUUSING AND	CO3	Comprehend the results obtained in the clustering,
DATA M	DATA MINING LAD	005	association and Classification techniques applied
			Ability to apply mining techniques for realistic
		CO4	Addits data
8FC65	COMDUTED		uma. Implement and analyze framing methods of the
OEC03	NETWORKS LAR	CO1	data link layer
	NETWORKS LAB		una IIIIX layer. Implement and analyze froming methods of the
		CO2	data link layer
			uala IIIK layel.
		CO3	correction techniques
		CO4	Implement different Routing Algorithms
		CO5	Understand basic Network Commands
			Understand Dasie Inetwork Commanus.
			Use of wiresnark and INS-2 tools.
		act	Understanding of Symmetric Encryption
OFC/F	ΙΝΈΩΡΜΑΤΙΩΝ	CO1	Algorithms, Asymmetric Encryption Algorithms,
8FC65	SECURITY I AR		Hash and Key Exchange, Digital Signature and
	SECUNITI LAD		Digital Envelope, Demonstration of NS3 Tool.
		act	Demonstrate a breadth of knowledge in Intellectual
		CO1	property.
8EC49 INTELLECTUAL PROPERTY RIGHTS			Overview of Patents, Searching, filling and drafting
		CO2	of Patents.
	INTELLECTUAL	CO3	Overview of copyright & GL
	PROPERTY RIGHTS	CO4	Overview of Trade Mark & Trade Secret
		004	Overview of Integrated Circuit and Industrial
	CO5	Design	
			Knowledge about different national and
		CO6	international: Conventions and Treaties Coverning
			international. Conventions and freaties doverning

				the IPRs.
				Use the concepts learned in the courses, so far, in
		CO1	conceptualizing, designing and executing the	
		SUMMER INDUSTRY INTERNSHIP-I		modules of the projects.
				Exhibit the interest in learning the modern tools
				and technologies through the bridge courses
			CO2	arranged in the college beyond the curriculum and
	8E491			hence developing the software
				Inculcate an enthusiasm to use the creative ideas to
				huild the innovative projects and prototypes which
			CO3	are meeting the current needs of the market and
				are meeting the current needs of the market and
				society as a whole.
			CO4	Improve their communicative skills and team
				skills.
				Gain knowledge on the stages of Startup and the
			CO1	turbulence environment it undergoes and the stages
		ADVANCED ENTREPRENEURSHIP		related to growth of the Startup.
				Exposed to the various business models and
	8ZC23 ENTREPRENEURSHIP		CO2	critically evaluating the effectiveness of the
III_II <i>&amp;</i>			business models and products.	
111-11 &			<b>CO</b> 2	Understand the method of business traction, create
A20	A20	05	roles and build their A- team.	
	CO4	Understand the various channels of revenue		
		building and exploration of new revenue avenues.		
		CO5	Understand the need of sales planning and people	
			plan and also financial modeling.	
			Exposed to the legal implications affecting the	
			CO6	company's prospects and identifying right mentors
				and advisors to support startups.
			001	Outline knowledge relating to the Indian
			CO1	Constitution and the Preamble to the Constitution.
				Relate to the fundamental rights and duties of the
			CO2	Indian citizens and the directive principles of state
				policy.
				Identify about the federal structure and judiciary of
	8ZC26	BASICS OF POLITY	CO3	India
		AND ECOLOGY		Understand knowledge relating to the conservation
			CO4	of the environment
				Analyse about bio-diversity and climatic changes
		CO5	occurring in the environment	
				Discuss about the international tractice
			C06	conventions and organizations active in the field of
				conventions and organizations active in the field of
				Students will understand the meters
			CO1	Sudents will understand the nature of
			002	Entrepreneursnip and its importance.
			CO2	will gain knowledge regarding project, its life

				cycle and organization.
		FNTDEDDENFUDSHID	CO3	Will gain knowledge relating to project formulation
	8ZC19	ENTREPRENEURSHIP		and implementation.
	MANAGEMENTAND STRUCTURED FINANCE	CO4	Comprehend the components of structured finance.	
		CO5	Establish a framework of CMBS.	
		CO6	Students will gain knowledge relating to the CRE	
		PRINCIPLES OF OPERATIONS	CO1	Formulate and solve mathematical model (linear programming problem) for a physical situations like production, distribution of goods and economics
	8BC52	RESEARCH	CO2	Recognize and Solve the problem of transportation involving a large number of shipping routes with least transportation cost and generate optimal assignment strategy for different situations.
			CO3	Use Johnson's rule to create the optimal sequencing schedule for a sequencing problem and make decisions about replacing an item using replacement policy.
			CO4	Analyze the performance measures of Queing system and Calculate the EOQ for minimizing the total inventory cost.
			CO5	Apply simulation techniques for solving various types of problems and general idea development about Markov chains.
			C01	Understand the principle of operation of different types of instruments viz., PMMC, moving iron type of instruments, the required characteristics of an instrument in general. The student demonstrates the ability to compensate for the errors in the instruments and to extend the range of the instruments.
	8AC44	FUNDAMENTALS OF MEASUREMENTS AND INSTRUMENTATION	CO2	Demonstrates the knowledge of Potential and Current transformers; the errors in them and the effect of having an open/short in the secondary circuits; Understand the principle of operation of Dynamometer and Moving-iron type of Power factor meters.
			CO3	Understand the principle of operation of dynamometer type of Wattmeter and Induction type of Energy meter; use the wattmeter to measure the Active and Reactive power and demonstrates the ability to extend the range of them.
		CO4	Identify and use different techniques of measurement of Resistance, Inductance and Capacitance values.	

			CO5	Understand the principle of operation of Different type of digital voltmeters, wave analyzers, spectrum analyzers and Cathode ray Oscilloscope
			CO6	Demonstrates the ability in characterizing the different types of transducers and uses them to measure Strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque and Temperature.
	8DC43	INTRODUCTION TO	CO1	Identify the working principle of diffusion, ion implantation, metallization and other basic components.
		VLSI DESIGN	CO2	Comprehend basic electrical properties of various types of mos transistors.
			CO3	Identify the significance of cmos logic gates and design the multiplexers.
			CO4	Draw layouts for a cmos circuit and logic design and validate them.
			CO5	Differentiate the various types of memories and clocking strategies.
			CO6	Design various combinational and sequential circuits.
	8ZC09	CO – CREATION AND PRODUCT DESIGN	CO1	Understand the inputs required for human centric design thinking the students learn the techniques of idea generation.
			CO2	Explore the different phases of Ideation process.
			CO3	Outline emerging technologies and understand 3d printing in manufacturing.
			CO4	Indicate developments of prototypes.
			CO5	Understand reverse engineering methods in product development.
			CO6	Review the information on IPR, and patent application.
			CO1	Appraise networking and Internet concepts and be familiar with OSI Model and TCP/IP model.
			CO2	Detect networking errors learn correction techniques.
	8EC12	ADVANCED COMPUTER	CO3	Infer the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
		NETWORKS	CO4	Differentiate Internet addressing IPv4 and IPv6 and Internet protocols.
			CO5	Conceptualize wireless networking and to Develop new protocols in networking.
			CO6	Design new virtual private networks.
			CO1	Outline Forensic science and Digital Forensic concepts.

			CO2	Comprehend the technical concepts involved in understanding the digital forensics.
			CO3	Interpret the cyber pieces of evidence, Digital forensic process model.
	8EC22	DIGITAL FORENSICS	CO4	Familiarize the computer operating system concepts involved in digital forensics.
			CO5	Determine the legal aspects of Digital Forensics.
			CO6	Demonstrate various forensic tools to investigate the cyber crime and to identify the digital pieces of evidence.
			CO1	Explain primitives of Project Planning and evolution of software economics.
			CO2	Describe software economics; reduce Software product size, improvement in software processes, improving team effectiveness, improving automation, Achieving quality.
	<b>8EC12</b>	SOFTWADE	CO3	Explain Life cycle phases and Artifacts of the process.
	BFC15 SOFTWA PROJEC MANAGEN	PROJECT MANAGEMENT	CO4	Describe Model based software architectures and Work Flows.
			CO5	Apply Checkpoints for a process such as Major mile stones, Minor Milestones and apply work breakdown structures for a iterative process within cost and schedule. Describe Project Organizations and Responsibilities.
			CO6	Describe Automation and Project Control and Process instrumentation and explain Future Software Project Management such as Modern Project Profiles and Next generation project management.
			CO1	Understand the fundamental concepts of ML and Designing a Learning System.
			CO2	Understand the basic concepts of MLP, RBF and SVM and their applications.
	8EC17 MACHINE LEAF	MACHINE LEARNING	CO3	Understand the Probability models namely supervised, unsupervised, basic statistics analyze their analysis of algorithms along with their applications
			CO4	Understand various Dimensionality Reduction Techniques and Apply various Evolutionary Algorithms with models.
			CO5	Understand the Graphical models and their applications.
			CO6	Understanding Analytical Learning and Analyze KBANN Algorithm.
			CO1	Analyze general terminology of image processing.

		CO2	Examine various types of images, intensity transformations and spatial filtering.
8FC18	IMAGE PROCESSING	CO3	Develop Fourier transform for image processing in frequency domain.
		CO4	Evaluate the methodologies for image segmentation, restoration etc.
		CO5	Implement image process and analysis algorithms.
		CO6	Apply image processing algorithms in practical applications.
		CO1	Introducing .Net Architecture and learn basic programming in C# and the object oriented programming concepts.
<b>AFCO</b>	CHAND NET	CO2	Explain advance features and enhance skills in writing windows applications, ADO.NET and ASP.NET.
8FC26	FRAMEWORK	CO3	Discuss various class libraries for different applications and data manipulation functions.
		CO4	Understand the advanced concepts in data connectivity, WPF, WCF and WWF with C# and .NET 4.5.
		CO5	Develop distributed applications using .NET Framework.
		CO6	Create mobile applications using .NET compact Framework.
		CO1	Design the finite automata different Languages.
		CO2	Construct finite Automata for a given regular expressions, and derive strings with suitable examples. Conceptualize context free grammars and normal forms.
8FC07 AUTOMATA THEORY	CO3	Design the push down automata and Turing Machine for complex languages.	
	DESIGN	CO4	Understand LEX tool and relate parsing techniques.
		CO5	Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool.
		CO6	Understand Semantic Analysis concepts to design compiler: and describe Intermediate code generation such as 3-address code form.
		CO1	Understand the functional architecture of an Operating System with usage of system calls.
8EC06	OPERATING SYSTEMS	CO2	Analyze various process scheduling algorithms & pragmatics of scheduling algorithms used by various Operating Systems.
	<b>3 1 3 1 1</b> /113	CO3	Solve issues related to process synchronization and Deadlocks in the Operating System.

		<b>CO4</b>	Illustrate the concepts of Memory Management.
		CO5	Outline the directory structure & analyze disk scheduling algorithms
		CO6	Summarize the aspects of Protection and Security, and understand the concepts of I/O systems.
		CO1	Demonstrate the use of HTML tags. Apply Styles using CSS and Bootstrap.
		CO2	Develop dynamic programs using Javascript and Typescript.
		CO3	Develop scripts using XML and validate using parsers.
		CO4	Design a data-interchange format using JSON.
8EC07	WEB TECHNOLOGIES	CO5	Appraise the Expressions, Filters, Directives, Controller, and Modules of Angular.
		CO6	Design responsive web applications with Forms, Scope, Dependency Injection & Services, and Single Page Application (SPA) of Angular.
		CO7	Comprehend the uses of Web servers and design the server-side scripts using Servlets.
		CO8	Design and develop server-side scripts and components using PHP.
		CO1	Familiarize the cryptographic procedures and Understand its primitives.
		CO2	Outline Security policy in Legislation and Comprehend E-Commerce. frame work, models and its associated threats.
8EC.08	CYBER SECURITY	CO3	Justify the role of electronic signatures in E- Commerce and summarize the various laws relating to it.
or Cuo	AND CIDER LAWS	CO4	Categorize international cyber laws and cyber crimes.
		CO5	Explore Penalties, Compensation and Adjunction of violations of provisions of IT Act 2000.
		CO6	Classify and Outline the offences under the Cyberspace law and the Internet in India.
8FC66	COMPILER DESIGN LAB	C01	Implementation of DFA for a given Languages/ Regular Expression.
		CO2	Usage LEX of tool to implement lexical analyzer in compiler design and implementation of Top-Down Parser.
		CO3	Usage of YACC tools for implementing bottom up parser.
8EC66	OPERATING SYSTEMS LAB	CO1	Implement scheduling algorithms, Deadlocks, File allocation and Memory management techniques.
		C01	Understand the basic fundamentals of computer vision and diversity of computer vision

				applications.
				Explore the various camera models, multi view
		CO2	geometry, structures and generate 3D model from	
			images.	
				Analyze and apply image preprocessing,
	07010		CO3	continuous and discrete representation methods and
	8FC19 COMPUTER VISION		feature extraction techniques.	
			Apply regularization theory, optical	
		<b>GO</b> 4	communication, stereo vision, and motion	
			CO4	estimation techniques to detect moving objects in a
				video.
				Illustrate different image shape representations and
			CO5	understand Fourier and wavelet descriptors and
				segmentation methods.
			CO6	Understand various object recognition methods.
				Hough transforms and illustrate shape matching.
				Demonstrate the use of HTML tags and be able to
			004	design web pages. Develop dynamic programs
		CO1	involving Java scripts, popup windows in	
			JavaScript along Event Handling	
				Develop scripts using XML and XSLT and read
				XML documents using parsers. DOM parser and
8EC67 WEB TECHNOLOGIES		CO2	SAX parser. Develop JSON files and access them	
	8EC67	WEB		via HTML pages.
			coa	Implement Angular with Expressions, Filters,
		IECHNOLOGIES LAD	003	Directives, Controller, and Modules.
			CO4	Develop a Single Page Application with
				implementation of Scope and Form.
			COF	Implement Java servlets using Apache Tomcat
			05	Server for User authentications.
			COC	Develop an application in PHP with Database
			000	connectivity
				Use the concepts learned in the courses, so far, in
			CO1	conceptualizing, designing and executing the
				modules of the projects.
				Exhibit the interest in learning the modern tools
			$CO^{2}$	and technologies through the bridge courses
			02	arranged in the college, beyond the curriculum, and
	8E694 GROUP PROJECT		hence developing the software.	
			Inculcate an enthusiasm to use the creative ideas to	
		CO3	build the innovative projects which are meeting the	
				current needs of the market and society as a whole.
			COA	Improve their communicative skills and team skills
			largely improve.	
	CO5	Work as an individual and in a team.		

	8E681	COMPREHENSIVE	CO1	Assessed the knowledge of the students in the Core
	02001	VIVA VOCE		and Elective subjects that they have studied till the
				completion of that academic year.
	8E692	SUMMER		
		INDUSTRY		
		INTERNSHID		
			C01	Comprehend the various access control rules available to assign privileges and protect data in databases.
			C02	Describe and compare the popular Security Models.
	8EC13	DATABASE	C03	Categorize the security mechanisms and their functions.
		SECURITY	CO4	Identify the Security Software Design principles to protect data in databases.
			CO5	Classify and compare the Statistical Database Protection & Intrusion Detection Systems
			CO6	Learn the new models of database systems and the models of protection
			C01	Explain need practices and Risk issues in Software
IV-I & A20			CUI	requirements
		SOFTWARE	C02	Describe Software Requirements Engineering
		REQUIREMENTS	002	elements such as review, quality and priorities.
		AND ESTIMATION	C03	Explain software Modeling and Requirements
	8FC11		0.00	Management.
			CO4	Apply Estimation methods for size using Mark II FPA, Full Function Points, LOC Estimation.
			CO5	Apply Cost and Schedule estimation factors during software development.
			CO6	Apply tools for Requirements Management and Estimation.
			C01	Discuss the importance of big data.
		BIG DATA ANALYTICS	C02	Interpret the challenges with big data; elaborate the knowledge about the technological developments in big data environment.
	0EC10		C03	Assess about NOSOL data environment.
	SEC 18		CO4	Capability of understanding the usage of big data in context to cloud and other technologies.
			CO5	Justify about map reduce work flows.
			CO6	Implement Data Analysis with HADOOP and related tools.
	OFC14	BLOCK CHAIN TECHNOLOGIES	C01	Understand basic principles of HDFS and digital signature.
	8FC16		C02	Learn about blockchain advantages, Simplified Payment Verification protocol and its life cycle.

				Explain the Nakamoto consensus and List and
			C03	describe differences between proof-of-work and
				proof-of-stake consensus.
			CO4	Understand Bitcoin and Ethereum.
			~~~	Learn about the legal issues of Blockchain through
			CO5	some applications.
			CO6	Discuss new trends in Blockchain technologies
			C01	Understand the Security Issues and Measures
				Know the KEV Elements and Logical Elements of
		INFORMATION	C02	Networks
	SECURITY.		Understand the Data Laskage its Threats and	
		MANAGEMENT AND	C03	Mitigation
	8EC14	STANDARDS	<u>CO4</u>	Understand the Database Security
			04	Understand the Database Security.
			CO5	onderstand the Policies, Guideline and Framework
				of information Security.
			CO6	onderstand the Ethics, Koles and Kesponsibilities
				OI ISM.
			C01	no understand the essence of agne development
				The second state and an extinct of easterney
			C02	To apply the principles and practices of extreme
	8FC12	2 AGILE SOFTWARE DEVELOPMENT		programming in real world problems.
			C03	To incorporate proper coding standards and
				guidelines in an aglie process.
			CO4	To optimize an agile process by exploring the
			CO5	possible risks and threats in the software process.
			05	To improve the process by eliminating waste.
			CO6	To design an agile process for a business
				application and deal with appropriate tradeoff.
			C01	Elaborate the fundamentals of business
			COA	intelligence.
			C02	Link data mining with business intelligence.
		BUSINESS	C03	Apply various modeling techniques.
	8EC19	INTELLIGENCE	CO4	Perform the data analysis and knowledge delivery
				stages.
			CO5	Apply business intelligence methods to various
				situations.
			CO6	Decide on appropriate technique for the given
				model.
		AUGMENTED AND	C01	Understand the fundamentals of Virtual Reality.
		VIRTUAL REALITY		Comprehend multiple Models of Input and Output
			C02	Interface in Virtual Reality like Gloves, Video-
	8FC17			based Input, 3D Menus & 3DScanner etc.
			C03	Describe the fundamentals or Advanced topics of
				Computer Graphics.
			CO4	Explain the Interactive Techniques on VR in
				respect of Body Track, Hand Gesture, 3D Manus,

1				
				Object Grasp.
			COF	Know about the developments Tools of VR and
			005	describe.
				Familiarize the Conceptual idea on Augmented
			CO6	Reality and relate the illustrations.
			C01	Describe concepts of Software testing.
			C02	Describe and apply the concepts Flow graphs, Path
			02	testing and Data Flow Testing.
				Practice Software testing strategy and Environment
			C03	with economics and apply Software Metrics useful
				in software development and maintenance.
				Software Testing Methodology, finding defects
		SOFTWARE		hard to find, Verification and validation,
		AUTOMATION AND	COA	Functional and structural, Workbench concept,
	8F719	TESTING	004	Eight Consideration of software testing
				methodology, checklist. Describe Agile computing
				with agile testing.
				Demonstrate Software Testing Techniques such as
			COS	JADs, Pareto Analysis ,Regression Testing,
			COS	Structured walkthroughs, Thread testing ,
				Performance testing and White box testing.
				Describe Graph matrices and applications, and
			CO6	practice and apply automated testing tools such
				load Runner. UFT and OTP.
				Get familiarized with the fundamental concepts of
	95.009	INFORMATION SECURITY	C01	security attacks, security services.
				Implement the conventional cryptographic
			C02	techniques.
			C03	Simulate the Public key cryptography techniques.
			CO4	Comprehend IP security Architecture and its role
	9EC09			in security framework.
			CO5	Implement SSL and TLS for Web Security.
			CO6	Design Intrusion Detection Systems and Firewall.
	8F708	LINUX	C01	Describe the basic Linux commands.
		PROGRAMMING	C02	Write Shell Scripts.
			C03	Enlist various System Calls in Linux.
			004	Classify various system calls to handle the
			004	processes and signal the process.
			CO5	Elaborate the working of IPC.
				Demonstrate the significance of Semaphores for
			CO6	Kernel support and simulate program using the
				same.
				Learn the distinction between optimal reasoning
			C01	Vs human like reasoning and formulate an efficient
				problem space for a problem expressed in natural

				language. Also select a search algorithm for a problem and estimate its time and space complexities
				A subset of the state of the subset of the s
		ARTIFICIAL	C02	playing, theorem proving, and machine learning.
	8EC20	INTELLIGENCE	C03	Learn different knowledge representation techniques.
			CO4	Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
			CO5	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks.
			CO6	Analyze Supervised Learning Vs. Learning Decision Trees.
			C01	Understand cyber-attacks, types of cybercrimes.
			C02	Realize the importance of cyber security and various forms of cyber attacks and counter measures
			C03	Get familiarity of other forancies
		CVDED SECUDITY	0.05	Get familiar with observity and perpendently in
	8FC20	CIBER SECORIII	CO4	out raminal with obscenity and pointography in other space and understand the violation of right of
				privacy on Internet
			CO5	Appraise Cyber laws and also how to protect them
				self and ultimately the entire Internet community
				from such attacks.
			CO6	Elucidate the various chapters of the IT Act 2008,
				power of Central and State Government to make
				rules under IT Act 2008.
		SOFTWARE		Prepare Test Plan document and write Test Cases
		AUTOMATION AND)	for Small scale Project (Like for their B.Tech IV
	8F778	TESTING LAB	C01	Year Project or Post-Graduate Projects), they are
				learn how to Analyze SRS document in order to
				prepare Test Plan Document.
				Demonstrate skills to use modern software testing
			C02	Test Director and Quality Center) and test
			02	application (web Window application) by using
				the tools.
				Demonstrate the ability to differentiate between
				different Testing tools present in the market (like
				functional testing tools, Test Management Tools.
			C03	Bug Tracking Tools and Performance Testing
				Tools) and prepare Test Plan document and write
				Test Cases for Small scale Project (Like for their
				B Tech IV Year Project or Post-Graduate Projects)
	1		1	Direction real respect of rest-Oraculate respects).

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		C01	To understand how to work with Linux commands for handling files, processes, text utilities, backup
			and network utilities.
		C02	To explore basics of building shell scripts gain
		C02	knowledge to compose various Shell Scripts.
	LINUX		To learn and demonstrate the I/O functions, low-
	PROGRAMMING LAB	C03	level system calls System Calls available for file
8F777			and directory handling
			To gain knowledge in implementing processes
		CO4	aspects mastering the process ADIs
			To understand how to implement pipes EIEO how
		CO5	to understand now to implement pipes, FIFO, now
			to use for communication purpose in IPC.
			To understand the significance of Semaphores for
		CO6	Kernel support and simulate program using the
			same.
			Design and Implement symmetric key encryption
		C01	algorithms
		C02	Simulate asymmetric key encryption algorithms
		C02	Implement hashing and low evaluate algorithms.
	INFORMATION	005	Implement hashing and key exchange algorithms.
8EC76	6 SECURITY LAB	CO4	Simulate and execute Digital Signature and Digital
			envelope.
		CO5	Install and execute various projects in NS3.
		C01	Develop plans with relevant people to achieve the
	4 PROJECT - I		project's goals.
		C03	Break work down into tasks and determine
01704		C02	handover procedures.
8E/84		GAA	Identify links and dependencies, and schedule to
		C03	achieve deliverables.
			Estimate the human and physical resources
		CO4	required and make plans to obtain the necessary
		00.	required, and make plans to obtain the necessary
			Allocate roles with clear lines of responsibility and
		CO5	Anotate roles with clear lines of responsibility and
			Design and develop the activity of prototype to
		CO6	Design and develop the software or prototype to
			meet societal needs.
			Use the concepts learned in the courses, so far, in
		C01	conceptualizing, designing and executing the
			modules of the projects.
			Exhibit the interest in learning the modern tools
		COA	and technologies through the bridge courses
	C02	arranged in the college, beyond the curriculum, and	
	CUMMED INDUCTOV		hence developing the software.
	SUMMER INDUSTRY		Inculcate an enthusiasm to use the creative ideas to
8E682		C03	huild the innovative projects which are meeting the
			current needs of the market and society as a whole
		1	current necus of the market and society as a whole.

			CO4	Improve their communicative skills and team skills largely improve.
			CO5	Work as an individual and in a team.
			C01	The students gain the knowledge on the inputs required for innovation and also gain familiarity on Entrepreneurship.
			C02	The students will get exposure on creative methods of ideation and the importance of protecting the ideas.
	8ZC24	INNOVATION AND DESIGN THINKING	C03	The students gain knowledge on design thinking and types of thinking.
			CO4	The students gain familiarity on emerging technologies like Internet of things (IOT).
IV-II & A 20			CO5	The students understand the process of building the startup.
			CO6	The students gain knowledge on various startup funding and also to branding building for the
				startup.
	8ZC27 1	NDIAN HISTORY, CULTURE AND	C01	To appreciate and understand our Indian History, Culture and Indian heritage.
		GEUGKAPHI	C02	To understand secularism of our country.
			C03	To appreciate and understand the social reformers who brought revolutionary changes in Indian society.
			CO4	To understand earth evolution and world climatic change.
			CO5	To understand India Oceanography, Able to enhance and understand Indian monsoons, Indian agriculture.
			C01	This unit enables the students to understand the financial structure and the financial sector reforms after 1991.
			C02	The unit gives the exposure on the role of RBI and the Regulating and credit policies adopted by the RBI.
		FINANCIAL INSTITUTIONS, MARKETS AND	C03	The students get awareness on the role of Non- Banking financial institutions and the role of financial institutions in India.
	8ZC15	SERVICES	CO4	The unit educates the students to know the role of regulatory bodies like SEBI and also to know the capital and money market instruments.
			CO5	The unit equips the students to understand about the asset fund based financial services.
				investment banking and merchant banking.

			C01	Understand the need for manufacturing processes
				and various material properties.
				Understand the principle of casting, Patterns used,
			C02	Pattern allowance and Gating systems used in
				casting, and various casting methods.
				Understand the basic principle of welding and
			C03	distinguish between various welding types and
				their applications.
		PRINCIPLES OF		Understand the principles of metal working,
	8BC52	MANUFACTURING		various types of metal working techniques,
		PROCESSES	CO4	Knowledge of hot working and cold working,
				Ability to understand the bulk deformation
				processes of rolling.
				Understand the bulk deformation processes of
			CO5	extrusion and forging, their applications and forces
				involved in these operations.
			CO6	Understand and distinguish the various press
				working operations with respect to their
				applications advantages and disadvantages
				applications, advantages and disadvantages,
				understand the various types of plastics and their
				processing techniques.
	8AC45	FUNDAMENTALS OF		Understand the role and potential of new and
		RENEWABLE		renewable energy sources realize the potential of
		ENERGY SOURCES	~ ~ ~	solar energy, its impact on environment; define and
			C01	understand the terms describing the different
				angles that one may incur in setting up a solar
				panel and be able to use the instruments for
				measuring solar radiation.
			C02	Demonstrates the knowledge of different
				techniques of solar collection and storage.
				The student becomes familiar with the different
				types of horizontal and vertical axis wind mills and
			C03	understands the performance characteristics of the
				same. The student also demonstrates the
				knowledge of different Bio-gas digesters and
				factors influencing its yield.
			CO4	Aware of the potential of geothermal energy in
			C04	India and will be able to characterize different
				types of geotnermal wells.
			COF	Aware of the different methods of kinetic energy
			005	extraction from Ocean waves and tides and thermal
			COL	Demonstration from Oceans.
			006	Demonstrates the knowledge of Direct Energy
				Conversion in different phenomena viz., Joule
				Thomson effect, Seebeck effect, Peltier effect etc.

				and the principle of operation of Fuel Cells.
			CO1	Analyse and Design of BJT Single stage,
				multistage amplifiers at low and high frequencies.
			C03	Analyse and Design JFET and MOSFET
			C02	amplifiers.
			C03	Design different types of Feedback Amplifier,
		ELECTRONICS	C03	Oscillators and their analysis.
	8CC44	AND ANALVSIS	004	Analyse and Design power amplifiers. Understand
		AND ANAL ISIS	CO4	distortions.
				Analyse and Design tuned and RF amplifiers such
			CO5	as single tuned, double tuned, stagger tuned and
				wide band amplifier.
			CO6	Understand the stability of oscillators and tuned
				amplifiers
			CO1	Pecognize of the principles of mobile ad hoc
		MODILE ADUOC AND	COI	networks (MANETs) and what distinguishes them
		SENSOR NETWORKS		from infrastructure-based networks
		SENSOR NET WORKS		Comprehend the characteristics of wireless sensor
	8EC15		C02	networks (WSNs)
				Report how proactive protocols function and their
			C03	implications on data transmission delay and
				bandwidth consumption.
				Assess how reactive routing protocols function and
			CO4	their implications on data transmission delay and
				bandwidth consumption.
				Analyze the functioning of proactive routing
			CO5	protocols and their implications on data
				transmission delay and bandwidth consumption.
			CO6	Analyze the functioning of reactive routing
				protocols and their implications on data
				transmission delay and bandwidth consumption.
				And become familiar with the mechanisms for
				implementing security and trust mechanisms in
			001	MANEIs and WSNs.
			C01	Understand the issues affecting the organization,
				planning, and development of large and complex
				software systems.
			C02	Understand the concepts of software metrics and
		ADVANCED		Apply software engineering principles in the
	8FC13	SOFTWARE	C03	Appry solitivate engineering principles in the development of distributed software systems
		ENGINEERING		Design and implement service-oriented software
			CO4	systems
			<i></i>	Understand the design and development of aspect-
			CO5	oriented software systems.
			CO6	Understand software re-engineering process model.
			I	0 01

			CO1	Describe the characteristics of cloud.
		C02	Describe the cloud services.	
8FC				Understand different architectures for cloud
			C03	applications, Creation and running of python
	8EC21			programs, running amazon ec2 instance
	011021	COMPUTING		Understand Data Intensive applications and future
		COM UTING	CO4	trends of Internet Clouds supporting Mobile
			0.04	Computing, Ubiquitious Computing and Social
				Networking.
			CO5	Discuss mapreduce and image processing app on
			005	cloud.
			CO6	Discuss cloud security architecture.
			CO1	Get familiar with terminology, technology and
				applications of IoT.
	8DC55	INTERNET OF		Understand and explain IoT system management
		THINGS	C02	using M2M (machine to machine) with necessary
			protocols.	
			C03	Design and develop Python Scripting Language
				programs preferred for many IoT applications.
			CO4	Use Raspberry PI as a hardware platform for
		~~~	designing the IoT sensor interfacing.	
			CO5	Implement web based services for IoT.
			CO6	Understand and analyze the case studies
			001	illustrating IoT Design.
			COI	Develop plans with relevant people to achieve the
				project's goals.
			C02	Break work down into tasks and determine
				nandover procedures.
			C03	identify links and dependencies, and schedule to
	8E885	PROJECT - II		Estimate the human and physical recourses
			CO4	Estimate the numan and physical resources
			04	required, and make plans to obtain the necessary
				Allocate roles with clear lines of responsibility and
			CO5	accountability with team spirit
			CO6	Design and develop the software or prototype
			000	using modern software tools wherever applicable
				to meet societal needs
				to meet boeletul needs.



## SREENIDHI INSTITUTE OF SCIENCE AND

## Course Outcomes of ECM Department



## Department of Electronics and computer Engineering

## COs for A22-1st Year and 2nd Year, A20-3rd Year and 4th Year course/subjects

Year and regulation	Course code	Course name	Co's	
			CO1	Explain semiconductor behaviour, types and their applications
			CO2	Differentiate the wave and particle, and its application for a particle in one dimension box
	04007	Engineering	03	Explain about emission, its types, laser principle and applications of optical fibers (sensors and medical endoscopy)
	911007	Physics	C04	Reveals about the magnetism-its origin and types and its applications
			CO5	Explain the basic concepts of dielectric materials, polarization and its types, their applications (piezo, ferro and Pyro electricity).
			CO6	Summarize nano& bulk concepts, surface to volume ratio and its applications.
			CO1	Explain basic fundamentals of Computer Systems , computing environments , Computer Languages – Machine Languages
			CO2	Describe C language Programs, Structure of a C Program
	9FC01	Problem Solving using C	CO3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break
			CO4	Write programs implementing application on arrays
			CO5	Write programs using Pointers and string handling functions
			C/06	Write programs using Enumerated, Structure, Union types and files.
I-I & A22	9HC11	MATRIX ALGEBRA AND CALCULUS	C01	Basic operation of matrices and about the linear system and some analytical methods for solution.
			CO2	Concept of Eigen value and Eigen vector and their properties and applications.
			CO3	Quadratic form and its properties.
			CO4	Mean value theorems and their applications to the given functions, series expansions of a function.
			C05	Various analytical methods to solve first order first degree and also the equations not of first degree ordinary differential equations.
			CO6	Methods to solve higher order ordinary differential equations.
		Essential English	COI	Demonstrate competence with suitable accuracy in vocabulary, and language fluency.
		Language Skills	CO2	State the definition of nouns, verbs, adjectives, and adverbs.
	oRCat	(EELS)	CO3	Identify the differences of each tense and use the tenses accurately.
	SHCOL		C04	Identify specialized reading strategies for specific types of texts
			C05	Produce written work that is substantive, organized, and grammatically accurate.
			C06	
	9BC01		C01	Get familiar to use the instruments to solve the engineering problem and draw various type of curves

		Engineering		used in engineering
		Graphics		Understand and Implement Orthographic projections
			CO2	and draw projections of simple drawing entities such as
				points Lines, and Planes
				Draw projections of different types of regular solids in
			CO3	various positions wrt principal planes of projection
				Draw Sections of various Solids including Cylinders
			CO4	cones prisms and pyramids and draw the developments
			004	of these selids and their sections
				of these solids and then sections.
			CO5	Construct Isometric Scale, Isometric Projections and
				Views and convert 3D views to 2D orthographic views
				Understand from basic sketching through 2D and 3-D
			CO6	solid modeling using computer aided design (CAD)
				software
			CO1	Describe people, objects and situations using simple
		Oral	001	sentences.
		Communication	CO2	Use appropriate tenses and expressions in different contexts
		Lab-I	002	of conversations.
	9HC61		CO3	Identify major areas of concern in their oral communication
				and address them.
			CO4	Create a SMART plan to enhance their communication skills
			COF	in English
			C05	
			000	Demonstrate the ways length of monochrometic course of
		Engineering Physics Lab	CO1	light by using Newton's Dings
			CO2	Analyza refractive index of a material prism and Dispersive
				nower of a glass Prism by using spectrometer
	0111166		CO3	Determine the wave length of spectral light and leser Source
	9HC66			of light by using Diffraction Grating
			CO4	Design and Applyzo PC. Circuits
			CO4	Analyze PLC Series circuit and parallel circuit
			CO5	Investigate magnetic Circuita
			C00	To formulate the algorithms for simple problems
			001	To translate given algorithms to a working and correct
		Duchlan Caluina	CO2	program
		Problem Solving		To be able to correct syntax errors as reported by the
		using C Lab	CO3	compilers
				To be able to identify and correct logical errors encountered
	9FC61		CO4	at run time
			CO5	To be able to write iterative as well as recursive programs
			~	To be able to represent data in arrays, string manipulation
			CO6	through a program
			007	<i>To be able to create, read and write to and from simple text</i>
			007	files.

Year and regulation	Course code	Course name	Co's	
			CO1	
			CO2	Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces.
			CO3	Identify and differentiate polymers, thermoplastic, thermosetting plastics and various lubricants.
	9HC04	Engineering Chemistry	CO4	Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
			CO5	Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
			CO6	Differentiate the types of corrosion and methods used to prevent the corrosion, surface coating techniques
			CO1	Design the programs using structures, unions and enum.
		Data Structures	CO2	Demonstrate the concepts of Abstract data type and also applications of stacks and queues.
	9EC01		CO3	Implement basic operations on single, double and circular linked list.
			CO4	Solve problems involving Binary Search trees and AVL trees.
			CO5	Articulate the concepts of graphs, heaps and hashing.
			CO6	Develop algorithms for various searching and sorting techniques and analyze their performance.
I-II & A22		Advanced Calculus	CO1	Find the limits and test for the continuity and differentiability of a function.
			CO2	Solve the problems on multiple integrals.
	011012		CO3	Solve linear and nonlinear first order partial differential equations.
	9HC12		CO4	Find Series expansion a function defined over the intervals.
			CO5	Find directional derivative, gradient, divergence and curl of a function.
			CO6	Solve problems of line, surface and volume integrals.
			CO1	Understand the principle of different methods of electrical circuit reduction.
		Electric Circuite	CO2	Understand the principle of single phase A.C circuits.
	04 C 42	and Notworks	CO3	Understand the principle of magnetic circuits.
	9AC42	and Networks Analysis	CO4	Understand the principles of network theorems along with its applications.
			CO5	Understand the principle two port networks along with its applications.

			CO6	<i>Understand the principle of transients with both DC and AC excitation</i>
			CO1	Understand the nuances of striking a great conversation in formal and informal situations.
	9HC62	Oral Communication	CO2	<i>Gain experience of facing an audience and speaking in public.</i>
		$Lao = \Pi$	CO3	Design a winning presentation and present it with ease
			CO4	
			CO5	
			CO6	
			CO1	Preparation of Inorganic compounds
			CO2	Determination surface tension of a liquid
			CO3	Determination viscosity of lubricant
			CO4	Determination acid value of an oil
			CO5	Estimation hardness of water
			CO6	Analysis the amount of chloride content
	9HC64	Engineering Chemistry Lab	CO7	Determination of cell constant and conductance of solutions
			CO8	Determination of redox potential and emf of solutions
			C9	Determination of the rate constant of acid
			CO10	Synthesis of a polymer (Thiakol rubber / Urea- Farmaldehyde resin)
			CO11	Synthesis of a drug- Aspirin
			CO12	Estimation of Mn ⁺⁷ by Colorimetry method
		Data Structures	CO1	Write programs on structures and unions.
			CO2	Implement Stacks, Queues and circular queues using arrays.
			CO3	Write programs to implement basic operations on various types of linked list.
	9EC01	using C Lab	CO4	Implement insertion and traversal operations on binary search tree
			CO5	Develop programs on various searching, sorting algorithms.
			CO6	
			CO1	Use various types of conventional manufacturing Processes
			CO2	Manufacture components from wood, MS flat, GI Sheet etc. – hands on experience
	9BC61	Workshop/Manu facturing Processes Lab	CO3	Manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc.
			CO4	Produce small devices / products /appliances by assembling different components
			CO5	
			CO6	

Year and regulation	Course code	Course name	Co's				
			CO1	Describe Connectives, Normal Forms and Theory of Inference with suitable examples.			
			CO2	Solve problems with Predicate Calculus and generate inferences.			
		Discrete Structure	CO3	Solve and explain Relations and Ordering problems and solve problems of Lattices.			
	9D301	and Graph Theory	CO4	Distinguish algebraic systems like semi-groups, monoids and groups and apply concepts of Combinatorics for solving problems			
			CO5	Solve problems with recurrence relations.			
			CO6	Explain and apply concepts of Euler's Formula, Multigraphs, Euler's Circuits, Hamiltonian graph and Chromatic Numbers for solving problems.			
			CO1	Gains exposure towards Python versions and their specifications			
		Python and Shell	CO2	Build programs using primitive data types and write applications that include functions, modules, packages along with respective exceptional handling mechanism			
	9D309	Programming	CO3	Writes applications using OO features of Python and also handle files			
			CO4	Understand and use the commands for text process, files management in the real time environment			
			CO5	Develop the commands for data management			
			CO6	Write shell scripts for the real time applications			
11-1 & A22		Electronic Devices and Circuits	CO1	Demonstrate the concepts of pn Diode, Zener Diode, Bipolar Junction Transistor, Field Effect Transistor and their characteristics.			
			CO2	Design and Analyze the Amplifier circuits using BJT and FET.			
	9CC01		CO3	Classify and characterize the Feed Back amplifiers and design various Oscillator circuits.			
			CO4	Understand the Basic regulator circuits and voltage multipliers.			
			CO5				
			CO6				
		Digital Logic	CO1	An ability to understand number systems and apply the rules of Boolean algebra and K-maps to simplify Boolean expressions.			
	90002	Design	CO2	An ability to design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters.			
	70002		CO3	An ability to design basic memory units (latches and flip- flops) and sequential circuits such as counters and registers			
			CO4	An ability to design digital design using PLD's such as ROM's, PLA's, PALs and digital controllers using Algorithmic State Machine Charts.			
	9CC03		CO1	Understand the concepts of signals, comparison of signals, orthogonal signal space and Apply the orthogonality properties to understand the Fourier methods of signal			

		Signals and		analysis- Fouries series and Fourier Transforms.
		Systems		Understand the concepts of systems, their characterization
			000	in the Time as well as Transformed domains and apply the
			02	mathematical tools, such as Convolution, Correlation and
				the Laplace transform to analyze signals and systems.
			~~~	Determine the sampling frequency for any low pass and
			CO3	band pass signals applying the sampling theorem.
				Distinguish between continuous and Discrete time signals
			CO4	and systems. Apply the concepts of Z-Transforms in the
			001	analysis of DT signals and systems.
			CO1	Apply process models in real world software products
		Software	<u>CO2</u>	Classify software requirement specification document
		Engineering	CO3	Design system models and user interface
	9D310	Lingineering	CO4	Evaluate test strategies for various softwares
			CO4	Evaluate test strategies for various softwares.
			C05	Describe product metrics, risks.
			000	The stand the quality management.
			CO1	To understand the basics of Managerial Economics at Micro
			G Q Q	
		Economics,	CO2	To understand cost concept
	9ZC01	Accountancy and	CO3	To understand and identify various basic concepts of
-	/	Management	005	Accounting
		Science	CO4	To understand the concepts of Capital expenditure
			CO5	To make student understand the basics of Management
			CO6	To make student learn about various personality traits
		Environmental Science and Ecology	CO1	Understand about ecosystem and energy flow among the
			COI	organisms.
			CO2	Know the resources available, use of them and
	9HC05			overexploitation of the resources in the nature.
			CO3	Learn the value, use and value of biodiversity.
			CO4	Understand the causes and effect of pollution and implement
				measures in control of pollution.
			CO5	Understand the sustainable development and implement
				green technology for sustainable development.
			CO6	Learn and implement policy to protect the environment.
			C01	Install and run the Python interpreter
	9D361		CO2	Apply the best features of mathematics
		Python and Shell	CO3	Describe the Numbers
	70501	Programming Lab	005	Understand and summarize different File handling
			CO4	onaersiana ana summarize aijjereni rue nanaling
		Electronic Devices		Understand color coding operations on Diode BIT FFT
		end Circuits Lab	CO1	Understand Color Could, operations on Diode, BJ1, FE1
		and Circuits Lab		and other electronic components.
			CO2	Correlate theoretical concepts with practical
	00071			implementation.
	90071			Apply the knowledge of Diodes, Capacitors and Transistors
			CO3	for the realization of rectifiers, regulators, amplifiers and
-				Oscillator circuits.
			CO4	Adapt effective Communication, presentation and report
				writing skills
		Comprehensive	CO1	Comprehend the concepts in the Core Courses of 1^{st}
		Test and Viva	001	year 1 st Semester
	9D385	Voce- III	CO2	Assess technical knowledge to face interviews.
		[2 Mids (Viva) and		Exhibit lifelong learning skills to pursue higher studies
		End Semester	CO3	or professional practice
1		(Test and Viva) =		· · · · · · · · · · · · · · · · · · ·

		30+70]		
	9D393	Technical Seminar – III	CO1	<i>Identify current general, political and technology related topics.</i>
			CO2	Arrange and presentseminar in a effective manner
			CO3	Collect, survey and organize content in presentablemanner
			CO4	Demonstrateoratoryskillswith the aidof Power Point Presentations
			CO5	Exhibit interview facingskillsand teamleadingqualities

Year and	Course	Course name	Co's		
regulation	code				
			CO1	Solve the random variable problems and probability distributions.	
			CO2	Estimate the parameters and solve the problems using central limit theorem.	
			CO3	Test the hypothesis related to samples concerning to the means and proportions of large size samples	
	9HC16 Probability and Statistics		CO4	Apply and solve the problems using t-test, Chi-square test also testing the hypothesis problems on small size samples, goodness of fit and independence of attributes.	
			CO5	Solve the problems on measures of central tendency, Correlation and regression models	
			CO6		
			CO1	Describe fundamentals of JAVA, its Classes, and Objects and write simple programs using constructors.	
		Ohisst	CO2	Explain and write programs using inheritance, interface and packages.	
		Object	CO3	Explain and write programs using Packages, I/O Stream and collections.	
	9EC02	Programming through Java	CO4	Describe and write programs to implement Exception handling and Multithreading.	
			CO5	Describe and write programs using AWT, Swings and develop applications using event handling.	
			CO6	Describe and develop applications using Applets and develop client server programs using networkingconcepts.	
			CO1	Basicstructureofadigitalcomputer	
		Computer	CO2	Arithmeticoperationsofbinarynumbersystem	
	9D403	Organization and	CO3	The organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit.	
11-11 &		Operating	CO4	Operatingsystemfunctions, types, system calls.	
AZZ		Systems	CO5	Memorymanagement techniquesanddead lockavoidance	
			CO6	Operatingsystemsfile systemimplementationanditsinterface	
		Database Management	CO1	Comprehend importance, significance, models, Database languages, architecture and design of Data BaseSystems.	
	0EC03	Systems	CO2	Design Relational Models and apply Integrity Constraints, Querying fundamentals, Logical data base Design and Views of databases along with application of Relational Algebra.	
	7EC03		CO3	Apply queries in SQL Query using Nested Queries Set, Comparison Operators, Aggregative Operators, Logical connectivity's with Joins statements and develop applications.	
			CO4	Eliminate data redundancy through normalforms.	
			CO5	Ensure ACID properties and Serializability in Transaction management and	

				Database Recovery.				
			COC	Use different External Storage Organization techniques and apply Indexing				
			000	in databases to enhance systemperformance.				
		Analog and	CO1	Distinguish between small and large signal amplifiers.				
		Pulse Circuits	CO2	Analyze and Design tuned and RF amplifiers.				
			CO3	Understand linear and non-linear wave shapingmethods.				
	9D414		CO4	Understand analyze and design various types of multivibrators, their analysis designing and applications				
			CO5	Explain different sweep generators and their applications				
			CO6	Analyze various types of Logic gates and Sampling gates				
		Soft Skills	CO1	Assess themselves using SWOT analysis.				
		Soft Shins	CO2	Appraise the importance of certain soft skills like time management and goal setting.				
			CO3	Improve their verbal ability to handle the competitive exams.				
	9HC03		CO4	Enhance their team skills and design thinking capabilities for effective problem solving and decision making.				
			CO5	Know their emotional quotient which guides their thinking, behavior and helps the manage stress efficiently.				
			CO6	Equip themselves with the prerequisites, and relevant techniques to effectively attend corporate interviews				
		Universal Human Values	CO1	Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.				
	9HC17		CO2	Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence				
			CO3	Strengthening of self-reflection.				
			CO4	Development of commitment and courage to act.				
		Soft Skills Lab	CO1	Assess themselves using SWOT analysis.				
			CO2	Appraise the importance of certain soft skills like time management and goal setting.				
			CO3	Improve their verbal ability to handle the competitive exams.				
	9HC63		CO4	Enhance their team skills and design thinking capabilities for effective proble solving and decision making.				
			CO5	Know their emotional quotient which guides their thinking, behavior and helps themmanage stress efficiently.				
			CO6	<i>Equip themselves with the prerequisites, and relevant techniques to effectively attend corporate interviews.</i>				
			CO1	<i>To understand the design and working of various linear and non-linear wave shaping circuits.</i>				
		Analog and	CO2	To demonstrate the working principle of various multivibrators.				
	9D463	Pulse Circuits	CO3	To verify the functionalities of various logic gates.				
		Lab	CO4	To perform and verify the BJT/ FET and feedback amplifiers.				
			CO5	To perform and verify the working of oscillators and voltage regulators.				
			CO6	To perform laboratory experiment to verify the conversion efficiency of various power amplifiers				
		Database Management	CO1	Create tables for a database and apply Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints,				
		Systems Lab	CO2	Write Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string				
	9EC63		CO3	Explain and write programs using PL/SQL programs using exceptions,				
			CO4	Develop programs using WHILE LOOPS, FOR LOOPS, nested loops using				
				BUILT-IN Exceptions and writeProcedures.				
			CO5	Write Programs for stored functions invoke functions in SQL Statement and write Programs for packagesspecification.				
			CO6	Describe and write programs using features of CURSORs and itsvariables.				
	9EC62	Object	CO1	Write programs to generate Prime numbers, Roots of quadratic equation				

	Oriented Programming through Java Lab			and Fibonacciseries.
			CO2	Write small application such as bankingsystem.
			CO3	Write programs on operator, function overloading and dynamic methoddispatch.
			CO4	Write programs to implement interface andpackages.
			CO5	Explain and write programs to implementthreads.
			CO6	Write programs to implement applets and eventhandling.
			CO7	Write an application to implement client and serverscenario
	Comprehensive Test and Viva		CO1	Comprehend the concepts in the Core Courses of 1 st year 1 st Semester
		Voce- IV [2 Mids (Viva) and End Semester (Test and Viva) = 30+70]	CO2	Assess technical knowledge to face interviews.
	9D486		CO3	<i>Exhibit lifelong learning skills to pursue higher studies or professional practice.</i>
		Technical	CO1	Identifycurrentgeneral, political and technologyrelated topics.
		Seminar - IV	CO2	Arrange and presentseminar in a effective manner
	9D494		CO3	Collect, survey and organize content in presentablemanner
			CO4	Demonstrateoratoryskills with the aid of Power Point Presentations
			CO5	Exhibit interview facingskillsand teamleadingqualities
			CO6	

Year and regulation	Course code	Course name	Co's	
			CO1	Analyze worst-case running times of algorithms using asymptotic analysis.
		Design and Analysis of Algorithms	CO2	Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide- and-conquer algorithms.
	9FC05		CO3	Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
			CO4	Comprehend the concept of dynamic programming algorithms, their applications and analyze them.
			CO5	Analyze the Backtracking and Branch and Bound algorithms and also identify the scenarios for its applicability.
			CO6	Comprehend the concept of P and NP Problems and its usage in the applications.
	9CC06 Analog and Digital Communications	CO1	Analyze and design of various continuous wave and angle modulation and demodulation techniques	
		Communications	CO2	Understand the effect of noise present in continuous wave and angle modulation techniques.
			CO3	Attain the knowledge about AM, FM Transmitters and

				Receivers
			CO4	Analyze and design the various Pulse Modulation
				Techniques.
III-I & A20				Understand the concepts of Digital Modulation
			CO5	Techniques and Baseband transmission, source coding
				and channel coding.
			C06	Analyze and design of various continuous wave and angle
			000	modulation and demodulation techniques
			CO1	Demonstrate the concepts of Differential Amplifier and
			001	Operational Amplifier and their characteristics.
			CO2	Design the basic circuits using IC 741 op-amp.
				Explore, design and analyze active filters, timers,
	8CC07	IC Applications	CO3	oscillators, voltage controlled oscillator DACs and ADCs,
				and IC regulators.
			CO4	Classify and characterize the TTL/ECL/CMOS Logic
			004	Families and design of various logic gates using them.
			CO5	
			CO6	
			CO1	Identify & summarize the functionalities of each layer in the OSI model
		Data	CO2	Implement Error detection & Error correction techniques
		Communication	CO3	Develop Network layer routing algorithms
	8D504	and Computer	005	Design a mechanism which can detect prevent or recover
		Networks	CO4	from a security attack
			CO5	Implementation of Hierarchical routing and subnets-
				routing algorithm
			C06	Protocols of transport layer and application layer
		Information Security	C01	To learn the fundamental concepts of security attacks
				security services.
			CO2	To apply conventional cryptographic techniques in order
				to do encryption.
	8EC06		CO3	To apply Public key cryptography techniques in order to
	8FC00		005	do encryption.
			CO4	To learn IP security Architecture and its role in security
				framework.
			CO5	To apply SSL and TLS for Web Security. To design and
			005	develop Intrusion Detection Systems and Firewall.
			CO6	
		Information		Understanding of Symmetric Encryption Algorithms,
	00065	Security Lab	001	Asymmetric Encryption Algorithms, Hash and Key
	8FC65		COI	Exchange, Digital Signature and Digital Envelope.
				Demonstration of NS3 Tool
		IC Applications	CO1	To explore the operating modes of IC 741 OP-AMP
		Lab	CO2	To design applications using 7410p-Amp
			02	To understand and implement applications using 555
	8CC76		CO3	Timers
			CO4	To design D to A converters and IC voltage regulators
			CO5	
			CO6	
		Web		Demonstrate the use of HTML tags and be able to design
	00000	Technologies Lab	001	web pages. Develop dynamic programs involving Java
	8EC/7		COI	scripts, popup windows in JavaScript along Event
				Handling.
			CO2	Develop scripts using XML and XSLT and read XML

				documents using parsers DOM parser and SAY parser
				Develop JSON files and access them via HTML pages.
			CO3	Implement Angular with Expressions, Filters, Directives, Controller, and Modules.
			CO4	Develop a Single Page Application with implementation of Scope and Form.
			CO5	Implement Java servlets using Apache Tomcat Server for User authentications
			CO6	Develop an application in PHP with Database connectivity
	8D580 Summer Industry Internship - I	CO1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.	
		Summer Industry Internship - I	CO2	Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
			CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
			CO4	Improve their communicative skills and team skills largely improve.
			CO5	Work as an individual and in a team.
			CO6	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.

Year and regulation	Course code	Course name	Co's	
			CO1	Understanding the concepts of 8086 Architecture
		Microprocessors and Microcontrollers	CO2	Understanding the concepts of Instruction set & developing skills in writing assembly language programs.
	8DC05		CO3	<i>Ability to interface keyboard, stepper motor</i> <i>ADC, DAC to 8086 using 8255</i>
			CO4	Understanding the concepts of 8051 Architecture
			CO5	<i>Exploring the concepts of instruction set of</i> 8051
			CO6	<i>Ability to interface LED, LCD, Keyboard DAC,</i> <i>ADC with 8051</i>
	8CC09	Digital Signal Processing	CO1	Distinguish between CT and DT signals and systems and understand the growing need of DSP and study the concepts of discrete time signals and systems.
			CO2	Represent periodic DT signals as a Fourier series; non-periodic DT signals as a Fourier Transform and use a powerful mathematical

III-II & A20 III-II & CO3 Compute the Fourier Transform of DT signals using the FFT algorithms. Recil: a digital IR filter in several forms and structures for a given transfer function HE;band on design IR filter as per specifications. Recil: a digital IR filter as per specifications. Recil: a digital IR filter in several forms and structures for a given transfer function HE;band on design IR filter as per specifications. Design of digital FIR filter as per specifications. CO4 Understand the need and implement the multirate sampling techniques. REC05 Automata and Compiler Design Convert regular expressions to finite automata, convert regular expressions to finite automata, convert regular expressions to finite extramation. REC06 Automata and Compiler Design Convert regular expressions to finite automata, convert regular expressions to finite extramation. REC07 Automata and Compiler Design Convert regular expressions to finite extramation. C04 Generate intermediate code from syntax tree and analyze semantic rules. C05 Implement various run time environments strategies. REC08 Cyber Security and Cyber Laws Co1 C04 Generate machine dependent code from syntax tree and analyze semantic rules. Inglineatic semantic rules. REC08 Cyber Security and Cyber Laws Co1 Familiariz the cryptographic procedures and therestand heritage. <th>III-II & A20 III-II & CO3 Compute the Fourier Transform of DT signals using the FFT algorithms. No. Reflex a digital IIR filter in several forms and structures for a given transfer function III (start and edigin IIR filter as perspections. No. Design of digital FR filters by several methods as per the given specifications. CO3 Design of digital FR filters by several methods as per the given specifications. CO4 Understand the used and implement the filter sample rechniques. 8D602 Automata and Compiler Design CO4 Convert regular expressions to finite automata. CO3 Parse the input string using CFG through Top down techniques. CO4 Generate methods and form syntax tree and analyze semantic rules. CO4 Generate methods code from optimized code. CO5 Generate international code from optimized code. CO6 Comprehence Proving syntax tree and analyze semantic rules. R8FC08 Cyber Security and Cyber Laws CO4 Categories international cyber intersition and comprehence and summarize the various laws modelsand its associated threats strategies. R8FC08 Microprocessors and Microprocessors and Microprocessors and CO4 Cotagreptine international cyber laws and cyberrimes. R8FC06 Microprocessors and Microprocessors and CO4 Cot</th> <th></th> <th></th> <th></th> <th></th> <th></th>	III-II & A20 III-II & CO3 Compute the Fourier Transform of DT signals using the FFT algorithms. No. Reflex a digital IIR filter in several forms and structures for a given transfer function III (start and edigin IIR filter as perspections. No. Design of digital FR filters by several methods as per the given specifications. CO3 Design of digital FR filters by several methods as per the given specifications. CO4 Understand the used and implement the filter sample rechniques. 8D602 Automata and Compiler Design CO4 Convert regular expressions to finite automata. CO3 Parse the input string using CFG through Top down techniques. CO4 Generate methods and form syntax tree and analyze semantic rules. CO4 Generate methods code from optimized code. CO5 Generate international code from optimized code. CO6 Comprehence Proving syntax tree and analyze semantic rules. R8FC08 Cyber Security and Cyber Laws CO4 Categories international cyber intersition and comprehence and summarize the various laws modelsand its associated threats strategies. R8FC08 Microprocessors and Microprocessors and Microprocessors and CO4 Cotagreptine international cyber laws and cyberrimes. R8FC06 Microprocessors and Microprocessors and CO4 Cot					
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8D664 CO3 systems using various modulation and demodulation technique like AM, FM, ASK, FSK and PSK CO4 CO4 Understand and demonstrate the process involved in analog to digital conversion Understand the concent of sampling rate conversion Understand the concent of sampling rate conversion	8D664 CO3 Systems using various modulation and demodulation technique like AM, FM, ASK, FSK and PSK CO4 Understand and demonstrate the process involved in analog to digital conversion CO5 Understand the concept of sampling rate conversion					Grasp the nature and significance of communication
CO4 Understand and demonstrate the process involved in analog to digital conversion Understand the concept of sampling rate conversion	CO4 Understand and demonstrate the process involved in analog to digital conversion CO5 Understand the concept of sampling rate conversion		8D664		CO3	systems using various modulation and demodulation
CO4 Understand and demonstrate the process involved in analog to digital conversion Understand the concept of sampling rate conversion	CO4Understand and demonstrate the process involved in analog to digital conversionCO5Understand the concept of sampling rate conversion				200	technique like AM, FM, ASK. FSK and PSK
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Understand the concent of sampling rate conversion	CO5 Understand the concept of sampling rate conversion				CO4	analog to digital conversion
	CO5					Understand the concept of sampling rate conversion
CO5 in terms of Interpolation and Decimation	in terms of Interpolation and Decimation				CO5	in terms of Interpolation and Decimation

			CO6	Analyze and simulate various signals and study their properties in time and frequency domain
	8D665	Automata and Complier Design	CO1	Implement the lexical analyzer using lexical analyzer generating tool such as LEX.
		Lab	CO2	1. Design top down parser for the given language
			CO3	2. Design bottom up parser for the given language using YACC parser tool.
		Group Project	CO1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
			CO2	Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
	8D677		CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
			CO4	Improve their communicative skills and team skills largely improve.
			CO5	Work as an individual and in a team.
			CO6	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
	8D688	Comprehensive Viva Voce-V	CO1	Assessed the knowledge of the students in the Core and Elective subjects that they have studied till the completion of that
	8ZC22	BASICS OF ENTREPRENEURSHIP(WADHWANI	CO1	academic year. The students' will acquire basic knowledge on Skills of Entrepreneurship.
		MODEL) (Open Elective-I)	CO2	The students' will understand the techniques of selecting the customers through the process of customer segmentation and Targeting
			CO3	Business Models and their validity are understood by the students'.
			CO4	The basic cost structure, Revenue Streams and the pricing strategies are understood by the students'.
			CO5	The students' will acquire knowledge about the project management and its techniques.
			CO6	The students' get exposure on marketing strategies and business regulations for the Start up.
	8ZC25	BASICS OF INDIAN ECONOMY (OPEN ELECTIVE-I)	CO1	Gain knowledge relating to Economics, various sectors and its growth
			CO2	Will gain knowledge relating to various concepts of National income and related aggregates
			CO3	Students will learn about Indian Industrial policy and benefits of LPG to India
			CO4	Comprehend knowledge relating to Fiscal policy & Taxation system in India

	CO5	Learn about inflation & business cycles.
	CO6	Know about the BoP and its influence on
		economy

Year and regulation	Course code	Course name	Co's		
	8D706	Embedded and Real Time Systems	CO1	Identify and summarize the characteristics and challenges of designing an embedded system	
			CO2	Utilize and apply ARM architecture for Embedded System Design	
			CO3	ARM Architecture and Programming (Assembly and C)	
			CO4	Design simple input output hardware interfaces using ARM	
			CO5	Explain the concepts and design requirements related to a real time systems	
			CO6	Getting embedded software into target system – Debugging	
	8D707	VLSI Design	CO1	Understand the existing device technologies and IC fabrication process	
			CO2	<i>Explore and analyze the electrical properties of MOS device & Inverter design and analysis</i>	
			CO3	Do physical design of basic logic gates, combinational and sequential circuits	
			CO4	Analyze the paracitic effect on IC power and performance	
			CO5	Design memory cells and basic data-path units	
			CO6	<i>Explore on the need for testing and design verification of</i> <i>VLSI circuits</i>	
	8DC72	Embedded Systems Lab	CO1	After completion of this course, the student should be able to	
				design simple input output hardware interfaces using	
IV-I & A20					
				AKMLF C2140	
	8DC73	VLSI Lab	CO1	To learn Verilog HDL and implement digital circuits	
				on FPGA using Xilinx tools.	
			CO2	To draw and simulate layout for digital logic gates	
				using Micro-wind tool	
	8D788	Python Programming Lab	CO1	Install and run the Python interpreter	
			CO2	Apply the best features of mathematics	
			CO3	Describe the Numbers	
			CO4	Understand and summarize different File handling operations	
			CO5		
			CO6		
	8D779	Project – I	CO1	Develop plans with relevant people to achieve the project's goals	
			CO2	Break work down into tasks and determine handover procedures	
			CO3	<i>Identify links and dependencies, and schedule to achieve deliverables</i>	
			CO4	Estimate the human and physical resources required, and make plans to obtain the necessary resources	
			CO5	Allocate roles with clear lines of responsibility and accountability with team spirit.	
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			CO6	Design the architectures and various diagrams.	
			CO7	Implement the designs and present the project execution.	
			CO1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.	
	80785	Evaluation of Summer	CO2	<i>Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.</i>	
	80785	Industry Internship-II	CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.	
			CO4	Improve their communicative skills and team skills largely improve.	
			CO5	Work as an individual and in a team.	
			CO6		
			CO1	Understand the importance of big data	
	Big Data 8EC18 Analytics (PE- III)	CO2	Understand challenges with big data		
		Big Data Analytics (PE-	CO3	Knowledge about the technological developments in big data environment	
			CO4	Understanding about map reduce work flows	
		III)	CO5	Knowledge about nosql data environment.	
			CO6	Analysis with Hadoop and related tools	
			CO7	Capability of understanding the usage of big data in context to cloud and other technologies.	
			CO1	1) Familiarize the functional/operational aspects of crypto currency ECOSYSTEM.	
	8FC16	Block Chain Technologies	CO2	2) Understand emerging abstract models for Block chain Technology.	
		(PE-III)	CO3	3) Identify major research challenges and technical gaps existing between theory and practice in crypto currency domain	
			CO1	<i>Realize the importance of cyber security and various forms of cyber attacks and countermeasures.</i>	
		Cyber Security & Cyber Laws Semantic (PE- III)	CO2	Get familiar with the E-Commerce frame work and the various model of E-Commerce, security threats to cyberspace and E-Commerce and the basic laws associated with it.	
	8EC13		CO3	Understand the role of electronic signatures in E-Commerce and the role of certifying authority in regulating license with the various laws relating to it.	
			CO4	Understand the various laws related to trades and WTO, council of Europe related to cyber crimes and have awareness with the various penalty and compensation in failure to protect data.	
			CO5	Get familiar with obscenity and pornography in cyber space and understand the violation of Right of privacy on Internet.	

			CO6	Elucidate the various chapters of the IT Act 2008, power of Central and State Government to make rules under IT Act 2008.
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Year and regulation	Course code	Course name	Co's		
		Project-II	CO1	Develop plans with relevant people to achieve the project's goals	
			CO2	Break work down into tasks and determine handover procedures	
	80880		CO3	Identify links and dependencies, and schedule to achieve deliverables	
			CO4	Estimate the human and physical resources required, and make plans to obtain the necessary resources	
			CO5	Allocate roles with clear lines of responsibility and accountability with team spirit.	
			CO6	Design the architectures and various diagrams.	
			CO7	Implement the designs and present the project execution.	
			CO1	Describe the characteristics of cloud	
			CO2	Describe the cloud services.	
IV-II & A20	8EC20	Cloud Computing (PE-V)	CO3	Understand different architectures for cloud applications, Creation and running of python programs, running amazon ec2 instance	
			CO4	Understand Data Intensive applications and future trends of Internet Clouds supporting Mobile Computing, Ubiquitious Computing and Social Networking	
			CO5	Discuss mapreduce and image processing app on cloud.	
			CO6	Discuss cloud security architecture	



Course Outcomes of CSE - (Cyber Security) Department

SREENIDHI INSTITUTE OF SCIENCE AND





Department of Computer Science & Engineering (Cyber Security) COs for A22-1st Year and 2nd Year, A20-3rd Year and 4th Year courses/subjects

Year and regulation	Course code	Course name		Co's
			CO1	Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces.
			CO2	Identify and differentiate polymers, thermoplastic, thermosetting plastics and various lubricants.
			CO3	Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
	9НС04	Engineering Chemisury	CO4	Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
I-I & A22			CO5	Differentiate the types of corrosion and methods used to prevent the corrosion, surface coating techniques
			CO6	Learn and implement synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.
	9FC01	Problem Solving using C	CO1	To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language)
			CO2	To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion
			CO3	To use arrays to formulate algorithms and programs and apply programming to solve matrix addition and multiplication problems and searching
			CO4	To decompose a problem into functions and synthesize a complete program using divide and conquer approach.

			CO5	To use pointers to formulate algorithms and programs.
			CO6	To apply files to do various file manipulation functions.
		MATRIX ALGEBRA AND CALCULUS	CO1	Check the consistency or inconsistency of a linear system and can solve the problems.
			CO2	Find the Eigen values and Eigen vectors and can solve the problems associated with these concepts.
			CO3	Find the nature, index and signature of the quadratic form.
	9HC11		CO4	Verify the applicability of mean value theorems and also can express the givenstandard function in series form using Taylor's and Maclaurin series.
			CO5	Find the solutions of first order first degree differential equations and solve the problems on Newton's law of cooling, Natural growth and decay.
			CO6	Solve higher order ordinary differential equations with constant coefficients using some standard methods.
		Essential English Language Skills (EELS)	CO1	Demonstrate competence with suitable accuracy in vocabulary, and language fluency.
			CO2	State the definition of nouns, verbs, adjectives, and adverbs.
	9HC01		CO3	Identify the differences of each tense and use the tenses accurately.
			CO4	Identify specialized reading strategies for specific types of texts
			CO5	Produce written work that is substantive, organized, and grammatically accurate
		Oral Communication Lab-I		Describe people, objects and situations using simple sentences.
	9HC61			Use appropriate tenses and expressions in different contexts of conversations.
				Identify major areas of concern in their

				oral communication and address them.
				Create a SMART plan to enhance their
				communication skills in English
				Understand and analyse microscopic
			CO1	chemistry in terms of atomic orbitals,
		Engineering Chemistry Lab		molecular orbitals and intermolecular forces.
			~~~	Identify and differentiate polymers,
			CO2	thermoplastic, thermosetting plastics and
				Various iupricants.
				industrial problems caused by bard water and
			CO3	also learn about the municipal water
	9НС64			treatment using various methods.
				Understand and interpret the important
			CO4	fundamental concepts of
			0.04	electrochemistry and solve the problems
				related to batteries.
			00 <i>5</i>	Differentiate the types of corrosion and
			COS	methods used to prevent the corrosion,
				Learn and implement synthesis of drug
				molecules and learn fundamentals of
			CO6	analytical techniques like electronic,
				vibrational and rotational spectroscopy.
			CO1	Enumerate the algorithms for simple
			COI	problems
		Problem Solving using C Lab		Classify the given algorithms to a
				working and correct program
				Correct the syntax errors as reported by
				the compilers
				Identify and correct logical errors
	9FC61			encountered at run time
				Write iterative as well as recursive
				programs
				Represent data in arrays, strings and
				structures and manipulate them through a
				program
				Declare pointers of different types and use
				them in defining self referential structures.
				Create, read and write to and from simple
				text files.
				Use various types of conventional
				manufacturing Processes
				Manufacture components from wood. MS
	9BC61	Workshop/Manufacturing		flat, GI Sheet etc. – hands on experience
		Processes Lab		manufacturing of components by
				machining like shafts, holes & threaded
				holes, surface finishing of components etc.
				Produce small devices / products
				r rouuce sman devices / products

				/appliances by assembling different components
I-II & A22		Engineering Physics	CO1	Differentiate the wave and particle, de- Broglie matter waves its experimental evidence, Schroedinger's wave concept and its application for a particle in one dimension box.
			CO2	Explain about emission, its types, laser principle, types, working and its applications and to reveals about TIR principle, optical fiber-types and signal propagation, attenuation, communication system and applications of optical fibers (sensors and medical endoscopy)
	011007		CO3	Reveals about the magnetism-its origin and types, Hysteresis, domain theory, Superconductivity, experimental facts, theoretical analysis, types of superconductors and its applications.
	98007		CO4	Explain the basic concepts of dielectric materials, polarization and its types, local fields, frequency and temperature effect on dielectrics and their applications (Piezo, Ferro and Pyro electricity).
			CO5	Explain semiconductor behavior, types, carrier concentration, Hall effect, Thermistor, demonstrate and analyze semiconductor devices like a PN-junction, I-V characteristics, LED, solar cell, photo diode and their applications.
			CO6	Summarize nano& bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD & TEM.
		Data Structures	CO1	Design the programs using structures, unions and enum.
	9EC01		CO2	Demonstrate the concepts of Abstract data type and also applications of stacks and queues.
			CO3	Implement basic operations on singly, doubly and circular linked list.
			CO4	Solve problems involving Binary Search trees and AVL trees.

			CO5	Develop algorithms for various searching and sorting techniques and analyze their performance.
			CO6	Articulate the concepts of graphs, heaps and hashing.
			CO1	Find the limits and test for the continuity and differentiability of a function.
			CO2	Solve the problems on multiple integrals.
			CO3	Solve linear and nonlinear first order partial differential equations.
	9HC12	Advanced Calculus	CO4	Find Series expansion a function defined over the intervals.
			CO5	Find directional derivative, gradient, divergence and curl of a function.
			CO6	Solve problems of line, surface and volume integrals.
	9BC01	Engineering Graphics	CO1	Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering
			CO2	Understand Orthographic projections and draw projections of simple drawing entities such as points Lines.
			CO3	Draw projections of different types of regular Planes, solids in various positions wrt principal planes of projection
			CO4	Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections
			CO5	Construct Isometric Scale, Isometric Projections and Views
			CO6	Convert Isometric to orthographic views and understand basic sketching using computer aided design (CAD) software.
			CO1	Outline the fundamentals of electrical engineering and DC machines
			CO2	Summarize the principles of AC circuits.
	9AC48	Basic Electrical and	CO3	Inspect the principle and operation of three phase induction motor and measuring instruments
		Lieu onies Engineering	CO4	Comprehend the principle and operation of diode.
			CO5	Explain the principle and operation of transistor.
			CO6	Enlist and describe the principles of digital

				electronics.
			CO1	Strike a conversation and engage in effective small talk
			CO2	Lose stage fear and confidently interact with others in different roles and tap their creative side.
	9HC62	Oral Communication	CO3	Speak for a minute, fluently and cohesively.
		Lau-11	CO4	Make official presentations with effective use of PPTs.
			CO5	Engage in group discussions in a confident and professional manner.
			CO6	Shed fear of questions from the audience and the interviewers.
				Understand the concepts of photo electric effect, importance, photo current, colour filters, optical sensors.
	9HC66	Engineering Physics Lab		Know about the light properties- dispersion, prism, spectrometer and minimum deviation arrangement.
				Recognize the difference between the interference and diffraction, grating, laser characteristics.
				Analyze the concepts of fiber optics, fundamentals, numerical aperture its importance, attenuation in fiber and applications
				Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot- Savart law
				Know the difference between AC and DC fundamentals, Magnetostriction, resonance, air column vibrations
				Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals
				Summarize the fundamentals of modulus- types, stress, strain, elasticity, plasticity and Hook's law.
				Analyze the concept a semiconductors, types, calculation of energy gap of a semiconductor diode and importance
				Analyze the difference between normal diode & LED, forward bias, reverse bias,

			1	
				I-V characteristics, direct and indirect band gap semiconductors.
			CO1	Write programs on structures and unions.
			CO2	Implement Stacks, Queues and circular queues using arrays.
	9EC61	Data Structures using C	CO3	Write programs to implement basic operations on various types of linked list.
		Lau	CO4	Implement insertion and traversal operations on binary search tree
			CO5	Develop programs on various searching, sorting algorithms.
	9HC16	Probability and Statistics	CO1	Solve the random variable problems and probability distributions.
			CO2	Estimate the parameters and solve the problems using central limit theorem.
			CO3	Test the hypothesis related to samples concerning to the means and proportions of large size samples.
			CO4	Apply and solve the problems using t-test, Chi-square test also testing the hypothesis problems on small size samples, goodness of fit and independence of attributes.
			CO5	Solve the problems on measures of central tendency, Correlation
			CO6	Classify and differentiate various regression models
н г үрэ			CO1	Understand the fundamentals of electrical engineering and DC machines.
II-I A22			CO2	Understand the principles of AC circuits.
			CO3	Understand the principle and operation of three phase induction motor and
		Elements of Electrical and		measuring instruments.
	94048	Electronics Engineering	CO4	Comprehend the principle and operation of diode.
			CO5	Understand the principle and operation of transistor.
			CO6	Understand the principles of digital electronics
	9EC02	Object Oriented		Comprehend the fundamentals of Java,
		Programming through Java	CO1	Classes, Objects and design the java
			COI	programs using constructors and String handling methods.
			CO2	Design the programs using inheritance, polymorphism and interface.

			CO3	Develop programs using Packages, I/O Streams and collections.
			CO4	Apply the concepts of Exception handling and Multithreading for various scenarios.
			CO5	Create programs using AWT, Swings and develop applications using event handling.
			CO6	Develop applications using Applets and client server programs using networking
				concepts.
			CO1	Evaluate elementary mathematical arguments and identify fallacious reasoning (not just fallacious conclusions).
			CO2	Reasoning about arguments represented in Predicate logic.
	0E303	Discrete Mathematics	CO3	Perform operations on sets, functions, relations.
	9F303 9DC10	Computer Organization & Architecture	CO4	Solve problems that involve: computing permutations and combinations, Binomial and Multinomial theorems
			CO5	Analyze and deduce problems involving recurrence relations and generating functions
			CO6	Apply graph theory Spanning trees, planar graphs, Isomorphism and connectivity
			CO1	Perceive basic operational concept of computer and data processing.
			CO2	Use data types with instruction set of specified architecture
			CO3	Justify different control unit design and algorithms for various operations.
			CO4	Elaborate basic architecture of 8086 processor
			CO5	Write assembly language programming and debug to 8086
			CO6	Interface devices to 8086 processor
			CO1	Apply process models in real world software products.
			CO2	Classify software requirement specification document.
	9D310	Software Engineering	CO3	Design system models and user interface.
			CO4	Evaluate test strategies for various software's.
			CO5	Describe product metrics, risks.
			CO6	Comprehend the quality management
	9HC17	Universal Human Values	CO1	This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature,

				which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values
			CO2	Understanding Harmony is designed which may be covered in their III or IV semester. During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.
			CO1	Write programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series.
		Object Oriented Programming through Java Lab	CO2	Write small application such as banking system.
	9EC62		CO3	Write programs on operator, function overloading and dynamic method dispatch.
			CO4	Write programs to implement interface and packages.
			CO5	Explain and write programs to implement threads.
			CO6	Write programs to implement applets and event handling.
				Write an application to implement client and server scenario
		Software Engineering and Computer Organization Lab	C01	Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish life cycles for developing software product.
	9EC77		CO2	Outline the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving.
			CO3	Define and design models for the requirements stated in the software project.
			CO4	Design class, object and interactive diagrams and know their significance.
			CO5	Design advanced behavioral and architectural modeling and work on case studies.
	9AC77	Elements of Electrical and Electronics Engineering Lab	CO1	Understand the working of single-phase transformer under different conditions, the performance of three phase induction motor,

			CO2 CO3 CO4	different speed control methods of DC motor with and without loading with its performance. Understand the applications of Thevenin's Theorem in circuit analysis. Identify, Specify and test R, L, C Components (Colour Codes), Potentiometers, Switches, Coils, Relays. Identify, Specify and test Active Devices,
			CO5	Explain and demonstrate working of PN Junction and Zener diode.
			CO6	Explain and demonstrate working Half and Full wave Rectifier without filters.
				Demonstrate working of CE characteristics and its application as an amplifier
	9J386	Technical Seminar - III	CO1	Identify topics related to Computer Science and Engineering domain
			CO2	Collect, survey and organize content in PPT form
			003	Present seminar in an effective manner
		Introduction to Cyber Security	CO1	systems,
			CO2	Outline techniques of defense against each threat.
			CO3	Describe the fundamentals of modern cryptography
	9EC41		CO4	Compare popular computer and network security mechanisms and protocols used in Authentication and Remote Access.
			CO5	Categorize the procedures used in the intrusion detection and prevention systems.
II-II A22			CO6	Identify security tasks that need to be used in e-banking by experts
			CO1	To Study in detail about various analog and digital modulation and demodulation
			CO2	techniques.
	05005	Data Communications and	CO3	To have a thorough knowledge of various multiplexing schemes and Data communication protocols,
	9605	Computer Networks	CO4	To Learn flow control, error control and access control mechanisms.
			CO5	To Learn routing and congestion control algorithms, internet protocols.
			CO6	To Understand Transport layer entities such as DNS and HTTP

			CO1	Analyze importance and significance of models, Database languages, architecture and design of Data Base Systems.
			CO2	Understand Relational Model – Integrity Constraints, Logic
			CO3	Analyze data base Design and Views of databases, queries using Relational Algebra and Relational Calculus.
	05000	Database Management	CO4	Solve Queries with Comparison Operators, Aggregative Operators and nested queries. Queries with joins.
	92003	Systems	CO5	Apply Schema refinement through all forms of Normalization to eliminate database redundancy.
			CO6	Apply ACID properties in transaction. Ensuring serializability in concurrent transactions. Concurrent control
				methods and recovery of transaction.
				Analyze External Storage Organization
				mechanisms and apply indexing in
				enhance system performance
	9EC06	Operating Systems	CO1	Understand the functional architecture of
				an Operating System with usage of system
				Calls.
			CO2	algorithms & pragmatics of scheduling algorithms used by various Operating Systems.
			CO3	Solve issues related to process synchronization and Deadlocks in the Operating System.
			CO4	Illustrate the concepts of Memory Management.
			CO5	Outline the directory structure & analyze disk scheduling algorithms.
			CO6	Summarize the aspects of Protection and
				I/O systems.
			CO1	Apply the rules of Boolean algebra to simplify Boolean expressions.
			CO2	Simplify of Boolean expressions using K-map.
	9CC55	Digital Electronics	CO3	Design MSI combinational circuits such as full adders, multiplexers, decoders, encoders.

				Code converters.
				Design basic memory units (latches and flip-
			CO4	flops) and sequential circuits such as counters
				and registers
			COF	Create digital design using PLD's such as
			005	ROM's, PLA's, PAL s.
			CO6	Design the digital controllers using
				Algorithmic State Machine Charts
				Acquire the basics of Managerial
			CO1	Economics at Micro level, Demand
			COI	analysis and production analysis in
				particular
				Gain exposure on Cost concept, Revenues
			CO2	and Market structure and describe the
				concepts
				Comprehend the basic concepts of
		Economics, Accountancy and Management Science	CO3	Accounting. Double entry system and
	9ZC01			Bookkeeping
				Interpret the concepts of Capital
			CO4	expenditure Revenue expenditure and
				Final accounts ad their significance
				Cain knowledge and elaborate the basics
			CO5	of Management, its principles and various
			COS	or wanagement, its principles and various
			000	functions performed in organization.
			006	Recognize various personality traits,
				perception, attitudes of individuals
			001	working in organization
			COI	Assess themselves using SWOT analysis.
			CO2	Appraise the importance of certain soft
				skills like time management and goal
				Setting.
			CO3	improve their verbal ability to handle the
				Enhance their teem skills and design
	011000		CO4	thinking conchilition for offective
	9803	SOTT SKIIIS	C04	problem solving and decision making
				Know their amotional quotiont which
			CO5	guides their thinking behavior and
			005	being them manage stress efficiently
			CO6	Equip thomsolves with the prorequisites
				and rolovant tochniques to effectively
				and relevant techniques to effectively
				attenu corporate interviews
	9EC63	Database Management Systems Lab	CO1	Quorios using ANY ALL IN EVICES
				QUELIES USING ANT, ALL, IN, EXISTS, NOTEXISTS LINION INTERSET Constraints

			CO2	Write Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a given application.
			CO3	Explain and write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
			CO4	Develop programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT–IN Exceptions and write Procedures.
			CO5	Write Programs for stored functions invoke functions in SQL Statement and write Programs for packages specification.
			CO6	Describe and write programs using features of CURSORs and its variables.
				Develop Programs implementing Triggers
				Simulate and implement operating system
	9EC66	Operating Systems Lab	CO1	concepts such as scheduling, deadlock
				management, page replacement techniques,
	9EC65	Computer Networks Lab	CO1	Implement and analyze framing methods of the data link layer.
			CO2	Illustrate and implement error detection & correction techniques.
			CO3	Implement different Routing Algorithms.
			CO4	Understand basic Network Commands.
			C05	Demonstrate the features of NS2 tool
	91479	Comprehensive Test and	COI	Assessed the knowledge of the students in the
				studied till the completion of that academic year
	9J487	Technical Seminar – IV	CO1	Identify topics related to Computer Science and Engineering domain or disruptive technologies
			CO2	Collect, survey and organize content in PPT form
			CO3	Present seminar in an effective manner
Year and regulation	Course code	Course name		Co's
			CO1	The students will acquire basic knowledge onSkills of Entrepreneurship.
			<b>CO</b> 2	The students will understand the techniques
	9ZC22	Basics of Entrepreneurship	02	process of customer segmentation and
		Enucpreneursmp		Targeting
			CO3	Business Models and their validity are understood
				by the students.
			CO4	The basic cost structure, Revenue Streams and the

				pricing strategies are understood by the
				students.
			CO5	The students will acquire knowledge about the project management and its techniques.
			CO6	The students get exposure on marketing strategiesand business regulations for the Start up.
			CO1	Summarize the characteristics of cloud models.
		Cloud Computing	CO2	Demonstrate the different kinds of cloud services.
III-I &	8EC20		CO3	Analyze different architectures for c through python programs
A20			CO4	Assess the performance of cloud services and summarize the innovative applications of IOT oncloud.
			CO5	Design architecture of an Apps such as map reduce, image processing app etc on cloud
			CO6	Understand various security aspects in cloud.
				Understand the fundamental concepts of
	8FC06	Information Security	CO1	SecurityAttacks and security standards with the model for network Security.
			CO2	Review and analyze conventional cryptographic techniques and authentication
				Review and analyze public
			CO3	cryptographic techniques and outline the concepts of Kerberosand email privacy
			CO4	Recognize architecture, key management and
				header formats of Ipsec
			CO5	and protocols
			CO6	Design principles of Firewalls
			CO1	Demonstrate the use of HTML tags. Apply Stylesusing CSS and Bootstrap.
			CO2	Develop dynamic programs using Java script and Typescript.
	8EC07	Web Technologies	CO3	Develop scripts using XML and validate using parsers and design a data-interchange formatusing JSON.
			CO4	Comprehend the uses of Web servers and design the server-side scripts using Servlets

			CO5	Design and develop server-side and scripts components using PHP.
			CO6	Design responsive web applications with Forms,Scope, Dependency Injection & Services, and Single Page Application (SPA) of Angular.
			CO1	alyze worst-case running times of algorithms usingmptotic analysis.
			CO2	Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
	8FC05	Design and Analysis of Algorithms	CO3	scribe the greedy paradigm and explain when an orithmic design situation calls for it. Recite orithms that employ this paradigm. Synthesize edy algorithms, and analyze them.
			CO4	mprehend the concept of dynamic programming orithms, their applications and analyze them.
			CO5	alyze the Backtracking and Branch and Bound orithms and also identify the scenarios for its plicability.
			CO6	mprehend the concept of P and NP Problems and usage in the applications.
	01012		CO1	Learn about various data types, types of datasets a data quality
			CO2	Implementation of R fundamentals and perform factors and data frames.
		Fundamentals of Data	CO3	Implementation of data structures iterative programming & function concepts using R
	owie 15	Science	CO4	Learn about data visualization techniques and apply suitable visualization techniques
			CO5	Learn about dimensionality reduction based on examples illustrations
			CO6	Perform predictive data analysis on variety of data along with appropriate statistical tests using R.
			CO1	Understand about ecosystem and energy flowamong the organisms.
			CO2	Know the resources available, use of them and overexploitation of the resources in the nature.
	8HC05	Environmental Science and Ecology	CO3	Learn the value, use and value of biodiversity.
			CO4	Understand the causes and effect of pollution and implement measures in control of
			CO5	Understand the sustainable development and implement green technology for sustainable development.

			CO6	Learn and implement policy to protect the protect
	8JC61	Web Technologies and	CO1	Design and implement dynamic webpages using HTML, Javascript, XML, servlets, and PHP.
	8JC61	Lab		Implement various cryptographic, hashing and key exchange techniques.
			CO1	Implement Merge sort algorithm for sorting a list of integers in ascending order, Dijkstra's algorithm for the single source shortest pathproblem.
			CO2	Implement Prim's algorithm to generate minimum cost spanning tree.
	8MC61	Design and Analysis of Algorithms and R	CO3	Solve the job sequencing with deadlines problem using greedy algorithm.
		Programming Lab	CO4	Design the solution for the 0/1 knapsack problemusing implement Dynamic Programming and implement
			CO5	Using Dynamic programming approach solve the Optimal Binary search Tree problem.
			CO6	Design and implement n-queens problem usingbacktracking approach.
		Summer Industry	CO1	
		Internship –I (Evaluation	CO2	
	8J491	of Summer Internship- 2 Internal Reviews and 1External Evaluation)	C03	
			C04	
			CO6	
			CO1	Gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
			CO2	Exposed to the various business models and criticallyevaluating the effectiveness of the business models and products
	8ZC23	ship	CO3	Understand the method of business traction, create rolesand build their A- team
111-11&			CO4	Understand the various channels of revenue building and exploration of new revenue avenues
A20			CO5	Understand the need of sales planning and people plan andalso financial modeling
			CO6	Exposed to the legal implications affecting the company'sprospects and identifying right mentors and advisors to support startups
			CO1	Understand the importance of business intelligenceand its applications in today's
			1	189

8EC19	Business Intelligence	CO2 CO3 CO4 CO5	Illustrate the different form of analytics such as business analytics, predictive analytics. Compare in detail the various aspects of business intelligence. Understand the technological components of operational intelligence. Analyze and understand the broad
			concepts in
			prescriptive analytics with Decision Tables.
		CO6	Apply business intelligence process for
		CO1	Understand the fundamentals of Data Mining and Identify the techniques used in data preprocessing.
8EC04	Data Warehousing and Data Mining	CO2	Understand the fundamentals of Data Warehousing and issues of mining with respect toarchitectures, technologies such as OLAP.
0LC01		CO3	Learn insights of Data Mining Primitives and
		CO4	Apply the algorithms for mining association rules
		CO5	Discuss and apply the models of classification and use those models for the prediction of the new samples.
		CO6	Apply various clustering techniques available for numerous applications. Identify the optimalclustering technique for a particular application
		CO1	Familiarize the cryptographic procedures and Understand its primitives
		CO2	Outline Security policy in Legislation Comprehend E-Commerce framework, models and its associated threats
8FC08	Cyber Security and Cyber Laws	CO3	Justify the role of electronic signatures in E-Commerce and summarize the various laws relating to it
		CO4	Categorize international cyber laws cybercrimes.
		CO5	Explore Penalties, Compensation and Adjunction of violations of provisions of IT 190

				Act 2000
			CO6	Classify and outline the offences under the Cyberspace law and the Internet in India
	8LC01 Introduction to Artificial Intellig	Introduction to Artificial Intelligence	cO1 gence CO2	Learn the distinction between optimal reasoning vs. human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Search algorithm for a problem and estimate its time and space complexities. Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.
			CO3	Learn different knowledge representation techniques.
			CO4	Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and Space complexities.

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			CO5	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks, analyzeSupervisedLearningvs.LearningDecision Trees.
			001	
			COI	Design the finite automata different Languages
			CO2	expressions, and derive strings with suitable examples. Conceptualize context free grammars and normal forms.
		Automote Theory and	CO3	Design the push down automata and Turing Machine for complex languages.
	8FC07	Compiler Design	CO4	Understand LEX tool and relate parsing techniques
			CO5	Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool.
			CO6	Understand Semantic Analysis concepts to design compiler: and describe Intermediate code generation such as 3-address code form.
	8JC62	Data Mining Lab and Artificial Intelligence Lab	CO1	Demonstrate the classification, clustering techniques on the data sets.
			CO2	Comprehend the results obtained in the clustering, Association and Classification techniques applied on the data sets with varied input parameters.
			CO3	Implement the simple AI programs using prolog.
	8JC63	Cyber Security and Compiler Design Lab	CO1	Use Autopsy tool to perform Memory capture and analysis.
			CO2	Demonstrate Network analysis using Network miner tools
			CO3	Demonstrate Lex and Yacc tools to simulate the grammar types used in the compilers.
			CO1	Describe the core concepts of the subjects that they have studied till the completion of that academic year.
	8J681	Comprehensive Viva Voce	CO2	Comprehensive Viva Voce will be conducted in third year second semester for 100 marks. Out of 100 marks 30 marks are evaluated internally and 70 marks for external evaluation.
			CO3	<b>Internal:</b> Comprehensive Viva Voce is conducted twice in a semester and evaluated for 30 marks each and average will be considered for internal.

			CO1	Use the concepts learned in the courses so far in
			001	concentualizing designing and executing the
				conceptualizing, designing and executing the
				modules of the projects.
			CO2	Exhibit the interest in learning the modern tools
				and technologies through the bridge courses
		Group Project		arranged in the college, beyond the curriculum,
	01/04			and hence developing the software.
	8J694		CO3	Inculcate an enthusiasm to use the creative ideas
				to build the innovative projects which are meeting
				the current needs of the market and society as a
				whole.
			CO4	Improve their communicative skills and team
				skills largely improve.
			CO5	Work as an individual and in a team.





## Course Outcomes of CSE - (AIML) Department

## Department of Computer Science & Engineering (Artificial Intelligence & Machine Learning) COs for A22-1st Year and 2nd Year, A20-3rd year and 4th Year courses/subjects

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SREENIDHI EDUCATIONAL GROUP SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

Year and	Course	Course name		Co's
regulation	code			
			CO1	Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces.
			CO2	Identify and differentiate polymers, thermoplastic, thermosetting plastics and various lubricants.
		Engineering	CO3	Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
	9HC04	Chemistry	CO4	Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
			CO5	Differentiate the types of corrosion and methods used to prevent the corrosion, surface coating techniques
			CO6	Learn and implement synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.
	9FC01		CO1	To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language)
		Problem Solving using C	CO2	To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion
			CO3	To use arrays to formulate algorithms and programs and apply programming to solve matrix addition and multiplication problems and searching
I-I & A22			CO4	To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
			CO5	To use pointers to formulate algorithms and programs.
			CO6	To apply files to do various file manipulation functions.
		MATRIX ALGEBRA AND CALCULUS	CO1	Check the consistency or inconsistency of a linear system and can solve the problems.
			CO2	Find the Eigen values and Eigen vectors and can solve the problems associated with these concepts.
			CO3	Find the nature, index and signature of the quadratic form.
	9HC11		CO4	Verify the applicability of mean value theorems and also can express the given standard function in series form using Taylor's and Maclaurin series.
			CO5	Find the solutions of first order first degree differential equations and solve the problems on Newton's law of cooling, Natural growth and decay.
			CO6	Solve higher order ordinary differential equations with constant coefficients using some standard methods.
		Essential English	CO1	Demonstrate competence with suitable accuracy in vocabulary, and language fluency.
	<b>0HC01</b>	Language Skills	CO2	State the definition of nouns, verbs, adjectives, and adverbs.
	711001	(EELS)	CO3	Identify the differences of each tense and use the tenses accurately.
			CO4	Identify specialized reading strategies for specific types of

		-		texts
			CO5	Produce written work that is substantive, organized, and grammatically accurate.
			CO6	Understand the appropriate use of active and passive voice in certain context
			CO1	Describe people, objects and situations using simple sentences.
		Oral Communication	CO2	Use appropriate tenses and expressions in different contexts of conversations.
	9HC61	Lab – I	CO3	Identify major areas of concern in their oral communication and address them.
			CO4	Create a SMART plan to enhance their communication skills in English
			CO5	
			CO6	
			CO1	To reparation of Inorganic compounds, To determine surface tension of a liquid
			CO2	To determine viscosity of lubricant, To determine acid value of an oil.
	04064	Engineering	CO3	To estimate hardness of water, To analyze the amount of chloride content.
	90004	Chemistry Lab	CO4	To determine cell constant and conductance of solutions, To determine redox potential and emf of solutions.
			CO5	To determine the rate constant of acid , To synthesize a polymer (Thiakol rubber / Urea-Farmaldehyde resin).
			CO6	To synthesize a drug- Aspirin, To estimate of Mn ⁺⁷ by Colorimetry method.
	9FC61		CO1	To be able to understand the fundamentals of programming in C Language
		Problem Solving	CO2	To be able to write, compile and debug programs in C
		using C Lab	CO3	To be able to formulate problems and implement in C.
			CO4	To be able to effectively choose programming components
			CO5	To solve computing problems in real-world.
			CO6	To be able to understand the fundamentals of programming in C Language
			CO1	Use various types of conventional manufacturing Processes
		Workshop /	CO2	Manufacture components from wood, MS flat, GI Sheet etc. – hands on experience
	9BC61	Manufacturing Processes Lab	CO3	Manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc.
		110003505 240	CO4	Produce small devices / products /appliances by assembling different components
			CO5	
			CO6	
			CO1	Learns Being a human, understands human values and purpose of education
		Induction	CO2	Understands the importance of different harmony levels needed. Understand Self and being in the current moment are the sources of happiness.
	9HC18	Drogram	CO3	Improves Learning capabilities and communication skills.
		FIOGRAIII	CO4	Improves Personality Development and Life Skills
			CO5	Understands and appreciate the importance of personality development and yoga for a holistic life.
			CO6	Understands the essence and Values and Social responsibilities for successful life.

Year and	Course	Course name	Co's		
regulation	code				
			CO1	Differentiate the wave and particle, de-Broglie matter waves-its experimental evidence, Schroedinger's wave concept and its application for a particle in one dimension box.	
			CO2	Explain about emission, its types, laser principle, types, working and its applications and to reveals about TIR principle, optical fiber-types and signal propagation, attenuation, communication system and applications of optical fibers (sensors and medical endoscopy).	
	9HC07	Engineering	CO3	Classify magnetism types, Hysteresis, domain theory, Anti- ferro and ferri-magnetism, Superconductivity, experimental facts, theoretical analysis, types of superconductors and its applications.	
I-II & A22		Physics	CO4	Explain the basic concepts of dielectric materials, polarization and its types, local fields, frequency and temperature effect on dielectrics and their applications (piezo, ferro and Pyro electricity).	
			CO5	Elaborate semiconductor behavior, types, carrier concentration, Hall effect, Thermistor, demonstrate and analyze semiconductor devices like a PN-junction, I-V characteristics, LED, solar cell, photo diode and their applications.	
			CO6	Summarize nano& bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD, SEM,	
	9EC01	Data Structures	CO1	Demonstrate the concepts of Abstract data type and also applications of stack and Queues	
			CO2	Select the data structure that efficiently model the information in a problem	
			CO3	Design programs using variety of data structures including Trees, AVL Trees and Graphs and their applications.	
			CO4	Solve problems and also assess efficiency trade off among searching and sorting using time complexity of each algorithm and also the applications of hashing and hash tables.	
			CO5	Describe the concepts of OOPs and implement programs	
			CO6	Apply concepts of OOPs to write program on over loading functions and concepts of inheritance.	
		Advanced	CO1	Find the limits and test for the continuity and differentiability of a function.	
		Calculus	CO2	Solve the problems on multiple integrals.	
	9HC12		CO3	Solve linear and nonlinear first order partial differential equations.	
			CO4	Find Series expansion a function defined over the intervals.	
			CO5	Find directional derivative, gradient, divergence and curl of a function.	
			CO6	Solve higher order ordinary differential equations with	

				constant coefficients using some standard methods.
			CO1	Understand the fundamentals of electrical engineering and
		Basic Electrical	COI	DC machines.
		and Electronics	CO2	Understand the principles of AC circuits.
		Engineering	CO3	Understand the principle and operation of three phase
	9AC48	Lingineering	005	induction motor and measuring instruments.
			CO4	Understand the principle and operation of diode.
			CO5	Understand the principle and operation of transistor.
			CO6	Understand the principles of digital electronics.
			001	Understand the nuances of striking a great conversation in
			COI	formal and informal situations.
		Oral	~~~	Gain experience of facing an audience and speaking in
		Communication	CO2	public.
		Lah - II		Design a winning presentation and present it with ease.
	9HC62	Lao - II	CO3	Design a winning presentation and present it with ease.
			004	Understand the nuances of striking a great conversation in
			CO4	formal and informal situations.
			CO5	
			C06	
			CO1	Understand the concepts of photo electric effect
			CO2	Know about the light properties-dispersion
	9HC66	Engineering Physics Lab	000	Recognize the difference between the interference and
			CO3	diffraction
			CO4	Analyze the concepts of fiber optics
			CO5	Understand and search to apply the fundamentals of
				magnetic induction
			CO6	Know the difference between AC and DC fundamentals
	9EC61		CO1	Implement Stacks, Queues and circular queues.
			000	Write programs using tree traversals. In-order, preorder and
		Data Structures	02	post-order.
		using C Lab	CO3	Program searching, sorting and hashing operations.
			CO4	Write programs on Binary trees
			CO5	Implement classes and operator overloading.
			000	
				Get familiar to use the instruments to solve the engineering
			CO1	problem and draw various type of curves used in
		Engineering		engineering
		Graphics		Understand and Implement Orthographic projections and
		Oraphics	CO2	draw projections of simple drawing entities such as points
				Lines, and Planes
			002	Draw projections of different types of regular solids in
	9BC01		003	various positions wrt principal planes of projection
				Draw Sections of various Solids including Cylinders, cones,
			CO4	prisms and pyramids and draw the developments of these
				solids and their sections.
			COS	Construct Isometric Scale, Isometric Projections and Views
			0.05	and convert 3D views to 2D orthographic views
			COA	Understand from basic sketching through 2D and 3-D solid
				modeling using computer aided design (CAD) software

Year and regulation	Course code	Course name		Co's
regulation			CO1	Understand and comprehend the fundamentals of JAVA, its Classes, and Objects and write simple programs using constructors.
			CO2	Write programs using inheritance, interface and packages.
	9EC02	Object Oriented Programming	CO3	Implement programs using Packages, I/O Stream and collections.
	through Java	through Java	CO4	Implement Exception handling and Multithreading.
			CO5	Design programs using AWT, Swings and develop applications using event handling.
			CO6	Develop applications using Applets and develop client server programs using networking concepts.
			CO1	Solve the random variable problems and probability distributions.
			CO2	Estimate the parameters and solve the problems using central limit theorem.
	9HC15	Probability and Statistics	CO3	Test the hypothesis related to samples concerning to the means and proportions of large size samples.
			CO4	Apply and solve the problems using t-test, Chi-square test also testing the hypothesis problems on small size samples, goodness of fit and independence of attributes.
			CO5	Solve the problems on measures of central tendency, Correlation
			CO6	Classify and differentiate various regression models
II-I & A22		Quantitative Aptitude and Logical Reasoning	CO1	Number system, HCF and LCM, Averages, Ages and ratio and proportion.
			CO2	Various important topics of quantative aptitude.
			CO3	Mensuration and data interpretation topics.
	9HC16		CO4	Series Completion, analogy, classification and coding and decoding topics.
			CO5	Various topics of logical reasoning.
			CO6	Venn-diagrams, cubes and dice and also on clocks and calendar problems.
			CO1	Select Python versions and mention their specifications.
		Python	CO2	Build programs using primitive data types.
	9FC02	Programming	CO3	Design applications that include functions, modules, packages along with respective exceptional handling mechanism.
			CO4	Design applications using OO features of Python
			CO5	Write applications using Files.
			CO6	Make use of NumPy/Tkinter/Plotpy modules in applications.
	9F303		CO1	Evaluate elementary mathematical arguments and identify fallacious reasoning (not just fallacious conclusions).
			CO2	Reason about arguments represented in Predicate logic.

		Discrete	CO3	Perform operations on discrete structures such as sets,
		Mathematics	000	functions, relations, and sequences.
			CO4	Solve discrete mathematics problems that involve:
			001	computing permutations and combinations of a set.
			CO5	Analyze and deduce problems involving recurrence relations
			005	and generating functions.
				Apply graph theory models of data structures and state
			CO6	machines to solve problems of connectivity and constraint
				satisfaction, for example, scheduling.
				Development of a holistic perspective based on self-
			CO1	exploration about themselves (human being), family, society
				and nature/existence.
	9HC03	Universal Human Values	CO2	Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
			CO3	Strengthening of self-reflection.
			CO4	Development of commitment and courage to act.
			CO5	
		·	CO6	
	9EC62	Object Oriented Programming through Java Lab	CO1	Write programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series.
			CO2	Write small application such as banking system.
			CO3	Write programs on operator, function overloading and dynamic method dispatch.
			CO4	Write programs to implement interface and packages.
			CO5	Explain and write programs to implement threads.
			CO6	Write programs to implement applets and event handling.
	9LC61	Python Programming Lab and IT workshop	CO1	Install and run the Python interpreter
			CO2	Apply the best features of mathematics
			CO3	Describe the Numbers
			CO4	Understand operations and summarize different File handling
			C04 C01	Examine the performance of DC machines and AC
				Machines. (L4)
		Basic Electrical	CO2	Illustrate the principles circuit theorems. (L2)
		Dasie Lieculeai	CO3	Examine the principle of operation of diode and its
	9AC95	and Electronics		applications. (L4)
				Analyze the principle of operation of transistor. (L4)
			CO4	Develop the principles of Verification of Logic gates.
		Engineering Lab		
				Examine the performance of DC machines and AC Machines (14)
			CO5	Illustrate the principles circuit theorems (I 2)
			C06	Examine the principle of operation of diode and its
			200	applications. (L4)

Year and	Course	Course name		Co's
regulation	code			Democive basic executional concent of computer and data
	9CC56	Computer	CO1	processing
			CO2	Use data types with instruction set of specified architecture
			002	Justify different control unit design and algorithms for
		Organization and	005	various operations.
		Architecture	CO4	Elaborate basic architecture of 8086 processor
			CO5	Write assembly language programming and debug to 8086
			CO6	Interface devices to 8086 processor.
			CO1	languages, architecture and design of Data Base Systems.
			CO2	Design Relational Models and apply Integrity Constraints, Querying fundamentals, Logical data base Design and Views of databases along with application of Balatianal
		Database		Algebra.
	9FC04	Systems	CO3	Apply queries in SQL Query using Nested Queries Set, Comparison Operators, Aggregative Operators, Logical connectivity's with Joins statements and develop applications.
			CO4	Eliminate data redundancy through normal forms.
			CO5	Ensure ACID properties and Serializability in Transaction management and Database Recovery.
			CO6	Use different External Storage Organization techniques and apply Indexing in databases to enhance system performance.
	9EC16	Introduction to Data Science	CO1	At the end of this course, the student will be able to
11-11 & A22			CO2	Learn about various data types, types of data sets a data quality
			CO3	Implementation of R fundamentals and perform factors and data frames.
			CO4	Implementation of data structures iterative programming & function concepts using R
			CO5	Learn about data visualization techniques and apply suitable visualization techniques
			CO6	Learn about dimensionality reduction based on examples illustrations
			CO1	Analyze worst-case running times of algorithms using asymptotic analysis.
		Design and	CO2	Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and- conquer algorithms.
	9FC05	Algorithms	CO3	Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
			CO4	Comprehend the concept of dynamic programming algorithms, their applications and analyze them.
			CO5	Analyze the Backtracking and Branch and Bound algorithms and also identify the scenarios for its applicability.
			CO6	Comprehend the concept of P and NP Problems and its usage in the applications.
	9ZC01		CO1	To understand the nuances of Business and its relation to

		Dusinasa		economics
		Economics And	CO2	To understand the production function and cost concepts
		Financial Analysis	CO3	To learn the basic market structures and their relevance to business
			CO4	To learn the fundamentals of financial accounting concepts
			CO5	To apply the fundamental concepts of financial accounting in preparation of financial statements.
			CO6	To understand the financial ratios that are used to analyze the financial performance of the company.
			CO1	Understand about ecosystem and energy flow among the organisms.
		Environmental	CO2	Know the resources available, use of them and overexploitation of the resources in the nature.
	9HC05	Science	CO3	Learn the value, use and value of biodiversity.
	711005	Science	CO4	Understand the causes and effect of pollution and implement measures in control of pollution.
			CO5	Understand the sustainable development and implement green technology for sustainable development.
			CO6	Learn and implement policy to protect the environment.
	9HC63	Soft Skills Lab	CO1	Determine the significance of soft skills in the working environment
			CO2	Understand how to demonstrate empathy in a wide range of situations.
			CO3	Effectively communicate through verbal/oral communication and improve the listening
			CO4	Become more effective individual through goal/target setting, self-motivation and practicing creative thinking.
			CO5	Develop a positive and responsible attitude to their own well-being
			CO6	
		R Programming Lab and Design and Analysis of	CO1	Understand basic terms what Statistical Inference means. Identify probability distributions commonly used as foundations for statistical modeling. Fit a model to data
			CO2	CO-2: Discuss the significance of exploratory data analysis (EDA) in data science and to apply basic tools (plots, graphs, summary statistics) to carry out EDA
	9LC62	Algoriums Lab	CO3	CO-3: Apply basic machine learning algorithms and to identify common approaches used for Feature Generation
			CO4	CO-4: Analyze fundamental mathematical and algorithmic ingredients that constitute a Recommendation Engine and to Build their own recommendation system using existing components
			CO5	
			CO6	
			CO1	Create tables and apply constraints.
	9FC63	Database Management	CO2	Write Queries using Aggregate functions, Conversion functions and use string functions
		Systems Lab	CO3	Explain and write PL/SQL programs using exceptions.
			CO4	Develop programs using loops, exceptions and write

				Procedures.
			CO5	Write Programs for stored functions, invoke functions in SQL Statement.
			CO6	Describe and write programs using features of CURSORs and its variables.
	9CC83	Computer Organization Lab	C01	Familiarize the architecture of 8086 processor, assembling language programming and interfacing with various modules.
			CO2	Experiment with Arithmetic operations of binary number system.
			CO3	Simulate any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.
			CO4	Familiarize the architecture of 8086 processor, assembling language programming and interfacing with various modules.
			CO5	
			CO6	
	9L484	Technical Seminar	CO1	Identify current general, political and technology related topics.
			CO2	Arrange and present seminar in a effective manner
			CO3	Collect, survey and organize content in presentable manner
			CO4	Demonstrate oratory skills with the aid of Power Point Presentations
			CO5	Exhibit interview facing skills and team leading qualities
			CO6	

Year and	Course	Course name		Co's
regulation	code			
9ZC22		BASICS OF	CO1	The students will acquire basic knowledge on Skills of Entrepreneurship.
			CO2	The students will understand the techniques of selecting the customers through the process of customer segmentation and Targeting
	07.000		CO3	The students understand business Models and their validity.
	Open Elective-I	CO4	The students understand the basic cost structure, Revenue Streams and the pricing strategies.	
			CO5	The students will acquire knowledge about the project management and its techniques.
			CO6	The students get exposure on marketing strategies and business regulations for the Start up.
		SOFTWARE	CO1	Describe concepts of software testing.
		TESTING	CO2	Describe and apply the concepts Flow graphs, Path

		METHODOLOCIES		testing and Data Flow Testing
		Professional Elective	CO3	Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.
III-I & A20			CO4	Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing.
			CO5	Demonstrate Software Testing Techniques such as JADs, Pareto Analysis, Regression Tasting, Structured walkthroughs, Thread testing, Performance testing and White box testing.
			CO6	Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.
			CO1	Understand the functionality of the various data mining functions.
			CO2	Apply pre-processing techniques on various datasets.
	05005	Data Warehousing and Data Mining	CO3	Build a Data warehouse system and perform business analysis with OLAP tools.
	9FC03		CO4	Characterize the kinds of patterns that can be discovered by association rule mining.
			CO5	Compare and contrast between different classification and clustering algorithms.
			CO6	
			CO1	Students can able to identify software processes and software engineering practices to select and justify approaches for a given project and its constraints and distinguish lifecycles for developing software products.
	9EC03	Software Engineering	CO2	Students can able to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
			CO3	Students understand the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving.
			CO4	Students can define and design models for the requirements stated in the baseline document.
			CO5	Students can able to understand and experience the testing process in improving the quality of the product by using software testing techniques/tools.
			CO6	
	9LC01	Introduction to Artificial Intelligence	CO1	Learn the distinction between optimal reasoning vs. human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time and space complexities.
			CO2	Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.
			CO3	Learn different knowledge representation techniques.
			CO4	Understand the concepts of state space representation,

				exhaustive search, heuristic search together with the
			CO5	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks, analyze Supervised Learning vs. Learning Decision Trees
			C06	Learning Decision rices.
			CO1	Identify the different types of network topologies and protocols useful for real time applications and transmission media.
	0EC05	Computer Networks	CO2	Discuss design issues of data link layer and solve problems on Checksum and flow control.
	9EC03		CO3	Analyze MAC layer protocols and LAN technologies.
			CO4	Obtain the skills of subnetting, routing mechanisms and congestion control.
			CO5	Discuss the concepts, services and protocols of Transport and Application layers along with the network security
			CO6	
			CO1	Understand the functional architecture of an Operating System with usage of system calls.
	9EC06	Operating Systems	CO2	Analyze various process scheduling algorithms & pragmatics of scheduling algorithms used by various Operating Systems.
			CO3	Solve issues related to process synchronization and Inter process Communication (IPC) in the Operating System.
			CO4	Comprehend the concepts of Deadlock and illustrate the concepts of Memory Management.
			CO5	Explain the concepts of File System with regard to Directory and Disk Management Algorithms, summarize the aspects of I/O Systems, Protection and Security.
			CO6	
		Software Engineering	CO1	Students can able to identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish life cycles for developing software product.
	01.062	Networks Lab	CO2	Students understand the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving.
	91003		CO3	Students can define and design models for the requirements stated in the software project.
			CO4	Students can able to design class, object and interactive diagrams and know their significance.
			CO5	Discuss design issues of data link layer and solve problems on Checksum and flow control.
			CO6	Analyze MAC layer protocols and LAN technologies.
	9LC64	Artificial Intelligence Lab and Data Mining	CO1	problem solving, knowledge representation, and learning.
		Lab	CO2	Apply pre-processing statistical methods for any given

				raw data.
			$CO^{2}$	Gain practical experience of constructing a data
			COS	warehouse.
				Implement various algorithms for data mining in order
			CO4	to discover interesting patterns from large amounts of
				data.
			CO5	Apply OLAP operations on data cube construction.
			CO6	
			CO1	Use the concepts learned in the courses, so far, in
				conceptualizing, designing and executing the modules of
				the projects.
			CO2	Exhibit the interest in learning the modern tools and
				technologies through the bridge courses arranged in the
		Summer Industry		college, beyond the curriculum, and hence developing
	9L591 Internship -I			the software.
		CO3	Inculcate an enthusiasm to use the creative ideas to build	
				the innovative projects and prototypes which are
				meeting the current needs of the market and society as a
				whole.
			CO4	Improve their communicative skills and team skills.
			CO5	
			CO6	
			CO1	Describe the new dimensions and products served by the
				banking system in INDIA.
	9ZC25	BASICS OF INDIAN	CO2	Explain the credit control system and create awareness
	FCONOMY		on NPA's	
		(Open Elective –D	CO3	Apply the knowledge of Insurance concepts in real life
				scenarios
			CO4	Recognize the importance of regulatory and legal frame
				work of IRDA
			CO5	Identify the risk management process and methods.
			CO6	Calculate the diversity of risk and return.

9BC51	INTRODUCTION TO ADDITIVE MANUFACTURING PROCESS (Open Elective –I)	CO1	Understand the Additive manufacturing processes and their relationship with subtractive manufacturing.	
		CO2	Demonstrate comprehensive knowledge of the broad range of liquid based rapid prototype processes, devices, capabilities and materials that are available.	
		CO3	Apply the principles of casting in Additive manufacturing processes	
		CO4	Articulate the various tradeoffs of Additive manufacturing software's/data format that must be made in selecting advanced/additive manufacturing processes, devices and materials to suit particular product requirements.	
		CO5	Learn various applications of additive manufacturing, such as in architecture art, health care direct part production and mass customization.	
		CO6		
			CO1	Describe concepts of software testing.
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			CO2	Describe and apply the concepts Flow graphs, Path
			02	testing and Data Flow Testing.
			CO3	Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.
	9LC11	SOFTWARE TESTING METHODOLOGIES (Professional	CO4	Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing.
		Elective-I)	CO5	Demonstrate Software Testing Techniques such as JADs, Pareto Analysis, Regression Tasting, Structured walkthroughs, Thread testing, Performance testing and White box testing.
				Describe Graph matrices and applications, and practice
		CO6	and apply automated testing tools such load Runner, UFT and QTP	
			CO1	Gain the knowledge on the inputs required for design thinking and also gain familiarity on concepts related to design thinking
			CO2	Understand the techniques of idea generation
			CO3	Classify different phases of design thinking
			CO4	Realize the product design process.
	0I C12	(Professional Flactive	CO5	Understand design thinking for service design.
	91015	(FIOIESSIONAL ELECUVE –I)	CO6	Gain knowledge on various case studies related to design thinking.
		HUMAN	CO1	Explain role of user Interface
		COMPUTER	CO2	Describe the concept of direct manipulation
	9FC10	INTERACTION	CO3	Describe Human interaction with computers
		(Professional	CO4	Apply and explain Screen Designing formalities such as
		Flective-D		Screen planning
		Elective-1)	CO5	Explain Windows–Navigation schemes and screen
			C06	Develop applications with the aid of Software tools
			000	Develop applications with the aid of Software tools

Year and regulation	Course code	Course name		Co's
			CO1	Understand the most common type of security attacks.
	9EC09 CRYPTOGRAPHY AND NETWORK		CO2	Understand the Encryption Principles, public key cryptography and algorithms.
		AND NETWORK SECURITY (Professional Elective –II)	CO3	Understand security protocols for protecting data on networks.
			CO4	Be able to digitally sign emails and files.
			CO5	Understand vulnerability assessments and the weakness of using passwords for authentication
			CO6	Understand the most common type of security attacks.
	9FC13 SOFTWARE PROJECT MANAGEMENT (Professional Elective –II)	CO1	Explain primitives of Project Planning and evolution of software economics.	
		(Professional Elective –II)	CO2	Describe software economics; reduce Software product size, improvement in software processes, improving

				team effectiveness, improving automation, Achieving
			000	quality.
			CO3	Explain Life cycle phases and Artifacts of the process.
			CO4	Work Flows.
			CO5	Apply Checkpoints for a process such as Major mile stones, Minor Milestones and apply work breakdown structures for a iterative process within cost and schedule. Describe Project Organizations and Responsibilities.
III-II & A20			CO6	Describe Automation and Project Control and Process instrumentation and explain Future Software Project Management such as Modern Project Profiles and Next generation project management.
			CO1	Ability to apply IR principles to locate relevant information large collections of data
		INFORMATION	CO2	Ability to design different document clustering algorithms
	9FC08	RETRIEVAL	CO3	Implement retrieval systems for web search tasks.
		SYSTEMS	CO4	Design an Information Retrieval System
		(Professional Elective –II)	CO5	
			CO6	
	9IC45	INTRODUCTION TO INTERNET OF THINGS (Professional Elective –II)	CO1	Getting familiar with terminology, technology and applications of IOT
			CO2	Understand and explain IoT system management using M2M (machine to machine) with necessary protocols
			CO3	Design and develop Python Scripting Language programs preferred for many IoT applications
			CO4	Use Raspberry PI as a hardware platform for designing the IoT sensor interfacing
			CO5	Implement web based services for IoT
			CO6	Understand and analyze the case studies illustrating IoT Design
			CO1	Understand the principles of HDFS and digital signature.
			CO2	Explore the block chain Technology, Simplified Payment Verification protocol and its life cycle.
	9JC05	BLOCKCHAIN	CO3	Analyze the Nakamoto consensus and differentiate proof-of-work and proof-of-stake consensus algorithms.
		(Professional Elective –	CO4	Understand the working of crypto currency, Bitcoin and Ethereum.
		111)	CO5	Explore Applications on legal issues of block chain.
			CO6	Explore new trends in block chain technologies.
			CO1	Understand various stages and phases of software projects.
		UNIFIED MODELING	CO2	Select the basic elements of modeling such as Things, Relationships and Diagrams

	9LC16	LANGUAGE (Professional Elective –		depending on the views of UML Architecture and SDLC.
		III)	CO3	Design class and object diagrams that represent static aspects of a software system.
			CO4	Design component and deployment diagrams for software systems.
			CO5	Design activity and state chart diagrams for software systems.
			CO6	•
			CO1	Understand the fundamentals of Virtual Reality.
		AUGMENTED REALITY AND	CO2	Analyze multiple Models of Input and Output Interface in Virtual Reality like Gloves, Video-based Input, 3D Menus & 3DScanner etc.
	9LC08	VIRTUAL REALITY	CO3	Illustrate the fundamentals or advanced topics of Computer Graphics.
		III)	CO4	Analyze the Interactive Techniques on VR in respect of Body Track, Hand Gesture, 3D Manus, and Object Grasp.
		-	CO5	Understand the development tools of VR.
			CO6	Explore the Conceptual idea on Augmented Reality and relate the illustrations.
		IMAGE PROCESSING (Professional Elective – III)	CO1	Analyze general terminology of image processing.
	9FC09		CO2	Examine various types of images, intensity transformations and spatial filtering.
			CO3	Develop Fourier transform for image processing in frequency domain.
			CO4	Evaluate the methodologies for image segmentation, restoration etc.
			CO5	Implement image process and analysis algorithms.
			CO6	Apply image processing algorithms in practical applications.
	9LC03	MACHINE LEARNING	CO1	Understand the fundamental concepts of ML and Designing a Learning System.
			CO2	Understand the basic concepts of linear models, tree and Probabilistic Models.
			CO3	Understand various Dimensionality Reduction Techniques and Apply Various, Evolutionary Algorithms with models.
			CO4	Understand the Graphical models and Analytical Learning.
			CO5	
			CO6	
			CO1	Design the finite automata different Languages
			CO2	Construct finite Automata for a given regular
		COMPILER DESIGN		examples. Conceptualize context free
	9LC04			grammars and normal forms.
			CO3	Design the push down automata and Turing Machine for complex languages.

			CO4	Understand LEX tool and relate parsing techniques,
			CO5	Demonstrate and solve problems on SLR,
				CLR, LALR, operator precedence parser, LR
				(O), LR(1), LR(K) grammar and use YACC
			006	Understand Semantic Analysis concepts to
				code generation such as 3 address code form
			CO1	Demonstrate a breadth of knowledge in Intellectual
				property
			CO2	Overview of Patents, Searching, filling and drafting of Patents
	91C04	INTELLECTUAL PROPERTY RIGHTS	CO3	Overview of copyright & GI.
	71004	PROPERTY RIGHTS	CO4	Overview of Trade Mark & Trade Secret,
			CO5	Overview of Integrated Circuit and Industrial Design.
			CO6	
				Conventions and Treaties, Governing the IPRs.
			CO1	1. Demonstrate the use of HTML tags. Apply Styles using CSS and Bootstrap.
	9FC06	WEB TECHNOLOGIES	CO2	2. Develop scripts using XML and validate using parsers.
			CO3	3. Appraise the Expressions, Filters,
				Angular.
			CO4	4. Design responsive web applications.
			CO5	5. Comprehend the uses of Web servers and design the server-side scripts using Servlets.
			CO6	6. Design and develop server-side scripts and components using PHP
			CO1	Apply common Machine Learning algorithms in
				practice and implementing their own.
			CO2	Perform experiments in Machine Learning using real- world data.
		MACHINE	CO3	Implementation of DFA for a given Languages/ Regular Expression.
	9LC65	LEARNING LAB	CO4	
		AND COMPILER	CO5	
		DESIGN LAB	CO6	
			CO1	Demonstrate the use of HTML tags and be
				able to design web pages. Develop dynamic
				programs involving Java scripts, popup
				windows in JavaScript along Event Handling.

9FC66	WEB TECHNOLOGIES LAB	CO2	Develop scripts using XML and XSLT and read XML documents using parsers, DOM parser, and SAX parser. Develop JSON files
		~~~	and access them via HTML pages.
		CO3	Implement Angular with Expressions, Filters,
			Directives, Controller, and Modules.
		CO4	Develop a Single Page Application with
			implementation of Scope and Form.
		CO5	Implement Java servlets using Apache
			Tomcat Server for User authentications
		CO6	Develop an application in PHP with Database
			connectivity.
		CO1	Assessed the knowledge of the students in the
			Core and Elective subjects that they have
			studied till the completion of that academic
			year
	COMPDEHENSIVE	CO2	
9I C04	VIVA VOCE	CO3	
7000	VIVAVOLE	CO4	
		CO5	
		CO6	

Year and	Course	Course name	Co's	
regulation	code			
	9BC52 PRINCIPLES OF OPERATIONS RESEARCH (Open Elective –II)	CO1	Formulate and solve mathematical model (linear programming problem) for a physical situation like production, distribution of goods and economics.	
		CO2	Recognize and Solve the problem of transportation involving a large number of shipping routes with least transportation cost and generate optimal assignment strategy for different situations	
		CO3	Use Johnson's rule to create the optimal sequencing schedule for a sequencing problem and make decisions about replacing an item using replacement policy	
		CO4	Analyze the performance measures of Queing system and Calculate the EOQ for minimizing the total inventory cost	
			CO5	Apply simulation techniques for solving various

				types of problems and general idea development about Markov chains
			CO6	
IV-I & A20			CO1	Gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
		ADVANCED	CO2	Exposed to the various business models and critically evaluating the effectiveness of the business models and products
	8ZC23	ENTREPRENEURSHIP	CO3	Understand the method of business traction, create roles and build their A- team
		(Open Elective –II)	CO4	Understand the various channels of revenue building and exploration of new revenue avenues.
			CO5	Understand the need of sales planning and people plan and also financial modeling
			CO6	Exposed to the legal implications affecting the company's prospects and identifying right mentors and advisors to support startups
			CO1	Students will understand the nature of Entrepreneurship and its importance.
		ENTREPRENEURSHIP	CO2	Will gain knowledge regarding project, its life cycle and organization.
	8ZC19	PROJECT MANAGEMENT AND STRUCTURED FINANCE (Open Elective –II)	CO3	Will gain knowledge relating to project formulation.
			CO4	Comprehend the components of structured finance
			CO5	Establish a framework of CMBS
			CO6	Students will gain knowledge relating to the CRE Servicing
	8ZC26	BASICS OF POLITY AND ECOLOGY (Open Elective –II)	CO1	Outline knowledge relating to the Indian Constitution and the Preamble to the Constitution.
			CO2	Relate to the fundamental rights and duties of the Indian citizens and the directive principles of state policy.
			CO3	Identify about the federal structure and judiciary of India.
			CO4	Understand knowledge relating to the conservation of the environment.
			CO5	Analyze about bio-diversity and climatic changes occurring in the environment.
			CO6	Discuss about the international treaties, conventions and organizations active in the field of environmental protection.
			CO1	Identify the differences between typical scripting languages and typical system and application programming languages.
	8FC77	SCRIPTING LANGUAGES	CO2	Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
		(Professional Elective _IV)	CO3	Acquire programming skills in scripting languages.
			CO4	
			CO5	
			CO6	
			CO1	Understand various stages and phases of software projects.
			CO2	Select the basic elements of modeling

	AGILE SOFTWARE		such as Things, Relationships and
8FC16	DEVELOPMENT		Diagrams depending on the views of
	(Professional Elective –IV)		UML Architecture and SDLC
			Design class and object diagrams that
		000	Design class and object diagrams that
		CO3	represent static aspects of a software
			system.
		CO4	Design component and deployment
		004	diagrams for software systems.
			Design activity and state chart diagrams
		CO5	for software systems
		CO(Tor software systems.
		000	
		CO1	Identify components of Devops
		001	environment.
	DEVOPS		Describe Software development models
	(Professional Elective –IV)	CO2	and architectures of DevOps.
			Apply different project management
		CO3	integration testing and code deployment
		005	integration, testing and code deployment
		CO4	Investigate different DevOps Software
			development models.
		CO5	Assess various Devops practices.
		001	Collaborate and adopt Devops in real-
		CO6	time projects.
		GOL	Gain the knowledge of the use and availability of
		COI	tools to support an ethical hack.
	ETHICAL HACKING	CO2	Interpret the results of a controlled attack.
	(Professional Elective –IV)	CO2	Explain the role of inherent and imposed
8JC04		005	limitations and metrics for planning of a test.
		CO4	Comprehend the dangers associated with
			penetration testing.
		CO5	
		CO6	
		001	Summarize the characteristics of cloud and
		COI	differentiate the cloud service and deployment
			2 Analyza different architectures for cloud
			applications Create and run Amazon ec2 instance
	CLOUD COMPLITING	CO2	through python programs, assess the performance
	(Drofossional Elective	002	of cloud services and summarize the innovative
8FC17	(Frotessional Elective –		applications of IOT on cloud.
	•)		3.Design architecture of an Apps such as map
		CO3	reduce, image processing app etc on cloud and
			understand various security aspects in cloud.
		CO4	
		CO5	
		CO6	
		CO1	Understand the importance of business
			intelligence and its applications in today's
			world.
		CO2	Illustrate the different form of analytics
1	1		masuale the annerent form of analytics

	BUSINESS		such as business analytics, predictive analytics.
	INTELLIGENCE (Professional Elective –V)	CO3	Compare in detail the various aspects of business intelligence
		CO4	Understand the technological components
			of operational intelligence.
		CO5	Analyze and understand the broad
			concepts in prescriptive analytics with
		607	Decision Tables.
		006	web mining and web analytics.
		CO1	Understand basics of quantum computing
		CO2	Understand physical implementation of
			Qubit
		CO3	Understand Quantum algorithms and their implementation
8LC21	COMPUTING	CO4	Understand the Impact of Quantum
	(Professional Elective – V)		Computing on Cryptography
		CO5	
		CO6	
		GO1	
		COI	Explore the methodologies adopted for parallel and distributed environments
		CO2	Analyze the networking aspects of Distributed and
			Parallel Computing.
	PARALLEL AND	CO3	Explore the different performance issues and tasks in parallel and distributed computing.
	DISTRIBUTED COMPUTING	CO4	1. Tools usage for parallel and distributed computing.
	(Professional Elective – V)	CO5	Understanding high performance computing
		CO6	
		CO1	Identify different types of agents and their
		001	relationships with the environment.
		CO2	Demonstrate the application of agents handling
		CO3	applications dealing with conflict resolution.
		005	able to convert it to a form suitable for
8LC02	ADVANCED		implementation.
	ARTIFICIAL INTELLICENCE AND	CO4	Derive inferences applying rules of First Order
	DEEP LEARNING	CO5	Formulate an approach for applications involving
			complete and incomplete Planning.
		CO6	Choose the appropriate learning strategy needed for solving a given problem
		CO1	Show sensitivity to linguistic phenomena
			and an ability to model them with formal
			grammars.

			1	
			CO2	Understand and carryout proper
				experimental methodology for training
		NATURAL		and evaluating empirical NLP systems.
	8LC18 LANGUAGE	CO3	Able to manipulate probabilities, construct	
		PROCESSING		statistical models over strings and trees
				and estimate parameters using supervised
				and unsupervised training methods
			CO4	Able to design implement and analyze
			C04	Able to design, implement, and analyze
				NLP algorithms.
			CO5	Able to design different language
				modeling Techniques.
			CO6	
			CO1	Comprehend the fundamentals of big data
				analytics and understand how Hadoop solves the
				big data problem in real life.
			CO2	Interpret the challenges with big data and elaborate
				developments in big data environment
		BIG DATA ANALYTICS	CO3	Demonstrate the difference between NOSOL and
	8FC15		005	SQL databases.
			CO4	Discuss the Hadoop distributed file system
				(HDFS) framework and anatomy of Hadoop map-
				reduce.
			CO5	Design the algorithms to process big data using
			007	Apache Spark Low Level API.
			C06	Apply Hadoop Data Analysis to social Media Analytics and Opinion Mining on Tweets
			CO1	Discuss system network and storage
				virtualization and outling their role in
				anabling the aloud computing system
				model
			COL	Inodel.
		DEEP LEARNING LAB	02	Learn The Fundamental Principles Of
	8LC66	AND BIG DATA	G00	Deep Learning.
		ANALYTICS LAB	CO3	Identify The Deep Learning Algorithms
				For Various Types of Learning Tasks in
				various domains.
			CO4	Implement Deep Learning Algorithms and
				Solve Real-world problems.
			CO5	Use Excel as an Analytical tool and
				visualization tool.
			CO6	Program using HADOOP and Map
				Reduce.
			CO1	Identify components of Devons
				environment
			CO2	Apply different project management
			0.02	integration testing and code donlorment
				tool
		PE-IV (SCRIPTING	CO2	Lougation different Desco C. ft
	8LC67	LANGUAGES) LAB	03	investigate different DevOps Software
				development models

			COI	Identify components of Devops environment
	8LC67	PE-IV (AGILE SOFTWARE DEVELOPMENT)	CO2	Apply different project management, integration, testing and code deployment tool
	8LC67 DEVELOPMENT) LAB	LAB	CO3	Investigate different DevOps Software development models
			CO1	Identify components of Devops environment
	8LC67	PE-IV (DEVOPS) LAB	CO2	Apply different project management, integration, testing and code deployment tool
	oleon		CO3	Investigate different DevOps Software development models
			CO1	At the end of this course, the student will be able to
	8LC67 PE-IV (ETHICAL HACKING)	CO2	Use the available tools to support an ethical hacking procedure.	
		HACKING)	CO3	Interpret the results of a controlled attack.
			CO1	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
	8L792 SUMMER INDUSTRY INTERNSHIP	CO2	Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.	
			CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole.
			CO4	Improve their communicative skills and team skills

Year and regulation	Course code	Course name		Co's
		FUNDAMENTALS OF RENEWABLE ENERGY SOURCES (Open Elective-III)	CO1	Understand the role and potential of new and renewable energy sources realize the potential of solar energy, its impact on environment; define and understand the terms describing the different angles that one may incur in setting up a solar panel and be able to use the instruments for measuring solar radiation.
			CO2	Demonstrates the knowledge of different techniques of solar collection and storage.
	8AC45		CO3	Classify different types of horizontal and vertical axis wind mills and understands the performance characteristics of the same. The student also demonstrates the knowledge of different Bio-gas digesters and factors influencing its yield.
			CO4	Understand the potential of geothermal energy in India and will be able to characterize different types of geothermal wells.
			CO5	Differentiate the different methods of kinetic

				energy extraction from Ocean waves and tides and
				between the
			CO6	Conversion in different phenomena viz., Joule
			000	Thomson effect, Seebeck effect, Peltier effect etc.
			CO1	Understand the basic concepts of product
				Determine the process of new product
			CO2	development and stages in the process.
		PRODUCT AND	CO2	Understand the concept of product testing, product
	8ZC24	SERVICES	005	launching a new product
		(Open Elective-III)		Differentiate various types of services, its
		(0)	CO4	differences with the goods and the application of
				marketing principles for services.
			CO5	and the tools for producing and distributing the
				services.
				Identify the importance of quality of services and
			CO6	also introduce some measurement scales to
				evaluate the service quanty.
			CO1	Understand the essentials of entrepreneurship and
			CO2	the key role played by the entrepreneurs.
	8ZC10	ENTREPRENEURSHIP AND BUSINESS DESIGN (Open Elective –III)	02	Outline the attentiveness on designing a business
			CO3	strategy.
			CO4	Explore on designing and delivery of services.
			CO5	Understand reverse engineering methods in product development.
			COC	Indicate information on IPR, and patent
			006	application.
			CO1	Understand the financial structure and the financial
		FINANCIAL		Identify the role of RBI and the Regulating and
			CO2	credit policies adopted by the RBI.
			CO2	Analyze the role of Non-Banking financial
		INSTITUTIONS,	COS	Institutions and the role of financial institutions in India.
	8ZC15	MARKEIS AND SERVICES		Understand the role of regulatory bodies like SEBI
		(Open Elective –III)	CO4	and also to know the capital and money market
				Understand about the asset fund based financial
			C05	services
			CO6	Expose to investment banking and merchant
			CO1	Familiarize the cryptographic procedures and
			01	Understand its primitives
			CO2	Outline Security policy in Legislation and Comprehend E-Commerce frame work models
	8FC07			and its associated threats
		CYBER SECURITY AND		Justify the role of electronic signatures in E-
		CYBER LAWS	CO3	Commerce and summarize the various laws
				relating to it.
			CO4	Categorize international cyber laws and cyber

				crimes.
			CO5	Explore Penalties, Compensation and Adjunction
			005	of violations of provisions of IT Act 2000
			C06	Classify and Outline the offences under the
			000	Cyberspace law and the Internet in India
				Estimate the human and physical resources
			CO1	required, and make plan for the development of
	8L896	PROJECT		Project.
			CON	Break down the Project into tasks and determine
			02	handover procedures.
			CO2	Identify links and dependencies, and schedule to
			005	achieve deliverables.
			CO4	Allocate roles with clear lines of responsibility and
			04	accountability with team spirit.
				Design and develop the software or prototype
			CO5	using modern software tools wherever applicable
				to meet societal needs.
			CO6	Present the Project done and submit the report.



Course Outcomes of CSE - (Data Science) Department

SCIENCE AND





Department of Computer Science & Engineering (Data Science) COs for A22-1st Year and 2nd Year, A20-3rd year and 4th Year courses/subjects

Year and	Course	Course name		CO's
regulation	code			
			CO1	Understand and analyses microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces. Identify and differentiate polymers, thermoplastic, thermosetting plastics and
				various lubricants.
	011004	Engineering Chemister	CO3	industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
	9604	Engineering Chemistry	CO4	Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
I-I & A22			CO5	Differentiate the types of corrosion and methods used to prevent the corrosion, surface coating techniques
			CO6	Learn and implement synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.
		Problem Solving using C	CO1	Formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs (in C language)
			CO2	Test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion
	9FC01		CO3	To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
			CO4	To use arrays, pointers and structures to formulate algorithms and programs.
			CO5	To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
			CO6	To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.
	9HC11		CO1	Check the consistency or inconsistency of a

	MATRIX ALGEBRA		linear system and also solve real time
	AND CALCULUS	GOO	problems.
		CO ₂	Calculate the Eigen values and Eigen
			vectors of a matrix and their application for
		002	orthogonal transformation.
		CO3	Identify the dependence and independence
		<u> </u>	of vectors and solve the problems on basis.
		C04	Solve problems on inner product spaces.
		CO5	Verify the mean value theorems and also
			express the given function in series form
		000	using Taylor's theorem.
		006	Solve the problems using special functions;
			evaluate surface areas and volumes of
		CO1	revolutions.
	Essential English	COI	Understand, Analyze and respond to the
	Longuage Skills (EELS)	COD	Drastice offectively the grashing shills with
	Language Skins (EELS)	02	the ant body language
		CO2	Develop strategies to improve speaking
		COS	skille
		CO4	Plan prepare and present effectively to meet
8HC01		0.04	the standards of corporate and real world in
			a group
		CO5	Comprehend the reading skills through note
		000	taking and other study skills.
		CO6	Express the opinions effectively on the
			given topic through role play and situational
			dialogues in group discussions.
		CO1	Prepare the Inorganic compounds.
		CO2	Determine surface tension of a liquid,
	Engineering Chemistry		viscosity of lubricant, acid value of an oil.
	Lab	CO3	Estimate hardness of water.
		CO4	Analyze the amount of chloride content.
8HC64		CO5	Determine cell constant and conductance of
			solutions, redox potential and emf of
			solutions, the rate constant of acid.
		CO6	Synthesize a polymer (Thiokol rubber /
			Urea-Formaldehyde resin), a drug- Aspirin.
		CO7	Estimate of Mn+7 by Colorimetry method.
		CO1	Formulate the algorithms for simple
			problems. Translate the given algorithms to
	Problem Solving using C	000	a working and correct program.
8FC61	Lab	002	Manufacture components from wood, MS
		CO3	Manufacturing of components by machining
		005	like shafts, holes & threaded holes, surface
			finishing of components etc.

		CO4	Produce small devices / products /appliances by assembling different components.
	Oral Communication	CO1	Describe people, objects and situations
	Skills Lab		using simple sentences.
		CO2	Use appropriate tenses and expressions in
9HC61			different contexts of conversation.
		CO3	Identify major areas of concern in their oral
			communication and address them.
		CO4	Create a SMART plan to enhance their
			communication skills in English

Year and regulation	Course code	Course name		(
I-II & A22			CO1	Differentiate the wave and particle, de- Broglie matter waves-its experimental evidence, Schrodinger's wave concept and its application for a particle in one dimension box.
			CO2	Explain about emission, its types, laser principle, types, working and its applications and to reveals about TIR principle, optical fiber-types and signal propagation, attenuation, communication system and applications of optical fibers (sensors and medical endoscopy)
	9HC07	Engineering Physics	CO3	Classify magnetism types, Hysteresis, domain theory, Anti-ferro and ferry- magnetism, Superconductivity, experimental facts, theoretical analysis, types of superconductors and its applications.
			CO4	Explain the basic concepts of dielectric materials, polarization and its types, local fields, frequency and temperature effect on dielectrics and their applications (piezo, ferro and Pyro electricity).
			CO5	Elaborate semiconductor behavior, types, carrier concentration, Hall effect, Thermistor, demonstrate and analyze semiconductor devices like a PN- junction, I-V characteristics, LED, solar cell, photo diode and their applications.
			CO6	Summarize nano & bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation

				methods (physical & chemical), analysis
				the techniques like XRD, SEM, TEM
				and also to understand the radioactivity,
				fusion & fission, alpha, beta and gamma
				rays decay and its applications.
		Data Structures using C	CO1	Demonstrate the concepts of Abstract
				data type and also applications of stack
				and Queues.
			CO2	Select the data structure that efficiently
				model the information in a problem.
			CO3	Design programs using variety of data
				structures including Trees, AVL Trees
				and Graphs and their applications.
	0EC01		CO4	Solve problems and also assess
	9EC01			efficiency trade off among searching and
				sorting using time complexity of each
				algorithm and also the applications of
				hashing and hash tables.
			CO5	Describe the concepts of OOPs and
				implement programs using objects,
				classes, constructors and destructors.
			CO6	Apply concepts of OOPs to write
				program on over loading functions and
				concepts of inheritance.
		Basic Electronics and	CO1	Understand and apply the principles of
		Electrical Engineering		electrical engineering to solve basic
				equations.
			CO2	Apply the knowledge gained to explain
				the principles of single and three phase
				AC circuits.
	9HC12		CO3	"Apply the knowledge gained to explain
	JHC12			the principle and operation of DC
				machine along with its applications".
			CO4	Use the principles of single-phase
				transformer along with its applications
				and solve the equations.
			CO5	Realize the principle and operation of
				three phase induction motor with its
			-	applications.
		Engineering Graphics	CO1	Get familiar to use the instruments to
				solve the engineering problem and draw
	05 66 1			various type of curves used in
	9BC01		~~-	engineering.
			CO2	Understand and Implement Orthographic
				projections and draw projections of
				simple drawing entities such as points
				Lines, and Planes.

		CO3	Draw projections of different types of
			principal planes of projection.
		CO4	Draw Sections of various Solids
			including Cylinders, cones, prisms and
			pyramids and draw the developments of
			these solids and their sections.
		CO5	Construct Isometric Scale, Isometric
			Projections and Views and convert 3D
			views to 2D orthographic views.
		CO6	Understand from basic sketching
			through 2D and 3-D solid modeling
			using computer aided design (CAD)
			software.
_		CO1	Understand, Analyze and respond to the
			audience by listening effectively
		CO2	Practice effectively the speaking skills
			with the apt body language
		CO3	Develop strategies to improve speaking
			skills
011002	Oral Communications	CO4	Plan, prepare and present effectively to
9HC02	Lab		meet the standards of corporate and real
			world in a group
		CO5	Comprehend the reading skills through
			note taking and other study skills
		CO6	Express the opinions effectively on the
			given topic through role play and
			situational dialogues in group
			discussions
		CO1	Understand the concepts of photo
			electric effect, importance, photo
			current, color filters, optical sensors.
0HC66	Engineering Physics	CO2	Write programs using tree traversals. In
911000	Lab	CO2	order, preorder and post order.
		003	Program searching, sorting and hashing
		CO4	Write programs on Binary trees
		C05	Implement classes and operator
			overloading.

Year and regulation	Course code	Course name	Co's		
	9HC16	Probability & Statistics	CO1	Solve the random variable problems and probability distributions.	
			CO2	Estimate the parameters and solve the problems	

				using central limit theorem.
			CO3	Test the hypothesis related to samples
				concerning to the means and proportions of large
				size samples.
			CO4	Apply and solve the problems using t-test, Chi-
				square test also testing the hypothesis problems
				on small size samples, goodness of fit and
				independence of attributes.
			CO5	Solve the problems on measures of central
			0.00	tendency. Correlation
			CO6	Classify and differentiate various regression
			000	models
			CO1	Understand the fundamentals of electrical
			001	engineering and DC machines
			CO2	Understand the principles of AC circuits
		Flements of Flectrical	CO3	Understand the principle and operation of three
	9AC48	and Electronics	005	phase induction motor and measuring
II-I & A22	511010	Engineering		instruments
			CO4	Understand the principle and operation of diode
			C07	Understand the principle and operation of
			005	transistor
-			C06	Understand the principles of digital electronics
			C00	Understand and comprehend the fundamentals
			COI	of LAVA, its Classes, and Objects and write
				of JAVA, its Classes, and Objects and write
			CO2	Simple programs using constructors.
		Object Oriented	02	while programs using inneritance, interface and
	0FC02	Drogramming through	CO3	Write programs using inheritance interface and
	9EC02	Iava	COS	nackages
		Java	CO4	Implement Exception handling and
			04	Multithreading
			COS	Design programs using AWT Swings and
			05	develop applications using AW1, Swings and
				develop appreadons using event handling.
			CO1	Evaluate elementary mathematical arguments
			001	and identify fallacious reasoning (not just
				fallacious conclusions).
			CO2	Reason about arguments represented in
			002	Predicate logic
	9F303	Discrete Mathematics	CO3	Perform operations on discrete structures such as
	/1 505	District munchances		sets functions relations and sequences
			CO4	Solve discrete mathematics problems that
				involve: computing permutations and
				combinations of a set
			COS	Analyze and deduce problems involving
				recurrence relations and generating functions
		1	1	recontence relations and generating functions.

			CO6	Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling
			CO1	Perceive basic operational concept of computer
				and data processing.
		Computer Organization	CO2	Use data types with instruction set of specified architecture
	9DC10	and Architecture	CO3	Justify different control unit design and algorithms for various operations.
			CO4	Elaborate basic architecture of 8086 processor
			CO5	Write assembly language programming and debug to 8086
			CO6	Interface devices to 8086 processor.
			CO1	Apply process models in real world software products.
			CO2	Classify software requirement specification
	9D310	Software Engineering		document.
			CO3	Design system models and user interface.
			CO4	Evaluate test strategies for various softwares.
			CO5	Describe product metrics, risks.
-			C00	Understand the quality management.
			COI	family. It very briefly touches issues related to
				their role in the society and the nature which
				needs to be discussed at length in one more
				semester for which the foundation course named
	9HC17	Universal Human values		as "H-102 Universal Human Values
			CO2	Understanding Harmony is designed which may
				be covered in their III or IV semester. During the
				Induction Program, students would get an initial
				exposure to human values through Universal
				Human Values – I. This exposure is to be
				augmented by this compulsory full semester
			001	toundation course.
			COI	Write programs to generate Prime numbers,
				series
			CO^2	Write small application such as banking system
		Object oriented	CO3	Write programs on operator, function
	9EC62	programming through		overloading and dynamic method dispatch.
		Java Lab	CO4	Write programs to implement interface and
				packages.
			CO5	Explain and write programs to implement
				threads.
			CO6	Write programs to implement applets and event

				handling.
			CO7	Write an application to implement client and
				server scenario.
			CO1	Students can able to identify software process
				and software engineering practices to select and
				justify approaches for a given project and its
				constraints and distinguish life cycles for
				developing software product.
			CO2	Students understand the importance and
				principles of Unified Modeling Language, its
		Software Engineering		building blocks and to relate UML paradigm for
	9EC77	and Computer		problem solving.
	Organization Lab	CO3	Students can define and design models for the	
			000	requirements stated in the software project.
			CO4	Students can able to design class object and
			001	interactive diagrams and know their
				significance.
			CO5	Students can able to design advanced behavioral
			000	and architectural modeling and work on case
				studies.
		Elements of Electrical and Electronics	CO1	Understand the working of single-phase
			001	transformer under different conditions, the
				performance of three phase induction motor
				different speed control methods of DC motor
				with and without loading with its performance.
			CO2	Understand the applications of Theyenin's
				Theorem in circuit analysis.
			CO3	Identify, Specify and test R, L, C Components
	9AC77			(Colour Codes), Potentiometers, Switches, Coils,
		Engineering Lab		Relays.
			CO4	Identify, Specify and test Active Devices,
				Diodes, BJTs, Low power JFETs.
			CO5	Explain and demonstrate working of PN
				Junction and Zener diode.
			CO6	Explain and demonstrate working Half and Full
				wave Rectifier without filters.
			CO7	Demonstrate working of CE characteristics and
				its application as an amplifier.
			CO1	Comprehend the concepts in the Core Courses
	QM279	Comprehensive Test		1styearand 2nd year 1st Semester.
	J1VIJ / 0	and Viva-voce – III	CO2	Assess technical knowledge to face interviews.
			CO3	Exhibit lifelong learning skills to pursue higher
				studies or professional practice.
	01/204	Technical Seminar –	CO1	Identify current general, political and technology
	9141300	III		related topics.
			CO2	Arrange and present seminar in a effective

		manner
	CO3	Collect, survey and organize content in
		presentable manner
	CO4	Demonstrate oratory skills with the aid of Power
		Point Presentations.
	CO5	Exhibit interview facing skills and team leading
		qualities

Year and regulation	Course	Course name		Co's
Tegulation	couc		CO1	Learn about various data types, types of data sets a data quality
			CO2	Implementation of R fundamentals and perform factors and data frames.
	9EC40	Introduction to Data Science	CO3	Implementation of data structures iterative programming & function concepts using R
			CO4	Learn about data visualization techniques and apply suitable visualization techniques
			CO5	Learn about dimensionality reduction based on examples illustrations
			CO6	"
	9FC05		CO1	Analyze worst-case running times of algorithms using asymptotic analysis.
II-II & A22		Design and Analysis of Algorithms	CO2	Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
			CO3	Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
			CO4	Comprehend the concept of dynamic programming algorithms, their applications and analyze them.
			CO5	Analyze the Backtracking and Branch and Bound algorithms and also identify the scenarios for its applicability.
			CO6	Comprehend the concept of P and NP Problems and its usage in the applications.
	9EC03	Database Management Systems	CO1	Comprehend importance, significance, models, Database languages, architecture and design of DataBaseSystems.
		Management Bystellis	CO2	Design Relational Models and apply Integrity Constraints, Querying

				fundamentals, Logical data base Design and Views of databases along with application of
				Relational Algebra
			CO3	Apply queries in SQL Query using Nested
			005	Oueries Set. Comparison Operators
				Aggregative Operators, Logical
				connectivity's with Joins statements and
				develop applications.
			CO4	Eliminate data redundancy through
				normalforms.
			CO5	Ensure ACID properties and Serializability
				in Transaction management and Database
				Recovery.
			CO6	Use different External Storage Organization
				techniques and apply Indexing in databases
				to enhance systemperformance.
			CO1	Understand the functional architecture of an
				Operating System with usage of system
	98EC06	Operating Systems		calls.
			CO2	Analyze various process scheduling
				algorithms & pragmatics of scheduling
				algorithms used by various Operating
				Systems.
			CO3	Solve issues related to process
		operating bystems		synchronization and Deadlocks in the
				Operating System.
			CO4	Illustrate the concepts of Memory
				Management.
			CO5	Outline the directory structure & analyze
				disk scheduling algorithms.
			CO6	Summarize the aspects of Protection and
				Security, and understand the concepts of I/O
			601	systems.
			COI	Apply the rules of Boolean algebra to
			602	simplify Boolean expressions.
			02	Simplify of Boolean expressions using K-
				map.
			003	Design MISI combinational circuits such as
	9CC55	Digital Electronics		full adders, multiplexers, decoders, encoders.
		-	<u> </u>	Design hasia moment units (latahas and flig
			C04	flore) and acquartial circuits such
				counters and registers
			CO5	Create digital design using DLD's such as
				ROM'_{c} PLA'_{c} DAL c
			C04	Design the digital controllors using
				Design the digital controllers using

				Algorithmic State Machine Charts.
			CO1	Assess themselves using SWOT analysis.
			CO2	Appraise the importance of certain soft skills
				like time management and goal setting.
			CO3	Improve their verbal ability to handle the
				competitive exams.
	9HC03	Soft Skills	CO4	Enhance their team skills and design tinking capabilities for effective problem solving and decision making.
			CO5	Know their emotional quotient which guidestheir thinking, behavior and helps them manage stress efficiently.
			CO6	Equip themselves with the prerequisites, and
				relevant techniques to effectively attend
				corporate interviews
			CO1	Acquire the basics of Managerial Economics at Micro level, Demand analysis and production analysis in particular
			CO2	Gain exposure on Cost concept, Revenues and Market structure and describe the concepts.
		Economics, Accountancy	CO3	Comprehend the basic concepts of Accounting, Double entry system and Book keeping.
	9ZC01	and Management Science	CO4	. Interpret the concepts of Capital expenditure, Revenue expenditure and Final accounts ad their significance.
			CO5	Gain knowledge and elaborate the basics of Management, its principles and various functions performed in organization
			CO6	Recognize various personality traits, perception, attitudes of individuals working in organization
			CO1	application."
	98EC63	Database Management SystemsLab	CO2	"Write Queries using Aggregate functions such as [COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING], Conversion functions and use string functions for a given
			CO3	"Explain and write programs using PL/SQL programs using exceptions, COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block."
			CO4	"Develop programs using WHILE LOOPS, FOR LOOPS, nested loops using BUILT–
			CO5	"Write Programs for stored functions invoke functions in SQL Statement and write
			CO6	Describe and write programs using features of CURSORs and its variables.Develop
			CO7	Programs implementing Triggers.
			C01	Implement Merge sort algorithm for sorting a list of integers in ascending order, Dijkstra's algorithm for the single source shortest path problem.
	9MC61	Design and Analysis of Algorithms and R	CO2	Implement Prim's algorithm to generate minimum cost spanning tree.
		programming Lab	CO3	Solve the job sequencing with deadlines problem using greedy algorithm.
			CO4	Design the solution for the 0/1 knapsack problem using implement DynamicProgramming and implement
		l		

 		<u>.</u>	
		CO5	Using Dynamic programming approach solve the Optimal Binary search Tree problem.
		CO6	Design and implement n-queens problem using backtracking approach.
9EC66	Operating Systems Lab	CO1	Simulate and implement operating system concepts such as scheduling, deadlock management, page replacement techniques, file management and memory management
	Comprehensive Test	C01	Comprehend the concepts in the Core Courses 1st year and 2nd year.
9M479	and Viva –Voce – IV	CO2	Assess technical knowledge to face interviews.
		CO3	Exhibit lifelong learning skills to pursue higher studies or professional practice.
		C01	Deliver lecture on emerging technologies.
9M487	Technical Seminar – IV	CO2	Explain domain knowledge to resolve real time technical issues
		CO3	Demonstrate ability to lead and explain concepts and innovative ideas.
		CO4	Demonstrate team leading qualities.
		CO5	Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice.
		CO6	Exchange new information that would not have been available otherwise.
		CO7	Develop debating and interview skills.

Year and regulation	Course code	Course name	Co's		
	9ZC05 Banking Operations, Insurance and Risk Management Open Elective-I	CO1	Describe the new dimensions and products served by the banking system in INDIA.		
		CO2	Explain the credit control system and create awareness on NPA's.		
		Management Open Elective-I	CO3	Apply the knowledge of Insurance concepts in real life scenarios.	
			CO4	Recognize the importance of regulatory and legal frame work of IRDA.	
			CO5	Identify the risk management process and methods.	

			CO6	Calculate the diversity of risk and return.
	8FC13		CO1	Explain primitives of Project Planning and
				evolution of software economics.
			CO2	Describe software economics; reduce
				Software product size, improvement in
				software processes, improving team
				effectiveness, improving automation,
				Achieving quality.
			CO3	Explain Life cycle phases and Artifacts of
				the process.
			CO4	Describe Model based software architectures
		Software Project		and Work Flows.
III-I &		Management	CO5	Apply Checkpoints for a process such
A20		C		as Major mile stones. Minor Milestones and
A20				apply work breakdown structures for a
				iterative process within cost and schedule.
				Describe Project Organizations and
				Responsibilities.
			CO6	Describe Automation and Project Control
				and Process instrumentation and explain
				Future Software Project Management such
				as Modern Project Profiles and Next
				generation project management.
	8EC07		CO1	Demonstrate the use of HTML tags. Apply
				Styles using CSS and Bootstrap. Develop
				dynamic programs using Javascript and
				Typescript.
			CO2	Develop scripts using XML and validate
				using parsers. Design a data-interchange
				format using JSON.
			CO3	Appraise the Expressions, Filters, Directives,
		Web Technologies		Controller, and Modules of Angular.
			CO4	Design responsive web applications with
				Forms, Scope, Dependency Injection &
				Services, and Single Page Application (SPA)
				of Angular.
			CO5	Comprehend the uses of Web servers and
				design the server-side scripts using Servlets.
			CO6	. Design and develop server-side scripts and
			-	components using PHP.
	8MC01		CO1	Understand the fundamentals of Data
				Mining.
			CO2	Understand the techniques used in data
		Data Mining		preprocessing.
			CO3	Learn insights of Data Mining Primitives
				and Infer the significance of Concept
				Description.

		CO4	Apply the algorithms for mining association rules in large databases.
		CO5	Discuss and apply the models of classification and use those models for the prediction of the new samples
		CO6	Applyvariousclusteringtechniquesavailablefornumerousapplications.Identify the optimal clustering technique fora particular application
8MC	202	CO1	Understand architecture of data warehouse and OLAP operations.
	Data Warehousing	CO2	Understand Fundamental concepts of BI and Analytics.
	and Business Intelligence (DW and	CO3	Understand basic reporting and querying and Design of Dashboards.
	BI)	CO4	Learn BI Strategy, Architecture.
		CO5	Design / Build a BI project plan with best practices.
		CO6	Understand BI target.
8EC	205	CO1	Understand concepts of different networks, network models and transmission medias.
		CO2	Classify various data conversion techniques and Multiplexing, Demultiplexing techniques.
		CO3	Summarize the design issues of Datalink layer and solve problems on Error and Flow control.
	Data Communication and Networks	CO4	Infer MAC layer protocols, various connecting devices, IP addressing concepts and design a network(using subnetting and supernetting techniques)
		CO5	Analyze various routing algorithms and outline the concepts of Internet control protocols and congestion control techniques.
		CO6	Recognize services and protocols of transport layer, application layer along with network security issues.
8HC	205	CO1	Understand about ecosystem and energy flow among the organisms.
	Environmental	CO2	Know the resources available, use of them and overexploitation of the resources in the nature.
	Science and Ecology	CO3	Learn the value, use and value of biodiversity.
		CO4	Understand the causes and effect of pollution and implement measures in control of

				pollution.
			CO5	Understand the sustainable development and
				implement green technology for sustainable
				development.
			CO6	Learn and implement policy to protect the
				environment.
			CO1	Work with the ETL and Mining tools.
	8MC62		CO2	Demonstrate the classification, clustering
				techniques on the data sets.
		Data Mining and	CO3	Comprehend the results obtained in the
		DWand BLL ab		clustering, Association and Classification
				techniques applied on the data sets with
				varied input parameters.
			CO4	Ability to apply mining techniques for
				realistic data.
			CO1	Implement and analyze framing methods of
				the data link layer.
			CO2	Implement and analyze framing methods of
		Computer Networks Lab		the data link layer.
	8EC65		CO3	Illustrate and implement error detection &
				correction techniques.
			CO4	Implement different Routing Algorithms.
			CO5	Understand basic Network Commands.
			CO6	Use of Wireshark and NS-2 tools.
			CO1	Demonstrate the use of HTML tags and be
				able to design web pages.Develop dynamic
				programs involving Java scripts, popup
				windows in JavaScript along Event
		-		Handling.
			CO2	Develop scripts using XML and XSLT and
	8EC67			read XML documents using parsers, DOM
		Web Technologies		parser, and SAX parser. Develop JSON files
		Lab	<u> </u>	and access them via HTML pages.
			COS	Eilters Directives Controller and Modules
			<u> </u>	Develop a Single Dage Application with
			C04	implementation of Seena and Form
			CO5	Implementation of Scope and Form.
			COS	Tomest Server for User authentications
			C06	Develop on application in PHP with
				Develop all application in FIIF with Database connectivity
			CO1	Use the concepts learned in the courses so
			COI	far in conceptualizing designing and
	8M591	Summer Industry		executing the modules of the projects
	0111371	Internship -I	CO2	Exhibit the interest in learning the modern
			002	tools and technologies through the bridge
	I			teens und teenneregies unough the bluge

		courses arranged in the college, beyond the curriculum, and hence developing the software.
	CO3	Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole.
	CO4	Improve their communicative skills and team skills.

Year and	Course	Course name		Co's
regulation	code			
			COI	Students will understand the nature of
		8ZC19 ENTREPRENEURSHIP PROJECT MANAGEMENTAND STRUCTURED		Entrepreneurship and its importance.
			CO2	Will gain knowledge regarding project, its
				life cycle and organization.
			CO3	Will gain knowledge relating to project
	8ZC19			formulation and implementation.
	FINANCE	CO4	Comprehend the components of structured	
		(Open Elective –II)		finance.
			CO5	Establish a framework of CMBS.
			CO6	Students will gain knowledge relating to
				the CRE Servicing.
			CO1	Identify vast application areas for mobile
	8EC15			/wireless communications and Understand
				GSM Architecture, Services.
			CO2	Examine Hidden and exposed terminals,
				Near and far terminals and Differentiate
				medium access control methods for
				wireless communication SDMA, FDMA,
				TDMA and CDMA.
		MOBILE	CO3	Illustrate mobile IP primitives in Network
		COMPUTING		layer and Demonstrate IP packet delivery,
		(Professional Elective -		DHCP.
III-II &		II)	CO4	Distinguish Traditional TCP, Indirect TCP,
A20				Snooping TCP, Mobile TCP in Transport
				layer.
			CO5	Understand applications of MANETs
				routing algorithms, data hoarding, client
				server computing along with the data
				delivery mechanisms.
			CO6	Understand protocols and tools such as
				WAP, Bluetooth and Identify emerging
				mobile operating systems.
	9EC07	Automata Theory and	CO1	Design the finite automata different
	8FCU/	Compiler Design		Languages

			CO2	Construct finite Automata for a given regular expressions, and derive strings with suitable examples. Conceptualize context free grammars and normal forms
			CO3	Design the push down automata and Turing Machine for complex languages.
			CO4	Understand LEX tool and relate parsing techniques,
			CO5	Demonstrate and solve problems on SLR, CLR, LALR, operator precedence parser, LR (O), LR(1), LR(K) grammar and use YACC tool.
			CO6	Understand Semantic Analysis concepts to design compiler: and describe Intermediate code generation such as 3-address code form.
	8MC03	Data Visualization Techniques	CO1	Visualize the objects in different dimensions.
			CO2	Design and process the data for Virtualization.
			CO3	Apply the visualization techniques in physical sciences, computer science, applied mathematics and medical science.
			CO4	Apply the virtualization techniques for research projects. (K1, K3).
	8LC01	Introduction Artificial Intelligence	CO1	Learn the distinction between optimal reasoning vs. human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time and space complexities.
			CO2	Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.
			CO3	Learn different knowledge representation techniques.
			CO4	Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
			CO5	Comprehend the applications of Probabilistic Reasoning and Bayesian Networks, analyze Supervised Learning vs. Learning Decision Trees.
	8EC17	Machine Learning	CO1	Understand the fundamental concepts of

				ML and Designing a Learning System.
			CO2	Understand the basic concepts of linear
				models, tree and Probabilistic Models.
			CO3	3. Understand the Probability models
				namely supervised, unsupervised, basic
				statistics analyze their analysis of
				algorithms along with their applications.
			CO4	4. Understand various Dimensionality
				Reduction Techniques and Apply various
				Evolutionary Algorithms with models
			CO5	5. Understand the Graphical models and
				their applications
			CO6	6. Understanding Analytical Learning and
				Analyze KBANN Algorithm
			CO1	Demonstrate a breadth of knowledge in
				Intellectual property .
			CO2	Overview of Patents, Searching, filling and
				drafting of Patents.
	00040	Intellectual Property	<u>CO3</u>	Overview of copyright & GI.
	8GC49	Rights	C04	Overview of Trade Mark & Trade Secret,
			005	Overview of Integrated Circuit and
			COG	Industrial Design.
			000	international: Conventions and Tractics
				Governing the IPPs
			CO1	Understand complexity of Machine Learning
	8MC64	Machine Learning Lab	COI	algorithms and their limitations:
			CO2	Understand modern notions in data analysis-
				, oriented computing;
			CO3	Be capable of confidently applying common
				Machine Learning algorithms in practice and
				implementing their own;
			CO4	Po canable of performing experiments in
			004	Machine Learning using real-world data
			CO1	Apply basic principles of AI in solutions
	8MC65		001	that require problem solving, knowledge
		Artificial Intelligence and Compiler Design Lab		representation, and learning.
				1
			CO2	Implementation of DFA for a given
				Language / Regular Expression
			CO3	Usage LEX of tool to implement lexical
				analyzer in compiler design and
				implementation of Top-Down Parser.
			CO4	Usage of YACC tools for implementing
				bottom up parser.

	8 M 680	Group Project	CO1 CO2	Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects. Exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the
				curriculum, and hence developing the software.
		1 5	CO3	Inculcate an enthusiasm to use the creative
				ideas to build the innovative projects
				which are meeting the current needs of the
				market and society as a whole.
			CO4	Improve their communicative skills and
				team skills largely improve.
			CO5	Work as an individual and in a team.
	8M692	Comprehensive Viva Voce	CO1	Comprehend the concepts in the Core
				Courses 1st year.
			CO2	Assess technical knowledge to face
				interviews.
			CO3	Exhibit life long learning skills to pursue
				higher studies or professional practice.



Course Outcomes of CSE - (Internet of Things) Department

SREENIDHI INSTITUTE OF SCIENCE AND





Department of Computer Science & Engineering (Internet of Things) COs for A22-1st Year and 2nd Year, A20-3rd year and 4th Year courses/subjects

Year and	Course	Course name	Co's	
regulation	code			
	011007	Engineering Physics	CO1	Explain semiconductor behaviour, types and their applications
			CO2	Differentiate the wave and particle, and its application for a particle in one dimension box
			CO3	Explain about emission, its types, laser principle and applications of optical fibers (sensors and medical endoscopy)
	911007		CO4	Reveals about the magnetism-its origin and types and its applications
			CO5	Explain the basic concepts of dielectric materials, polarization and its types, their applications (piezo, ferro and Pyro electricity).
			CO6	Summarize nano& bulk concepts, surface to volume ratio and its applications.
I-I & A22	9FC01	Problem Solving using C	CO1	Explain basic fundamentals of Computer Systems , computing environments , Computer Languages – Machine Languages
			CO2	Describe C language Programs, Structure of a C Program
			CO3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while, for, break
			CO4	Write programs implementing application on arrays
			CO5	Write programs using Pointers and string handling functions
			CO6	Write programs using Enumerated, Structure, Union types and files.
	9HC11	MATRIX ALGEBRA AND CALCULUS	CO1	1. Check the consistency or inconsistency of a linear system and can solve the problems.
			CO2	2. Find the Eigen values and Eigen vectors and can solve the problems associated with these concepts.
			CO3	3. Find the nature, index and signature of the quadratic form.
			CO4	4. Verify the applicability of mean value theorems and also can express the givenstandardfunction in series form using Taylor's and Maclaurin series.
			CO5	5. Find the solutions of first order

9HC01 Inst degree differential equations we work is law of cooling. Nature and a solve the problems Newton's law of cooling. Nature growth and decay. 9HC01 6. Solve higher order ordin differential equations we constant coefficients using son standard methods. 9HC01 0 9HC01 0 0 - State the definition of nouns, verbs. adjectives, and adverbs. 0 - State the definition of nouns, verbs. adjectives, and adverbs. 0 - Identify the differences of each tease adjectives, and adverbs. 0 - Identify specialized recalls strategies for specific types of texts. 0 - Memiliar to use the instruments to sold strate or projections and larw varia strategies for specific types of texts. 0 - Identify specialized recalls strategies for specific types of texts. 0 - Memiliar to use the instruments to sold strate the engineering more tere with subtable accuracy in vocabulary, and language fluency. 1 - Identify specialized recalls strategies for specific types of texts. 0 - Identify specialized recalls strategies for specific types of texts. 0 - Identify specialized recalls strategies for specific types of texts. 0 - Identify specialized recalls strategies for specific types of texts. 0 - Orde accuracy in vocabulary, and					
9HC01 6. Solve higher order ordinations we constant competence with suitable accuracy in vocabulary, and language fluency. 9HC01 Essential English Language Skills (EELS) CO1 Demonstrate competence with suitable accuracy in vocabulary, and language fluency. 9HC01 CO2 - State the definition of nouns, verbs, adjectives, and adverbs. CO3 - Identify the differences of each rense and use the tenses accurately. 9HC01 CO4 - Identify the differences of each rense and use the tenses accurately. - Identify the differences of each rense and use the tenses accurately. 9HC01 - Identify specialized reading strategies for specific types of texts. - Identify the differences of each rense and use the tenses accurately. 9HC01 - Identify specialized reading strategies for specific types of texts. - Identify specialized reading strategies for specific types of texts. 9BC01 Engineering Graphics CO1 Engineering Graphics CO2 9BC01 Engineering Graphics CO3 Traw projections of different types regular solids in various positions v principal planes of projections of simp drawing entities such as points Lines, a planes 9BC01 Oral Communication Lab-I CO3 Draw projections of simp drawing conversations. 9HC61 Oral Communication Lab-I CO3 <					first degree differential equations and solve the problems on Newton's law of cooling, Natural growth and decay.
PHC01 Essential English Language Skills (EELS) COI EELS) Demonstrate competence with suitable accuracy in vocabulary, and language fluency. 9HC01				CO6	6. Solve higher order ordinary differential equations with constant coefficients using some standard methods.
9HC01 • State the definition of nouns, verbs, adjectives, and adverbs. 003 • Identify the differences of each tense and use the tenses accurately. 004 • Order tension and tension and tension and tension and tension and tension accurate. 005 • Produce written work that is substantive organized, and grammatically accurate. 006 • Order and tension and tensis and tensis tension and tension and tension and tension			Essential English Language Skills (EELS)	CO1	Demonstrate competence with suitable accuracy in vocabulary, and language fluency.
9HC01 · Identify the differences of each tense and use the tenses accurately. · Identify specialized reading strategies fo specific types of texts CO4 · Identify specialized reading strategies fo specific types of texts CO5 · Produce written work that is substantive organized, and grammatically accurate. Demonstrate competence with suitable accuracy in vocabulary, and language fluency. CO6 accuracy in vocabulary, and language fluency. Engineering Graphics CO1 Engineering Graphics CO2 CO3 - Engineering fluency. CO4 - Marstand and Implement Orthograph projections of drifterent types CO3 regular solids in various positions v principal planes of projection projections and Views and communics of these solids a their sections. CO4 Costruct Isometric Scale, Isometric CO5 Protocostruct Copments of these solids a their sections. CO4 CO4 Oral Communication Lab-I CO1 Oral Communication Lab-I CO2 CO3 - Identify major areas of conversions. in different contexts of conversations. CO4 - Create a SMART plan to enhance their communication and address them. CO4 - Use appropriate tenses and expressions in different contexts of conversations. <t< td=""><th></th><th></th><td></td><td>CO2</td><td>• State the definition of nouns, verbs, adjectives, and adverbs.</td></t<>				CO2	• State the definition of nouns, verbs, adjectives, and adverbs.
9BC01 Co4 - Identify specialized reading strategies for specific types of texts C05 - Produce written work that is substantive organized, and grammatically accurate. C06 - Code written work that is substantive organized, and grammatically accurate. C06 - Code written work that is substantive organized, and grammatically accurate. C06 - Code framiliar to use the instruments to sol the engineering problem and draw vario type of curves used in engineering C02 Code framiliar to use the instruments to sol the engineering problem and draw vario type of curves used in engineering C03 Projections of different types C04 Draw projections of different types C05 Draw projections of various Solids includi C04 Code draw the developments of these solids a draw the developments of these solids a their sections. C05 Construct I Sometric Scale, Isometric to 2D orthographic views C06 and 3-D solid modeling using computaided design (CAD) software Describe people, objects and situations usi simple sentences. - Use appropriate tenses and expressions in different contexts of conversations. C03 - Maerity major areas of concern in their oral communication skills in English - Code in different contexts of conversations. C04 - Creat a SMART plan to enhance their communication skills in Engl		0HC01		CO3	• Identify the differences of each tense and use the tenses accurately.
9BC01 CO3 • Produce written work that is substantive organized, and grammatically accurate. Demonstrate competence with suitable accuracy in vocabulary, and language fluency. Get familiar to use the instruments to sol the engineering problem and draw variot projections and draw projections of simple for curves used in engineering problem and draw variot projections and draw projections of simple projections and draw projections of simple regular solids in various positions v principal planes of projection 9BC01 Co3 Draw projections of different types regular solids in various positions v principal planes of projection 9BC01 Co4 Cylinders, conse, prisms and pyramids a draw the developments of these solids a their sections. CO4 Co5 Projections and Views and convert 3D viet to 2D orthographic views Oral Communication Lab-I Co1 Describe people, objects and situations usi simple sentences. 9HC61 Co2 • Create a SMART plan to enhance their communication and address them. 9HC61 Co3 Describe people, objects and situations usi simple sentences. Co3 • Create a SMART plan to enhance their communication skills in English Co4 • Create a SMART plan to enhance their communication and address them. Co4 • Create a grapropriate tenses and expressions in different contexts of conversations.		9601		CO4	• Identify specialized reading strategies for specific types of texts
PBC01 Demonstrate competence with suitable accuracy in vocabulary, and language fluency. Engineering Graphics CO1 Get familiar to use the instruments to sol the engineering problem and draw vario type of curves used in engineering 9BC01 CO2 Get familiar to use the instruments to sol type of curves used in engineering 9BC01 Draw projections and draw projections of sim principal planes of projection Draw projections of different types regular solids in various positions v principal planes of projection 9BC01 Draw projections of various Solids includi Cylinders, cones, prisms and pryamids a draw the developments of these solids a their sections. CO3 CO4 Co4 Co4 Co4 Pinnes CO4 Co4 Co4 Pinnes CO4 CO4 CO4 Part to applic views CO4 CO4 CO4 Projections and Views and convert 3D vie to 2D orthographic views CO4 CO4 CO4 9HC61 Oral Communication Lab-I CO4 Describe people, objects and situations usi simple sentences. CO3 9HC61 CO4 Co3 Create a SMART plan to enhance their communication sultistis in English 9HC61 CO4 Co24				CO5	• Produce written work that is substantive, organized, and grammatically accurate.
9BC01 Get familiar to use the instruments to sol the engineering problem and draw vario type of curves used in engineering 9BC01 CO1 Get familiar to use the instruments to sol the engineering problem and draw vario type of curves used in engineering 9BC01 CO2 Understand and Implement Orthograph projections and draw projections of different types regular solids in various positions v principal planes of projection 0 Draw projections of various Solids includi Cylinders, cones, prisms and pyramids a draw the developments of these solids a their sections. 0 CO4 Draw Sections of various Solids includi Cylinders, cones, prisms and pyramids a draw the developments of these solids a their sections. 0 Oral Communication Lab-I CO4 CO4 9HC61 Oral Communication Lab-I CO1 Describe people, objects and situations usi simple sentences. 9HC61 CO4 - CC2 - Use appropriate tenses and expressions in different contexts of conversations. 9HC61 CO4 - Create a SMART plan to enhance their communication and address them. CO4 - Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and situations usi simple sentences. CO6 - Use appropriate tenses and expressions in diffe				CO6	Demonstrate competence with suitable accuracy in vocabulary, and language fluency.
9BC01 Understand and Implement Orthograph projections and draw projections of simp drawing entities such as points Lines, a Planes 9BC01 Draw projections of different types regular solids in various positions v principal planes of projection 000 Draw projections of various Solids includi Cylinders, cones, prisms and pyramids a draw the developments of these solids a their sections. 001 CO3 Costruct Isometric Scale, Scale, Isometr		9BC01	Engineering Graphics	CO1	Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering
9BC01 Draw projections of different types regular solids in various positions v principal planes of projection 9BC01 Draw Sections of various Solids in cludi Cylinders, cones, prisms and pyramids a draw the developments of these solids a their sections. CO4 Co4 CO5 Projections and Views and convert 3D viet to 2D orthographic views CO6 Understand from basic sketching through 2 and 3-D solid modeling using computaided design (CAD) software Oral Communication Lab-I C01 Oral Communication Lab-I C02 Oral Communication Lab-I C03 CO3 · Use appropriate tenses and expressions in different contexts of conversations. C04 · Create a SMART plan to enhance their communication skills in English C05 Describe people, objects and situations usin simple sentences. C04 · Create a SMART plan to enhance their communication skills in English C05 Describe people, objects and situations usin simple sentences. C06 · Use appropriate tenses and expressions in different contexts of conversations. C05 Describe people, objects and situations usin simple sentences. C06 · Use appropriate tenses and expressions in different contexts of conversations. C05 Describe people, objects and situations usin simple sentences.				CO2	Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes
9BC01 Draw Sections of various Solids includi Cylinders, cones, prisms and pyramids a draw the developments of these solids a their sections. CO4 Construct Isometric Scale, Isometric Describe people, objects and situations usin simple sentences. Oral Communication Lab-I Co1 Oral Communication Lab-I Co2 Oral Communication Lab-I Co2 Oral Communication Lab-I Co2 Oral Communication Lab-I Co3 CO4 · Use appropriate tenses and expressions in different contexts of conversations. CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and situations usin simple sentences. CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and situations usin simple sentences. CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and situations usin simple sentences. CO6 · Use appropriate tenses and expressions in different contexts of conversations. CO6 · Use appropriate tenses and expressions in different contexts of conversations.				CO3	Draw projections of different types of regular solids in various positions wrt principal planes of projection
9HC61 Construct Isometric Scale, Isometratet Isometraterian Scale, Isometraterian Scale, Isometr				CO4	Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.
9HC61 Oral Communication Lab-I CO1 Describe people, objects and situations usin simple sentences. 0HC61 CO2 · Use appropriate tenses and expressions in different contexts of conversations. CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and situations usin simple sentences. CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and expressions in different contexts of conversations. CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and expressions in different contexts of conversations. CO6 · Use appropriate tenses and expressions in different contexts of conversations. CO6 · Use appropriate tenses and expressions in different contexts of conversations.				CO5	Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views
9HC61 Oral Communication Lab-I CO1 Describe people, objects and situations usin simple sentences. 9HC61 CO2 · Use appropriate tenses and expressions in different contexts of conversations. CO3 · Identify major areas of concern in their oral communication and address them. CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and situations usin simple sentences. CO6 · Use appropriate tenses and expressions in different contexts of conversations.				CO6	Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software
9HC61 CO2 · Use appropriate tenses and expressions in different contexts of conversations. 9HC61 CO3 · Identify major areas of concern in their oral communication and address them. CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and situations usin simple sentences. CO6 · Use appropriate tenses and expressions in different contexts of conversations.		9HC61	Oral Communication Lab-I	CO1	Describe people, objects and situations using simple sentences.
9HC61 CO3 · Identify major areas of concern in their oral communication and address them. CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and situations usin simple sentences. CO6 · Use appropriate tenses and expressions in different contexts of conversations. OUCC6 CO4				CO2	• Use appropriate tenses and expressions in different contexts of conversations.
CO4 · Create a SMART plan to enhance their communication skills in English CO5 Describe people, objects and situations usin simple sentences. CO6 · Use appropriate tenses and expressions in different contexts of conversations. DUCCC CO1				CO3	· Identify major areas of concern in their oral communication and address them.
CO5 Describe people, objects and situations usin simple sentences. CO6 · Use appropriate tenses and expressions in different contexts of conversations. OUCCC · Output				CO4	Create a SMART plan to enhance their communication skills in English
CO6 · Use appropriate tenses and expressions in different contexts of conversations. OUCCC Demonstrate Demonstrate				CO5	Describe people, objects and situations using simple sentences.
Demonstrate the wave length				CO6	• Use appropriate tenses and expressions in different contexts of conversations.
9HC66 CO1 monochromatic source of light by usi Newton's Rings		9HC66		CO1	Demonstrate the wave length of monochromatic source of light by using Newton's Rings
		Engineering Physics Lab		Analyze refractive index of a material prism	
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			CO2	and Dispersive power of a glass Prism by	
				using spectrometer	
			~~~	Determine the wave length of spectral light	
			CO3	and laser Source of light by using Diffraction	
			CO4	Grating	
			04	Design and Analyze RC Circuits	
			CO5	circuit	
			C06	Investigate magnetic Circuits	
			000	Explain basic fundamentals of Computer	
				Systems computing environments.	
		Problem Solving using C Lab	CO1	Computer Languages – Machine Languages.	
		1 toblem Solving using C Lab		Writing/ Drawing simple Algorithms and	
				flowcharts.	
			$CO^{2}$	Formulate the algorithms for	
			002	simple problems	
			CO3	Translate the given algorithms to	
				a working and correct program	
			CO4	Correct the syntax errors as	
			COS	Identify and correct logical errors	
			005	encountered at run time	
	9FC61			Write iterative as well as	
			CO6	recursive programs	
				Represent data in arrays, strings	
			CO7	and structures and manipulate	
				them through a program	
				Declare pointers of different	
			CO8	types and use them in defining	
				Self referential structures.	
			CO9	from simple text files	
I-I & Δ22				nom simple text mes.	
	9BC61	WORKSHOP/MANUFACTURING	<b>GO</b> 1	Use various types of conventional	
		PROCESSES LAB	COI	manufacturing Processes	
				Manufacture components from	
			CO2	wood MS flat GI Shoot atc. hands	
			02	wood, wis hat, of sheet etc. – hands	
				on experience	
				manufacturing of components by	
			CO3	machining like shafts, holes &	
			005	threaded holes, surface finishing of	
				components etc.	
				Produce small devices / products	
				(appliances by assembling different	
				components	
				components	
			CO4		
I-II& A22					

9HC07	Engineering Physics		1.	Differentiate the wave and
				particle. de-Broglie matter
				waves-its experimental
		CO1		evidence Schroedinger's wave
				concent and its application for a
				norticle in one dimension here
			2	particle in one dimension box.
			Ζ.	Explain about emission, its
				types, laser principle, types,
				working and its applications and
				to reveals about TIR principle,
		CO2		optical fiber-types and signal
				propagation, attenuation,
				communication system and
				applications of optical fibers
				(sensors and medical
				endoscopy)
			3.	Classify magnetism types,
				Hysteresis, domain theory, Anti-
				ferro and ferri-magnetism,
		CO3		Superconductivity, experimental
				facts, theoretical analysis, types
				of superconductors and its
				applications.
			4.	Explain the basic concepts of
				dielectric materials, polarization
				and its types, local fields,
		CO4		frequency and temperature
				effect on dielectrics and their
				applications (piezo, ferro and
				Pyro electricity).
			5.	Elaborate semiconductor
				behavior, types, carrier
				concentration, Hall effect,
		COS		Thermistor, demonstrate and
		005		analyze semiconductor devices
				like a PN-junction, I-V
				characteristics, LED, solar cell,
				photo diode and their
				applications.
			6.	Summarize nano& bulk
				concepts, surface to volume
		CO6		ratio, quantum confinement,
				CNTs and preparation methods
				(physical & chemical), analysis
				the techniques like XRD, SEM,

			TEM and also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications.
9EC01	Data Structures	CO1	<ol> <li>Demonstrate the concepts of Abstract data type and also applications of stack and Queues</li> </ol>
		CO2	2 Select the data structure that efficiently model the information in a problem
		CO3	3 Design programs using variety of data structures including Trees, AVL Trees and Graphs and their applications.
		CO4	4 Solve problems and also assess efficiency trade off among searching and sorting using time complexity of each algorithm and also the applications of hashing and hash tables.
		CO5	5 Describe the concepts of OOPs and implement programs using objects, classes, constructors and destructors.
		CO6	<ul> <li>Apply concepts of OOPs to write program on over loading functions and concepts of inheritance.</li> </ul>
9HC12	ADVANCED CALCULUS	CO1	<ol> <li>Find the limits and test for the continuity and differentiability of a function.</li> </ol>
		CO2	<ol><li>Solve the problems on multiple integrals.</li></ol>
		CO3	<ol> <li>Solve linear and nonlinear first order partial differential equations.</li> </ol>
		CO4	<ol> <li>Find Series expansion a function defined over the intervals.</li> </ol>
		CO5	5. Find directional derivative, gradient, divergence and curl of a function.
		CO6	6. Solve problems of line, surface and volume integrals.
9BC01	ENGINEERING GRAPHICS		<ol> <li>Get familiar to use the instruments to solve the engineering problem and</li> </ol>

 			-
			draw various type of curves
			2) Understand Orthographic
			2) Onderstand Orthographic
			projections and drawing
			projections of simple drawing
			entities such as points Lines.
			3) Draw projections of different
			types of regular Planes, solids
			in various positions wrt
			principal planes of projection.
			4) Draw Sections of various
			Solids including Cylinders,
			cones, prisms and pyramids
			and draw the developments
			of these solids and their
			sections.
			5) Construct Isometric Scale,
			Isometric Projections and
			Views.
			6) Convert Isometric to
			orthographic views and
			understand basic sketching
			using computer aided design
			(CAD) software.
9AC48	Basic electrical and	CO1	1. Understand the fundamentals of
	Engineering	001	machines.
		603	2. Understand the principles of AC
		02	circuits.
			3. Understand the principle and
		CO3	operation of three phase induction
			4. Understand the principle and
		CO4	operation of diode.
		CO5	5. Understand the principle and
			operation of transistor.
		CO6	electronics.
9HC62	Oral Communication Lab - II		• Understand the nuances of
		CO1	striking a great conversation in
			formal and informal situations.
		-	• Gain experience of facing an
		CO2	audience and speaking in public.
			• Design a winning presentation
		CO3	and present it with ease.
	1	1	

9HC66	Engineering Physics Lab	CO1	<ul> <li>Understand the concepts of photo electric effect, importance, photo current, colour filters, optical sensors.</li> </ul>
		CO2	<ul> <li>Know about the light properties-dispersion, prism, spectrometer and minimum deviation arrangement.</li> </ul>
		CO3	<ul> <li>Recognize the difference between the interference and diffraction, grating, laser characteristics.</li> </ul>
		CO4	<ul> <li>Analyze the concepts of fiber optics, fundamentals, numerical aperture its importance, attenuation in fiber and applications.</li> </ul>
		CO5	<ul> <li>Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot-Savart law.</li> </ul>
		CO6	<ul> <li>Know the difference between AC and DC fundamentals, Magnetostriction, resonance, air column vibrations.</li> </ul>
		CO7	<ul> <li>Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals.</li> </ul>
		CO8	<ul> <li>Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law.</li> </ul>
		CO9	<ul> <li>Analyze the concept a semiconductors, types, calculation of energy gap of a semiconductor diode and importance.</li> </ul>
		CO10	Analyze the difference

			between normal diode, LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors.	
	CO11	<ul> <li>Characterize the RC network, time constant, capacitor functioning and its application.</li> </ul>		
			CO12	<ul> <li>Understand the concept of radiation, ionizing radiation, radiological protection and inverse square law.</li> </ul>
	9EC61	DATA STRUCTURES Using C Lab	CO1	<ol> <li>Implement Stacks, Queues and circularqueues.</li> </ol>
			CO2	<ol> <li>Write programs using tree traversals. In-order, preorder and post-order.</li> </ol>
			CO3	3 Program searching, sorting and hashing operations.
			CO4	4 Write programs on Binarytrees
			CO5	5 Implement classes and
				operatoroverloading.

Year and regulation	Course code	Course name	Co's	
		OHC16 Probability and Statistics	CO1	1. Solve the random variable problems and probability distributions.
			CO2	2. Estimate the parameters and solve the problems using central limit theorem.
	9HC16		CO3	3. Test the hypothesis related to samples concerning to the means and proportions of large size samples.
			CO4	4. Apply and solve the problems using t-test, Chi-square test also testing the hypothesis problems on small size samples, goodness of fit and independence of attributes.
			CO5	5. Solve the problems on measures of central tendency, Correlation

			<b>G G G G</b>	Classify and differentiate various
			CO6	regression models
		ELEMENTS OF		1. Understand the fundamentals
II-I & A22		ELECTRICAL &	CO1	of electrical engineering and
		ELECTRONICS		DC machines.
		ENGINEERING	000	2. Understand the principles of
			CO2	AC circuits.
				3. Understand the principle and
			<b>CO</b> 2	operation of three phase
	9AC48		COS	induction motor and measuring
				instruments.
			CO4	4. Understand the principle and
			C04	operation of diode.
			COS	5. Understand the principle and
			005	operation of transistor.
			C06	6. Understand the principles of
			000	digital electronics.
		OBJECT ORIENTED		1 Understand and comprehend the
		PROGRAMMING	<b>G G 1</b>	fundamentals of JAVA, its
		THROUGH JAVA	COI	Classes, and Objects and write
	9EC02			simple programs using
				constructors.
			CO2	2 Write programs using inheritance,
			CO3	2 Implement programs using
				Packages I/O Stream and
				collections
			CO4 CO5	4 Implement Exception handling
				and Multithreading.
				5 Design programs using AWT.
				Swings and develop applications
				using event handling.
				6 Develop applications using
II-I & A22			C06	Applets and develop client server
			000	programs using networking
				concepts.
		Discrete Mathematics		Evaluate elementary mathematical
				arguments and identify fallacious
			CO1	reasoning (not just fallacious
				conclusions).
	05000			
	9F303		CO2	Reason about arguments represented
				in Predicate logic.
			<b>C C C</b>	Perform operations on discrete
			CO3	structures such as sets, functions,
				relations, and sequences.
			CO4	Solve discrete mathematics problems

				that involve: computing permutations and combinations of a set.
			CO5	Analyze and deduce problems involving recurrence relations and generating functions.
			CO6	Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling
		Computer Organization and Architecture	CO1	<ol> <li>Perceive basic operational concept of computer and data processing.</li> <li>Use data target spith instantion set</li> </ol>
			CO2	2. Use data types with instruction set of specified architecture
	9DC10		CO3	3. Justify different control unit design and algorithms for various operations.
			CO4	4. Elaborate basic architecture of 8086 processor
			CO5	5. Write assembly language programming and debug to 8086
			CO6	6. Interface devices to 8086 processor.
		Software Engineering	CO1	(i) Apply process models in real world software products.
			CO2	(ii) Classify software requirement specification document.
	9D310		CO3	(iii)Design system models and user interface.
			CO4	(iv)Evaluate test strategies for various softwares.
			CO5	(v) Describe product metrics, risks.
			CO6	(vi)Understand the quality management.
		Universal Human values	CO1	Recognizing the significance of value education and Understand the way to have continuous happiness and prosperity
II-I & A22	9нС1/		CO2	Distinguish between the Self and the body to realize the meaning of harmony for co-existence of Self and body

		CO3	Appreciating the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human- human Relationship
		CO4	Recognize the need of harmony in nature and existence, and work out their mutually fulfilling participation in the nature with
		CO5	Practice natural acceptance and implement and collaborate ethical human conduct
		CO6	Understand and Apply harmony in professional ethics
	Object oriented Programming through Java Lab	CO1	1 Write programs to generate Prime numbers, Roots of quadratic equation and Fibonacci series.
		CO2	2 Write small application such as banking system.
9EC62		CO3	3 Write programs on operator, function overloading and dynamic method dispatch.
,2002		CO4	4 Write programs to implement interface and packages.
		CO5	5 Explain and write programs to implement threads.
		CO6	6 Write programs to implement applets and event handling.
9EC77	Software Engineering and Computer Organization Lab	CO1	Identify software process and software engineering practices to select and justify approaches for a given project and its constraints and distinguish life cycles for developing software product. Appraise the importance and principles of Unified Modeling Language, its building blocks and to relate UML paradigm for problem solving. Define and design models for the requirements stated
			in the software project. Design

II-I & A22			CO2	class, object and interactive diagrams and know their significance. Design advanced behavioral and architectural modeling and work on case studies. Appraise the architecture of 8086 processor, assembling language programming and interfacing with various modules. Experiment with Arithmetic operations of binary number system. Simulate any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.
II-I& A22				
	9AC77	Elements of Electrical and Electronics Engineering Lab	CO1	Understand the working of single- phase transformer under different conditions, the performance of three phase induction motor, different speed control methods of DC motor with and without loading with its performance.
			CO2	Understand the applications of Thevenin's Theorem in circuit analysis.
			CO3	Identify, Specify and test R, L, C Components (Colour Codes), Potentiometers, Switches, Coils, Relays.
			CO4	Identify, Specify and test Active Devices, Diodes, BJTs, Low power JFETs.
			CO5	Explain and demonstrate working of PN Junction and Zener diode
			CO6	Explain and demonstrate working Half and Full wave Rectifier without filters.
			CO7	Demonstrate working of CE characteristics and its application as an amplifier.
II-I& A22	91378	Comprehensive Test and Viva- Voce - III	CO1	1. Comprehend the concepts in the Core Courses 1 st yearand 2 nd year 1 st Semester.
			CO2	2. Assess technical

				knowledge to face
				interviews.
				3. Exhibit lifelong learning
			CO3	skills to pursue higher
				studies of professional practice
	91386	Technical Seminar – III	<i></i>	Identifycurrentgeneral, political and
	1000		CO1	technologyrelatedtopics.
			CO2	Arrange and presentseminar in a effective manner
			CO3	Collect, survey and organize content in presentablemanner
			CO4	Demonstrateoratoryskills with the aid of Power Point Presentations
			CO5	Exhibit interview facingskills and team leadingqualities
II-II&	9E445	Introduction to IOT	~ ~ .	Understand the concepts of Internet of
A22			CO1	Things
			<b>~</b> ~~	• Analyze basic protocols in wireless
			CO2	sensor network
				• Design IoT applications in different
			CO3	domain and be able to analyze their
				performance
				• Implement basic IoT applications on
			CO4	embedded platform
			CO5	Understand the concepts of Internet of
			005	Things
				• Analyze basic protocols in wireless
			C06	sensor network
	9EC05	Data Communications and Networks	CO1	Identify the different types of network topologies and protocols useful for real time applications and transmission medias.
			CO2	Discuss design issues of data link layer and solve problems on Checksum and flow control.
			CO3	Describe Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA/CD and MAC addresses with IEEE 802.X and wireless LAN.

			CO4	Discuss network layer design issues, routing algorithms and Internetworking concepts.
			CO5	Discuss network layer sub netting concepts, its protocols of control and congestion and QOS.
			CO6	Describe concepts and services and protocols of transport, Application layers
II-II& A22	9EC03	Database Management Systems	CO1	1. Comprehend importance, significance, models, Database languages, architecture and design of DataBaseSystems.
			CO2	2. Design Relational Models and apply Integrity Constraints, Querying fundamentals, Logical data base Design and Views of databases along with application of Relational Algebra.
			CO3	3. Apply queries in SQL Query using Nested Queries Set, Comparison Operators, Aggregative Operators, Logical connectivity's with Joins statements and develop applications.
		Operating Systems	CO4	4. Eliminate data redundancy through normalforms.
			CO5	5. Ensure ACID properties and Serializability in Transaction management and Database Recovery.
			CO6	6. Use different External Storage Organization techniques and apply Indexing in databases to enhance systemperformance.
	9EC06		CO1	1. Describe the basic functionalities and structure of the Operating System
			CO2	<ol> <li>Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.</li> <li>Comprehend the concepts of</li> </ol>
			CO3	Synchronization and Deadlocks in

		-		-
				the Operating System
			CO4	4. Discuss the concepts of Memory
				Management(Physical and Virtual
				memory)
				5. Explain the concepts of File System
			CO5	with regard to directory and disk
				management algorithms.
				6. Students understand the concepts of
			CO6	I/O systems, protection and
				security
	9CC55	Digital Electronics	CO1	1. Apply the rules of Boolean algebra
			COI	to simplify Boolean expressions.
			CO2	2. Simplify of Boolean expressions
				using K-map.
				3. Design MSI combinational circuits
			000	such as full adders, multiplexers,
			003	decoders, encoders. Code
				converters.
				4. Design basic memory units (latches
			004	and flip-flops) and sequential
			CO4	circuits such as counters and
				registers
			COF	5. Create digital design using PLD's
			005	such as ROM's, PLA's, PAL s.
			CO6	6. Design the digital controllers using
II-II&				Algorithmic State Machine Charts.
A22	9ZC01	Economics, Accountancy and Management Science	CO1	1. Acquire the basics of Managerial
				Economics at Micro level,
				Demand analysis and production
				analysis in particular.
			CO2	2. Gain exposure on Cost concept,
				Revenues and Market structure
				and describe the concepts.
				3. Comprehend the basic concepts of
			CO3	Accounting, Double entry system
				and Bookkeeping.
				4. Interpret the concepts of Capital
			CO4	expenditure, Revenue expenditure
			0.04	and Final accounts ad their
				significance.
				5. Gain knowledge and elaborate the
			CO5	basics of Management, its
				principles and various functions
				performed in organization.
				6. Recognize various personality
			CO6	traits, perception, attitudes of
				individuals working in

				organization.
			CO6	Learn and implement policy to protect
	00000			the environment
	9EC63	DATABASE	001	• Create tables for a database and
		MANAGEMENTSYSTEMS	COI	apply Queries using ANY,
		LAB		ALL, IN, EXISTS,
			CO2	<ul> <li>NOTEXISTS, UNION,</li> </ul>
				INTERSET, Constraints.
				• Write Oueries using Aggregate
			CO3	functions such as [COUNT,
				SUM, AVG, MAX, MIN,
				• GROUP BY, HAVING],
			CO4	Conversion functions and use
			04	string functions for a given
			CO5	• application.
			CO6	• Explain and write programs
				using PL/SQL programs using
				exceptions, COMMIT,
II-II&				ROLLBACK and
A22			007	SAVEPOINT in PL/SOL
			0/	block
				DIOCK.
			CO8	• Develop programs using
				WHILE LOOPS, FOR LOOPS,
				nested loops using BUILT-
			CO9	• IN Exceptions and write
				Procedures
				Tiocouros.
				• Write Programs for stored
			CO10	functions invoke functions in
				SQL Statement and write
				• Programs for packages
			CO11	specification
				specification.
				• Describe and write programs
			CO612	using features of CURSORs
				and its variables.
			CO13	Develop Programs implementing
			_	Iriggers
		OPERATING SYSTEMS		Simulate and implement operating
		AND COMPUTER	<b>~</b> ~	system concepts such as scheduling,
		NETWORKS LAB	CO1	deadlock management, page
				replacement techniques, file
				management and memory management

		Computer Networks Lab	CO1	1. Implement and analyze framing methods of the data link layer.		
			CO1	2. Implement and analyze framing methods of the data link layer.		
			CO2	Illustrate and implement error		
				Implement different Routing		
			CO3	Algorithms.		
			CO4	3. Understand basic Network Commands.		
			CO5	4. Demonstrate the features of NS2 tool		
			CO6	5. Implement and analyze framing methods of the data link layer.		
				·		
II-II&	9I479	Comprehensive Test and Viva	CO1	After completing this course, the		
A22		Voce - IV		student will be able to		
				Comprehend the concepts in the Core		
				Courses 1 st year and 2 nd year.		
			CO2	Assess technical knowledge to face		
				interviews.		
			CO3	Exhibit life long learning skills to pursue		
				higher studies or professional practice.		
	9I487	Technical Seminar – IV	CO1	Deliver lecture on emerging technologies.		
			CO2	Explain domain knowledge to resolve real time technical issues		
			CO3	3Demonstrate ability to lead and explain concepts and innovative ideas.		
			CO4	Demonstrate team leading qualities.		
			CO5	Demonstrate public speaking and lifelong learning skills for higher studies and to pursue		
			CO6	Exchange new information that would		
			000	not have been available otherwise.		
				Develop debating and interview skills.		
III-I&	8FC06	Information Security	CO1	Understand the fundamental concepts of		
A20				Security Attacks and security standards		
-				with the model for network Security.		
			CO2	Review and analyze conventional		
				cryptographic techniques and		
				authentication		
			CO3	Review and analyze public cryptographic techniques and outline the concepts of		

			Kerberos and email privacy
		CO4	Recognize architecture, key management
			and header formats of Ipsec
		CO5	Outline the various web security threats
			and protocols
		CO6	Understand Intrusion Detection System
			and Design principles of Firewalls
8I506	INTRODUCTION TO	CO1	Classify embedded systems and their
	EMBEDDED SYSTEMS		applications
		CO2	Write ALP for 8051 architecture
		CO3	3. Implement interfaces for Embedded
		005	System using various protocols and
			hardware modules.
		CO4	Understand the principles of
		001	Communication Interface. Wireless and
			Mobile Systems Protocols
		CO5	Design the interrupt routines for variois
		000	OS concepts and Memory Management
			techniques in an BTOS Environment
		CO6	Recognize the issues and design of basic
		000	Real-Time Operating System principles.
			Semaphores and Queues. Hard Real-Time
			Scheduling Considerations.
8EC07	WEB TECHNOLOGIES	CO1	Demonstrate the use of HTML tags.
			Apply Styles using CSS and Bootstrap.
			a. Develop dynamic programs using
			Iavascript and Typescript
			b. Develop scripts using XML and
			validate using parsers. Design a data-
			interchange
			format using ISON
		$CO^{2}$	Appraise the Expressions Eilters
		002	Directives Controller and Modules of
			Angular
		CO3	Design responsive web applications with
		005	Forms Scope Dependency Injection
			Reamp: Services, and Single Page
			Application (SPA) of Apgular
		CO4	Comprehend the uses of Web servers and
		04	design the server-side scripts using
			Social contents
		COS	6 Design and develop conver side scripts
		COS	and components using DHD
		CO6	
8EC16		C00	Inderstand basic terms what Statistical
OLC IU	SCIENCE	COI	Inference means Identify probability
	SCIENCE		distributions commonly used as
			uist inations commonly used as

				for a shart and for a start at the base shall be a still a
				model to data
			CO2	Discuss the significance of exploratory
				data analysis (EDA) in data science and to
				apply basic tools (plots, graphs, summary
				statistics) to carry out FDA
			CO3	Apply basic machine learning algorithms
			000	and to identify common approaches used
				for Feature
				Generation
			CO4	Analyze fundamental mathematical and
				algorithmic ingredients that constitute a
				Recommendation Engine and to Build
				their own recommendation system using
				existing components
				<u> </u>
	8HC05	Environmental Science and	CO1	Understand about ecosystem and
		Ecology		energy flow among the organisms.
			CO2	Know the resources available, use of
				them and overexploitation of the
				resources in the
				nature.
			CO3	Learn the value, use and value of
				biodiversity.
				-
			CO4	Understand the causes and effect of
				pollution and implement measures in
				control of pollution.
			CO5	Understand the sustainable
				development and implement green
				technology for sustainable
				development.
			CO6	Implement policy to protect the
				environment.
	8EC67	WEB TECHNOLOGIES	CO1	Demonstrate the use of HTML tags
		LAB		and be able to design web pages.
				Develop dynamic
				programs involving Java scripts, popup
				windows in JavaScript along Event
				Handling.
			CO2	Develop scripts using XML and XSLT
				and read XML documents using
				parsers, DOM parser,
				and SAX parser. Develop JSON files
				and access them via HTML pages.
			CO3	Implement Angular with Expressions,

				Filters, Directives, Controller, and
				Modules.
			CO4	Develop a Single Page Application with
				implementation of Scope and Form.
			CO5	Implement Java servlets using Apache
				Tomcat Server for User authentications
			CO6	Develop an application in PHP with
				Database connectivity.
III-I-	8FC65	Information Security Lab		Understanding of Symmetric Encryption
&A20				Algorithms, Asymmetric Encryption
				Algorithms, Hash and
				Key Exchange, Digital Signature and Digital
				Envelope, Demonstration of NS3 Tool
	81595	SUMMER INDUSTRY	CO1	Use the concepts learned in the courses,
		INTERNSHIP-I		so far, in conceptualizing, designing and
				executing the modules of the projects
			CO2	. Exhibit the interest in learning the
				modern tools and technologies through
				the bridge courses arranged in the
				college, beyond the curriculum, and
	-			hence developing the software.
III-II-			CO3	Inculcate an enthusiasm to use the
&A20				creative ideas to build the innovative
				projects and
				prototypes which are meeting the current
				needs of the market and society as a
			004	whole.
			CO4	Improve their communicative skills and
	81510	IOT Security	CO1	Describe IOT features and discuss IOT
	81310	101 Security	COI	related protocols
			$CO^2$	Classify IOT attacks and recommend
			002	counter measures
			CO3	Implement IOT Lifecycle for a project
			CO4	Examine various cryptographic protocols
			C05	Access Privacy challenges and mitigate
			CO6	Examine compliance standards for IOT
			000	infrastructures
	8DC05	Microprocessors and	CO1	Understanding the concepts of 8086
	00000	Microcontrollers	001	Architecture
			CO2	Understanding the concepts of
			002	Instruction set & amp: developing skills in
				writing assembly language programs.
			CO3	Ability to interface keyboard, stepper
			200	motor ADC, DAC to 8086 using 8255
			CO4	Understanding the concepts of 8051
				Architecture
			CO5	Exploring the concepts of instruction set
				of 8051

			CO6	Ability to interface LED. LCD. Keyboard
			000	DAC, ADC with 8051
	8IC07	Introduction to Linux	CO1	List and demonstrate the basic Linux
		Programming		utilities
			CO2	Recite and solve problems using Shell
				Scripting
			CO3	Understand and elaborate File System
				structure and kernel support for files in
				Linux.
			CO4	4. Summarize the fundamentals of
				process control primitives and signal
				handling.
			CO5	Classify the techniques of Inter process
				communication and apply them to real
				world problems.
			CO6	Demonstrate the significance of
				Semaphores for Kernel support and
				simulate program
				using the same.
	8LC01	Introduction to Artificial	CO1	Ability to formulate an efficient problem
		Intelligence		space for a problem expressed in
				natural language.
			CO2	Select a search algorithm for a problem
				and estimate its time and space
				complexities.
			CO3	Possess the skill for representing
				knowledge using the appropriate
				technique for a given 🛽 problem.
			CO4	Possess the ability to apply AI techniques
				to solve problems of game playing,
			~ ~ .	and machine learning.
	8FC07	Automata Theory and	COI	Design the finite automata different
		Compiler Design	~~ <b>^</b>	Languages
			CO2	Construct finite Automata for a given
				regular expressions, and derive strings
				with suitable examples. Conceptualize
			<b>G</b> 00	context free grammars and normal forms.
			CO3	Design the push down automata and
			004	Turing Machine for complex languages.
			CO4	Understand LEX tool and relate parsing
			COF	Techniques,
			COS	Demonstrate and solve problems on SLR,
				(CLR, LALR, operator precedence parser, LR
				(O), LR(I), LR(K) grammar and use YACC
			COG	Lunderstand Compantic Analysis conserves to
			000	design compiler; and describe
				latermediate code
				milermediale code
1	1			generation such as 3-address code form.

8GC49	INTELLECTUAL	CO1	Demonstrate a breadth of knowledge in
	PROPERTY RIGHTS		Intellectual property
		CO2	Overview of Patents, Searching, filling
			and drafting of Patents
		CO3	Overview of copyright & amp; GI .
		CO4	Overview of Trade Mark & amp; Trade
			Secret,
		CO5	Overview of Integrated Circuit and
			Industrial Design.
		CO6	Knowledge about different national and
			international: Conventions and Treaties
			Governing the IPRs
8IC61	Programming Using Linux -	CO1	To understand how to work with Linux
	Lab		commands for handling files, processes,
			text utilities, backup and network utilities.
		CO2	To explore basics of building shell scripts
			gain knowledge to compose various Shell
			Scripts.
		CO3	To learn and demonstrate the I/O
			functions, low-level system calls System
			Calls available for file and directory
			handling.
		CO4	. To gain knowledge in implementing
			processes aspects, mastering the process
		~ ~ ~	APIs.
		CO5	To understand how to implement pipes,
			FIFO, how to use for communication
			purpose in IPC.
		C06	To understand the significance of
		000	Semaphores for Kernel support and
			simulate program
			using the same
8DC66	MICROPROCESSORS AND	CO1	Analyze and apply working of 8086.
	MICROCONTROLLERS	CO2	Compare the various interface
	LAB(MPMC)		techniques. Analyze and apply the
			working of 8255, 8279,8259, 8251, 8257
			ICs and design and develop the programs
		CO3	Learning the Communication Standards
8I680	COMPREHENSIVE VIVA	CO1	Assessed the knowledge of the students
	VOCE		in the Core and Elective subjects that they
			have studied till
			the completion of that academic year.
8I691	GROUP PROJECT	CO1	Use the concepts learned in the courses,
			so far, in conceptualizing, designing and
			executing the modules of the projects.
		CO2	Exhibit the interest in learning the modern
			tools and technologies through the bridge
			courses arranged in the college, beyond

				the curriculum, and hence developing the
				software.
			CO3	3. Inculcate an enthusiasm to use the
				creative ideas to build the innovative
				projects which are meeting the current
				needs of the market and society as a
				whole.
			CO4	Improve their communicative skills and
				team skills largely improve.
III-II-A20			CO5	Work as an individual and in a team.
	8I612	Introduction To Ethical	CO1	1. Discuss Ethical hacking primitives
		Hacking	CO2	Use ethical hacking to deal with foot
				printing and social engineering
			CO3	Justify Network Scanning and system
				security
			CO4	Apply Rootkits and sniffers to gather
				information from the network and
				develop a Security model
			CO5	Apply techniques to counter Web
				Hacking and Vulnerabilities.
			CO6	Justify Wireless Network Hacking and
				physical site security



## SREENIDHI INSTITUTE OF SCIENCE AND

## Course Outcomes of MBA Department





## Department of MBA - Master of Business Administration COs for A22-1st Year and 2nd year courses/subjects

Year and regulation	Course code	Course name		Co's
			CO1	Exposure to evolution of management and managerial role and responsibilities
		MANAGEMENT AND	CO2	Acquire the process of planning and decision making
	8Z101	ORGANIZATIONALBEHAVIOUR	CO3	Acquire and gain the art of organizing and controlling the organization
			CO4	Exposure on organization behavior, groups, teams and building teams
				Identify different styles of leadership and different theories of motivation.
				Infer personality theories and stress Management
	8Z102		CO1	Outline the objectives of accounting, its importance
I-I & A22		FINANCIAL ACCOUNTING AND ANALYSIS	CO2	Apply the concepts of accounting for the preparation financial statements.
			CO3	Apply various methods for valuation of inventory and fixed assets
			CO4	Analyze the financial statements using cash flow and funds flow analysis statement's
				Analyze the financial statements using comparative, common size and ratios
			CO6	Explain the basic

			computerized accounting concepts and its applications using Tally Software
		CO1	Acquire the knowledge relating to Managerial economics and its importance
		CO2	Outline meaning of demand and how it can be forecasted
8Z103	MANAGERIAL ECONOMICS	CO3	Acquire knowledge regarding production function and returns to scale
		CO4	Infer meaning of cost and its determinants
		CO5	Examine market structures and pricing strategies for firms
		CO6	Outline profit theory and measurement
8Z104	LEGAL AND ECONOMIC ENVIRONMENT OF BUSINESS	CO1	Explain the nature of contract and the essential elements of contract
		CO2	understanding Indian companies act
		CO3	Identify and understand the utility of different negotiable instruments alongside sales goods act and Central Excise act,
		CO4	Analyze the implications of business environment using the appropriate methods
		CO5	Infer and interpret the components of balance of payments and the recent trends
		CO6	Discover the WTO its structure and functions in governing and administering policy decisions
8Z105	RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS	CO1	Explain basic process of research and measurement

				of variables
			CO2	Explain the research design
			002	and types of research design
			900	Examine the types of data
			CO3	and evaluate using the
				sample tests
			CO1	Evaluate the variances using
			C04	parametric and
				Explain the applications of
			CO5	time series analysis
				Equip with the art of
			CO6	research report writing
			<i></i>	Exposure to process of
			COI	project management
				Acquire and Discover the
			CO2	project formulation, project
			02	rating preliminary report
				and feasibility report
			CO3	Equip the techniques of
	8Z106	PROJECT MANAGEMENT		project appraisal methods
			004	Discover project finance
			C04	and project evaluation
				Exposure on project control
			CO5	and techniques
				Discover the organization
			CO6	behavior in project
				management
				Acquire knowledge on
			COL	sustainability management
			001	and sustainable business
				practices
			CO2	Discover planning methods
				Equipping the method of
			CO3	integrating sustainability
	8Z107	SUSTAINABILITY MANAGEMENT		Gain knowledge on
			CO4	sustainability in functional
				areas
				Gain exposure on creating
			CO5	eco system for change and
				sustainability
			CO6	Discover sustainable
				entrepreneurship
	8Z108	BUSINESS COMMUNICATION	CO1	Gain knowledge on basic

				communication skills
			CO2	Equipping with presentation skills and chairing meetings
			CO3	Acquire the skills in writing skills
			CO4	Articulate the method of writing business reports
			CO5	Gain exposure on employability skills
			CO6	Discover the contemporary aspects in communication
	8Z109		CO1	Outline the basic functions and features of Microsoft- Office.
			CO2	Infer the knowledge on functions of Excel Data Processing
		STATISTICAL DATA ANALYSIS LAB	CO3	Equip with data analysis chart and graphs for data analysis
			CO4	Gain knowledge on frequency descriptive analysis using spss
			CO5	Acquire knowledge on parametric tests using spss
			CO6	Acquire knowledge on non- parametric using spss
I-II & A22	8Z210		CO1	Gain the knowledge relating to profit & wealth maximization, time value of money
			CO2	Evaluate investment decisions
		FINANCIAL MANAGEMENT	CO3	Solve problems relating to capital structure and cost of capital
			CO4	Acquire knowledge relating to working capital
			CO5	Appraise about cash, receivables and inventory management
			CO6	Know about dividend decisions and theories relating to dividends
	8Z211	HUMAN RESOURCE	CO1	Understand and Inculcate knowledge on Human Resource Planning and its

		MANAGEMENT		functions and policies
			CO2	Understand the basic knowledge about the Job analysis
			CO3	Develop the skills required for Recruitment process at the work place
			CO4	Excel the skill required for effective training and Appraisal of the employee at the work place
			CO5	Understand the concept of Compensation and its influence on job evaluation system
			CO6	Develop negotiation skills for handling Industrial Disputes and grievances
	8Z212		CO1	Gain exposure on Marketing functions and process
			CO2	Disseminate and apply STP analysis
			CO3	Discover different types of product decisions
		MARKETING MANAGEMENT	CO4	Exposure on various types of pricing decisions
			CO5	Equip with the strategies of distribution and promotion
			CO6	Discover the rising growth of digital marketing and it tools
	8Z213		CO1	Outline the Nature of Entrepreneurship
			CO2	Explore customer analysis and finding opportunities
			CO3	Discover and evaluate different business models and validation
		ENTREPRENEURSHIP AND DESIGN THINKING	CO4	Identify MVP using economic and financial analysis
			CO5	Discover the process and types of Innovation
			CO6	outline the process of design thinking

	8Z214		CO1	Acquire knowledge relating to operations research and areas of its application
			CO2	Gain knowledge relating to linear programming and its application
		QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS	CO3	Solve problems relating to transportation and assignment
			CO4	Acquire knowledge relating to decision theory and its applications
			CO5	Solve problems relating to game theory
			CO6	Solve problems relating to queuing theory
	8Z215	OPERATIONS MANAGEMENT	CO1	Inculcate knowledge on industry operations with respect to production
			CO2	Develop in-depth knowledge on optimum utilization of resources in Operations
			CO3	Outline the concepts of global procedures with respect to scheduling
			CO4	Summarize the importance of materials & stores management with respect to production
			CO5	Inculcate and enlighten on quality management techniques and create
			CO6	Explain the project management techniques
	8Z216		CO1	Acquire knowledge relating to Business and professional ethics
		BUSINESS ETHICS & CORPORATE	CO2	Outline Legal & environmental aspects of ethics
		GOVERNANCE	CO3	Outline the ethical practices in Business Management
			CO4	Acquire knowledge relating to corporate governance
			CO5	Gain exposure in code of

				corporate governance
			CO6	Explore and gain knowledge relating to legal position of IPR
	8Z217		CO1	Gain exposure on Drivers of globalization WTO and its implications
			CO2	Outline the international trade theory
		INTERNATIONAL BUSINESS	CO3	Acquire knowledge on entering in international business strategy and management
		CO4	Equipping with global marketing strategies and R & D	
			CO5	Outline the concept of financial management in international business
			CO6	Enlighten in the area of FDI and its importance in India
	8Z218		CO1	Identify the need for Quality Management in a business organization.
		CO2	Develop proficiency in various quality control techniques and methods to ensure customer satisfaction	
		TOTAL QUALITY MANAGEMENT	CO3	Acquire knowledge on TQM methodologies and benchmarking
			CO4	Discover the cost of quality and the role of business process reengineering
			CO5	Apply the principles of TQM in service sector
			CO6	Examine the need for ISO standards and their benefits
II-I(A22)	8Z321		CO1	Explain the key concepts and process of Strategic management.
		STRATEGIC MANAGEMENT	CO2	Analyze different models and techniques of strategic formulation
			CO3	Outline various levels of strategic analysis and different types of strategies

			CO4	Evaluate the relationship between strategy, organization structure, leadership, organizational values in a global perspective
			CO5	Explore strategies for operational zing and institutionalizing strategy
			CO6	Assess strategic performance and control mechanisms
	8Z322		CO1	Acquire the knowledge relating to Management accounting and cost analysis
			CO2	Prepare students to analyze cost sheet
			CO3	Acquire knowledge regarding Marginal costing
		COST MANAGEMENT ACCOUNTING	CO4	Apply knowledge of marginal costing to solve business problems
			CO5	Appraise about budget preparation and budgetary control.
			CO6	Know about standard costing and its application
	8Z323		CO1	Explain the nature of contract and the essential elements of contract
		LEGAL AND ECONOMIC ENVIRONMENT OF BUSINESS	CO2	understanding Indian companies act
			CO3	Identify and understand the utility of different negotiable instruments alongside sales goods act and Central Excise act,
			CO4	Analyze the implications of business environment using the appropriate methods
			CO5	Infer and interpret the components of balance of payments and the recent trends
			CO6	Discover the WTO its

			structure and functions in governing and administering policy decisions
8Z324		CO1	Acquire knowledge relating to operations research and areas of its application
		CO2	Gain knowledge relating to linear programming and its application
	QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS	CO3	Solve problems relating to transportation and assignment
		CO4	Acquire knowledge relating to decision theory and its applications
		CO5	Solve problems relating to game theory
		CO6	Solve problems relating to queuing theory
8Z325		CO1	Acquire knowledge relating to investments and about securities market
	SECURITY ANALYSIS AND	CO2	Analyze investments based on fundamentals and calculate intrinsic value
	PORTFOLIO MANAGEMENT	CO3	Analyze and value the bond
		CO4	Understand equity valuation models
		CO5	Acquire knowledge relating to Portfolio management
		CO6	Evaluate Portfolio performance and revision
8Z326		CO1	Identify the basic concepts of consumer behavior
		CO2	Explore the process of formation of consumer attitude, learning and perception
	CONSUMER BEHAVIOUR	CO3	Examine the environmental influences on consumer behavior
		CO4	Examine the consumer decision making
		CO5	Analyze the consumer behavior models

			Identify the need of
		CO6	studying consumer
			protection laws
8Z327			Identify the basic concepts
		CO1	of performance
			management
			Examine the process of
		CO2	employee appraisal and
			feedback mechanism
			Analyzing the methods of
		CO3	performance appraisal and
	PERFORMANCE MANAGEMENT AND	005	understanding
	COUNSELING		benchmarking
	COUNSEEMVO	CO4	Apply the performance
		04	metrics and models
		COS	Outline the counseling
		COS	process
			Analyze the relation
		CO6	between counseling and
			performance management
8Z328			Identify and understand the
	CO1 CO2	CO1	need of preparing business
			plan and feasibility
			Create a marketing plan for
		appropriate launch of the	
			business in the market
		CO3	Infer and acquire the
	BUSINESS PLAN PREPARATION AND		knowledge pertaining to
	MODELS IN ENTREPRENEURSHIP		production and operations
			Identify the importance of
		CO4	social entrepreneurship
			Create business models and
		CO5	lean canvas models
			Analyze the business
		CO6	conditions in selection of
			business structure
8Z329		CO1	Understand the structure of
		COI	financial system
			Identify various banking
	FINANCIAL INSTITUTIONS, MARKETS ANDSERVICES	CO2	institutions and their
			policies
		CO3	Exploring the NBFC and
			their functions
		CO4	Understand the financial
			and securities market
		CO5	Outline the asset and fund

			based financial services
		CO6	Learn the investment and
0.5.0.0		000	merchant banking
8Z330		~ ~ .	Explore the basic concepts
		COI	related to services
		~ ~ ~ ~	marketing
		CO2	evaluate service quality
		CO3	Create a Service Design
	SERVICES MARKETING		develop blueprint and
		CO4	decide on appropriate
			pricing
		CO5	Identify the various
			distribution
		CO6	Identify various promotion
07221			of services
8Z331			Outline the concept of
		CO1	implementation in
			argenizations
		-	Inspect the Training peeds
		CO2	and developing the Training
		002	process
		-	Build Training designs and
	TRAINING AND DEVELOPMENT	CO3	Explain various methods of
		000	Training
		GOA	Explain the Measuring of a
		CO4	training program
		COS	Explain various areas of
		COS	organizational training
			Examine the Strategic
		CO6	training
8Z332		CO1	Explore the various business
			models
			Identify the resources in
		CO2	helping in the formation of a
			A polyzo the leap stortup
	STARTUP MANAGEMENT AND	CO3	mathad
	SUSTAINABILITY	-	Explore growth strategies
		CO4	Explore growin sudiegies
			Identify the various startup
		CO5	sustainable strategies
		COG	Identify startup sustainable
			strategies
8Z333	STRATEGIC INVESTMENT AND	CO1	Identify and understand the

	FINANCING DECISIONS		different means of
			investment and
			disinvestment
			Assessing the risk
		CO2	components by applying the
			capital budgeting techniques
		<i></i>	Assessing the risk related to
		CO3	investment decisions
			Examining the critical
		CO4	analysis of project appraisal
			techniques
			Exploring investment
		CO5	decisions under capital
			constraints
		a o c	Asses and understand the
		CO6	management of risk
8Z334		GOI	Identify the basic concepts
		COI	of Retailing Management
		CO2	Analyze the consumer
			behavior in retailing malls
			and their experiences
		~ ~ ~ ~	Create value through
		CO3	various formats of Retailing
			Evaluate the linkages
	RETAILING MANAGEMENT	CO4	between supply chain
			management and Retailing
			Explore the various types of
		CO5	retail layouts and
			arrangement of merchandize
			Identify the role of
		CO6	technology and FDI in
			Retailing
8Z335			Acquire the process of
		CO1	Managing strategic change
			process
		<u> </u>	Implement the change and
		002	assessing the results thereof
		<u> </u>	Identify methods of change
		003	management
	LEADERSHIP AND CHANGE	CO4	Acquire the theories of
	MANAGEMENT	CO4	leadership
		COS	Examine the leadership
		COS	transformation process
			Explore and analyze the
		COL	traits required for
			development of good
			leadership

	87336			Explore the various business
02	02550		COL	models helping in the
			COI	formation of a startun
				Analyzing the process of
			$CO^2$	starting an enterprise and its
			002	environment
		CO1Explore the models help formation of Analyzing the starting an end environmentCO2Analyzing the starting an end environmentCO3Analyze the method andCO3Explore the model opportunities and develop startupCO4Infer the imp sustainability principles of Identify the sustainable sCO6Identify the sustainable sCO6Identify the sustainable sCO1Infer the imp sustainability principles of Identify the sustainable sCO3Identify the sustainable sCO4Understandin proportionsCO5Explore the s and compound computationCO6Understandin proportionsCO7Explore the s and compound computationCO6Acquire the business inte evolutionCO3Analyze the business ana relations wit decision maleCO3Acquire the business ana relations wit decision male	Analyze the lean startup	
		TECHNOLOGY FOR	CO3	method and its limitations
		ENTREPRENEURSHIP AND		Explore the various
		INTELLECTUAL PROPERTY RIGHTS	CO4	opportunities for the growth
			0.04	and development of a
				startup
				Infer the importance of
			CO5	sustainability and guiding
				principles of sustainability
			CO6	Identify the various startup
	07220			Sustainable strategies
	02330		COL	and direction sense test and
			COI	puzzle test
			CO2	Learn data sufficiency and
				venn diagrams
			<b>G</b> 00	Understanding HCF and
		QUANTITATIVE APTITUDE AND	CO3	LCM
		LOGICAL REASONING	CO4	Understand ratios and
			04	proportions
				Explore the simple interest
			CO5	and compound interest
				computation
			CO6	Understanding area of plane
TT TT 0-	87/20			A against he concent of
$11-11 \propto$	02439		COL	Acquire the concept of
1122			COI	evolution
				Analyze the significance of
				business analytics and its
			CO2	relations with organization
				decision making methods
				Acquire the knowledge
		BUSINESS ANALYTICS	CO3	related to data warehousing
				and its architecture
				Outline the importance of
			CO4	data mining and its
				applications
			C05	Analyze the descriptive
				models through R software
			CO6	Make use of big data in

			measuring the business	
			performance	
 0.7.4.0				
8Z440		CO1	Understanding the	
			fundamentals of derivatives	
		CO2	Learn Futures and Forward	
			Markets	
	MANAGEMENT OF DEPIVATIVES	CO3	between options and futures	
	WAIVAOLIVILITI OF DERIVATIVES	CO4	Learn basic option strategies	
			Understand commodity	
		CO5	market derivatives	
		COG	Explore on swaps and credit	
		000	risk	
8Z441		CO1	Learn the basic product	
			concepts	
		CO2	Explore the strategies of	
			Product Positioning	
		CO3	Packaging and support	
PRODUCT AND BRAND	005	service		
	MANAGEMENT	<u> </u>	Understanding Brands and	
		CO4	its significance	
		CO5	Exploring the concept of	
		005	Brand Awareness	
		CO6	Understanding Brand	
 07440			Equity	
8Z442		CO1	of industrial relations and	
		COI	trade union act 1926	
		~~•	Exploring the framework of	
		CO2	collective bargaining	
		CO2	Learn the labor legislation	
	MANAGEMENT OF INDUSTRIAL	005	and factories act 1948	
	RELATIONS		Understand the labor	
		CO4	legislation and wage	
			regulation	
		COS	Learn employee	
		COS	of work life	
			Exploring the contemporary	
		CO6	issues in industrial relations	
8Z443			Explore the various avenues	
		CO1	of entrepreneurial financing	
	ENTREPRENEURIAL		sources and types of	
	FINANCE		entrepreneurship	
		CO2	Explain and outline methods	
				and principles of financial
--	----------------------------------------------	-------------------------------------	----------------------	-------------------------------
				forecasting
			CO3	Develop and create a
				financial model with
				reference to certain
				Evoluction of new business
			CO4	Evaluation of new business
			04	valuation techniques
				Assess and measure the
			CO5	current condition of venture
				and identify future financial
				needs
			-	Identify different methods
			CO6	of harvesting from venture
				financing
	8Z444		CO1	Understanding the structure
				of behavioral finance
				Learning the history of
			CO2	behavioral finance and
				the assot allocation process
		BEHAVIORAL FINANCE	CO3	Identify the investor biases
			05	Learning different types of
			CO4	Investor biases
			CO5	Exploring the different
				types of bias and diagnosis
				testing
			CO6	Exploring the concept of
				neuroeconomics
	8Z445 CUSTOMER RELATIONSHIP MANAGEMENT	CUSTOMER RELATIONSHIP MANAGEMENT	CO1	Exploring the process of
				CRM
			CO2	Learning the application of
				Exploring the need of selec
			CO3	force automation
				Understanding the concept
			CO4	of analytical CRM
			CO5	Learning the CRM
				implementation
				Understand the process
		CO6	Managing customer	
				relationships.
	8Z446			Outline the Evolution and
	TALENT AND KNOWLEDGE MANAGEMENT	CO1	importance of Talent	
		MANAGEMENT		Management
			CO2	Relate Talent management

			1	
				and employee engagement
			CO3	Explain the role of HR to
			005	Talent management
			CO4	Explain the concept and
				types of Knowledge
				management
			COS	Summarize the Knowledge
			COS	management framework
			COG	Analyze the implementation
			00	of Knowledge management
	8Z447			Identify the reasons of
			CO1	understanding the
				entrepreneurial marketing
			CO2	Identify business
				opportunities methods of
				understanding customer
				problems
			CO3	Develop a communication
				strategy to reach the
				appropriate target audience
				Analyze the Cost,
		ENIREPRENEURIAL MARKEIING	CO4	production cost to reach a
				minimum viable product
				through corresponding
				revenue analysis
				Explore the various
			CO5	alternatives available for a
				proper distribution network
				Identify the need of
			maintaining customer	
			CO6	relationship using the
				relevant methods
	8Z448			Identify the nature and
		INTERNATIONAL FINANCIAL	CO1	scope of International
				Financial Management and
				its recent trends in the
				growth of the Indian
	INTERNATIONAL FINANCIAL MANAGEMENT			economy
			CO2	Examine the application of
				exchange rate system by
		MANAGENIENI		following FEDAI
				regulations and role of RRI
			CO3	Provide awareness on the
				utility of currency
				derivatives and their impact
				on cash management
				Identify the immediate of
			LU4	identify the importance of

			1	
				hedging as a risk management tool in foreign
				currency payables.
			CO5	Know the benefits of
				Interest Rate Parity and
				Purchasing Power Parity in
				Examine the capital
			CO6	structure of International
			000	Financial Management
	8Z449			Identify the various trends
			CO1	in digital marketing
				strategies
			CO2	Evaluate the appropriate
				means of digital marketing
				channel
				Explore the various
	DIGITAL MARKETING		CO3	sustomers and retain the
		DIGITAL MARKETING		customers
			CO4	Create digital marketing
				plan to execute the
				marketing objectives
			CO5 CO6	Analyze the search engine
				optimization and online
				advertising
				Infer the strength of social
				marketing
	8Z450			Outline HRD mechanisms
			CO1	processes and interventions
				and understand the
				significant role played by
				HRD professionals
			CO2	Design HRD programs and
				evaluate the effectiveness of
				designed HRD programs
		Organizational Development	CO3	trends and applications
			CO4	Explain insights on concepts
				of Organizational
				development and role of top
				management in defining OD
			CO5	Develop intense knowledge
				related to various
				organizational interventions
			CO6	Analyze the interface

				between HRD and OD
	8Z451		CO1	Explore the forms of social entrepreneurship and basic traits of social entrepreneurship
			CO2	Identify different types and forms of social entrepreneurship
		SOCIAL ENTREPRENEURSHIP	CO3	Create new business ventures and considering acquisition and franchising
			CO4	Discover the importance of sustainable development and its factors
			CO5	Analyze critical factors for new venture development
			CO6	Analyze and monitor the challenges of social entrepreneurship