

CRITERION 2 - TEACHING LEARNING AND EVALUATION

Key Indicator 2.6 - Students Performance and Learning Outcomes

Metric No 2.6.1. Programme and course outcomes offered by the institution are stated and displayed on website and communicated to teachers and students.

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NPR

COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

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DEPARTMENT OF CIVIL ENGINEERING

Course Code & Title:

As per Anna University Regulation 2017, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S/N	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER – I			
1.	C101	HS8151	COMMUNICATIVE ENGLISH
2.	C102	MA8151	ENGINEERING MATHEMATICS–I
3.	C103	PH8151	ENGINEERING PHYSICS
4.	C104	CY8151	ENGINEERING CHEMISTRY
5.	C105	GE8151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6.	C106	GE8152	ENGINEERING GRAPHICS
7.	C107	GE8161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8.	C108	BS8161	PHYSICS AND CHEMISTRY LABORATORY
SEMESTER – II			
9.	C109	HS8251	TECHNICAL ENGLISH
10.	C110	MA8251	ENGINEERING MATHEMATICS – II
11.	C111	PH8201	PHYSICS FOR CIVIL ENGINEERING
12.	C112	BE8251	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
13.	C113	GE8291	ENVIRONMENTAL SCIENCE AND ENGINEERING
14.	C114	GE8292	ENGINEERING MECHANICS
15.	C115	GE8261	ENGINEERING PRACTICES LABORATORY
16.	C116	CE8211	COMPUTER AIDED BUILDING DRAWING
SEMESTER – III			
17.	C201	MA8353	TRANSFORMS AND PARTIAL DIFFERENTIAL

			EQUATIONS
18.	C202	CE8301	STRENGTH OF MATERIALS I
19.	C203	CE8302	FLUID MECHANICS
20.	C204	CE8351	SURVEYING
21.	C205	CE8391	CONSTRUCTION MATERIALS
22.	C206	CE8392	ENGINEERING GEOLOGY
23.	C207	CE8311	CONSTRUCTION MATERIALS LABORATORY
24.	C208	CE8361	SURVEYING LABORATORY
25.	C209	HS8381	INTERPERSONAL SKILLS / LISTENING AND SPEAKING
SEMESTER – IV			
26.	C210	MA8491	NUMERICAL METHODS
27.	C211	CE8401	CONSTRUCTION TECHNIQUES AND PRACTICES
28.	C212	CE8402	STRENGTH OF MATERIALS II
29.	C213	CE8403	APPLIED HYDRAULIC ENGINEERING
30.	C214	CE8404	CONCRETE TECHNOLOGY
31.	C215	CE8491	SOIL MECHANICS
32.	C216	CE8481	STRENGTH OF MATERIALS LABORATORY
33.	C217	CE8461	HYDRAULIC ENGINEERING LABORATORY
34.	C218	HS8461	ADVANCED READING AND WRITING
SEMESTER – V			
35.	C301	CE8501	DESIGN OF REINFORCED CEMENT CONCRETE ELEMENTS
36.	C302	CE8502	STRUCTURAL ANALYSIS - I
37.	C303	EN8491	WATER SUPPLY ENGINEERING
38.	C304	CE8591	FOUNDATION ENGINEERING
39.	C305	GI8013	ADVANCED SURVEYING
40.	C306	GI8013	ENVIRONMENT AND AGRICULTURE
41.	C307	CE8511	SOIL MECHANICS LABORATORY
42.	C308	CE8512	WATER AND WASTE

43.	C309	CE8513	SURVEY CAMP (2 WEEKS –DURING IV SEMESTER)
SEMESTER – VI			
44.	C310	CE8601	DESIGN OF STEEL STRUCTURAL ELEMENTS
45.	C311	CE8602	STRUCTURAL ANALYSIS II
46.	C312	CE8603	IRRIGATION ENGINEERING
47.	C313	CE8604	HIGHWAY ENGINEERING
48.	C314	EN8592	WASTE WATER ENGINEERING
49.	C315	CE8611	HIGHWAY ENGINEERING LABORATORY
50.	C316	CE8612	IRRIGATION AND ENVIRONMENTAL ENGINEERING DRAWING
51.	C317	HS8581	PROFESSIONAL COMMUNICATION
SEMESTER – VII			
52.	C401	CE8701	ESTIMATION, COSTING AND VALUATION ENGINEERING
53.	C402	CE8702	RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING
54.	C403	CE8703	STRUCTURAL DESIGN AND DRAWING
55.	C404	EN8591	MUNICIPAL SOLID WASTE MANAGEMENT
56.	C405	CE8711	CREATIVE AND INNOVATIVE PROJECT (ACTIVITY BASED – SUBJECT RELATED)
57.	C406	CE8712	INDUSTRIAL TRAINING (4 WEEKS DURING VI SEMESTER – SUMMER)
SEMESTER – VIII			
58.	58	C407	ENVIRONMENTAL ENGINEERING
59.	59	C408	MAINTENANCE, REPAIR AND REHABILITATION OF STRUCTURES
60.	60	C409	PROJECT WORK

Course Outcomes with K-Level Mapping for all Courses (Regulation 2017)

SEMESTER 1

Course Code & Name: C101 & HS8151 – Communicative English		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Enhance their reading and technical writing skills in the first year itself	K2
C101.2	Comfortably read and understand articles in science and Engineering journals and articles in dailies	K2
C101.3	Get themselves involved in an active manner during informal conversations, state opinions and express willingness	K3
C101.4	Communicate effectively in short conversations and talks uttered in English	K4
C101.5	Draft essays related to their subjects and write personal letters and emails in comfortable manner for lifelong learning	K4

Course Code & Name: C102 & MA8151 - Engineering Mathematics-I		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Analyze and apply the Engineering knowledge in differentiation to solve maxima and minima problems.	K4
C102.2	Solve the problems of integrals using different methods of calculus.	K5
C102.3	Design and develop the problems of integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K6
C102.4	Analyze the problems of integrals by using various methods of integration, such as substitution, partial fractions and integration by parts.	K4
C102.5	Apply various tools in solving the differential equations to recognize the need for life-long learning.	K3

Course Code & Name: C103 & PH8151 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Analyse the problems in columns and beams and gain the engineering knowledge in properties of matter to formulate.	K4
C103.2	Understand the fundamental concepts and applications of waves, lasers and fiber optics to give theoretical approaches to design modern devices.	K2
C103.3	Interpret the knowledge in thermal properties of materials and can determine expansion joints and heat exchangers in devices.	K3
C103.4	Understand the fundamental concepts of quantum theory and how modern electron microscope techniques use it to make predictions in the field of physics.	K2
C103.5	Appreciate the behavior of solids, describe the fundamentals of crystals, their structures, and the various crystal development processes.	K2

Course Code & Name: C104 & CY8151 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Apply the water treatment techniques water in the industries and domestic water Using the latest techniques by using engineering knowledge.	K3
C104.2	Select the adsorption methods used in the field of water and air pollution Purification to assess societal, health, safety, and cultural issues in the environmental.	K2
C104.3	Explain the significance of alloying and the behavior of one component and two component systems using phase diagram and apply appropriate techniques in the field of metallurgy.	K2
C104.4	Discuss the types of fuels, calorific value calculations, and analyze the need for alternative fuels to solve current social problems by using engineering techniques.	K4
C104.5	Review the principles and generation of energy in batteries, nuclear reactors, solar cells, windmills and fuel cells with appropriate consideration for the societal and environmental considerations.	K2

Course Code & Name: C105 & GE8151 Problem Solving and Python Programming

	CO Statements	Knowledge Level
The students should be able to		
C105.1	Express the concepts of computational thinking and algorithmic problem-solving techniques.	K2
C105.2	Develop simple python programs for applying the concepts of data types, expressions, and python statements.	K3
C105.3	Develop Python programs for solving real-time computational problems by using conditionals, looping, functions, and strings.	K3
C105.4	Explain the concepts of compound data using Python lists, tuples and dictionaries.	K2
C105.5	Develop python programs for solving computational problems by using modules, files and python packages.	K3

Course Code and Name: C106 & GE8152 Engineering Graphics

	CO Statements	Knowledge Level
The students should be able to		
C106.1	Sketch the conic sections, special curves, and draw orthographic views from pictorial views and models.	K4
C106.2	Apply the principles of orthographic projections of points in all quadrants, lines, and planes in first quadrant.	K3
C106.3	Sketch the projections of simple solids like prisms, pyramids, cylinder, and cone and obtain the traces of plane figures.	K4
C106.4	Practice the sectional views of solids like cube, prisms, pyramids, cylinders & Cones and extend its lateral surfaces.	K3
C106.5	Sketch the perspective projection of simple solids, truncated prisms, pyramids, Cone and cylinders and sketch the isometric projection of simple machine parts.	K4

Course Code and Name: C107 & GE8161 Problem Solving and Python Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C107.1	Develop simple python programs for applying the concepts of data types, expressions, and python statements.	K3
C107.2	Develop Python programs using conditionals, looping, functions, and strings for solving real-time computational problems.	K3
C107.3	Explain the concepts of compound data using Python lists, tuples and dictionaries.	K2
C107.4	Develop python programs for solving problems by using modules, files, and python packages.	K3
C107.5	Utilize Python packages for developing real-world software applications.	K6

Course Code and Name: C108 & BS8161 Physics and Chemistry Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C108.1	Manipulate the fundamental concepts like torque, elasticity and bending moment of beams for various engineering applications by the determination of rigidity modulus of the wire and young's modulus of the material of the beam by non- Uniform bending.	K3
C108.2	Practice the fundamentals of thermal properties of material of the bad conductor By Lee's disc method.	K3
C108.3	Apply the basic knowledge and estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer.	K2
C108.4	Dramatize the strength of an acid using pH meter and conductometer for applications in the field of engineering.	K3
C108.5	Experimenting the estimation of total, permanent and temporary hardness of water for our environment.	K3

Course Code and Name: C109 & HS8251 Technical English		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	Read and write their technical and area-specific texts in an effortless manner.	K3
C109.2	Listen comfortably and respond confidently to lectures and talks pertaining to their domain skills.	K2
C109.3	Speak in an appropriate manner in both formal and informal situations for lifelong learning.	K3
C109.4	Create CVs and draft Job applications in confident manner.	K6
C109.5	Communicate confidently by using all the four skills with their peers and in real life situations.	K4

Course Code and Name: C110 & MA8251 Engineering Mathematics - II		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	Analyze the different types of matrices for solving practical problems.	K4
C110.2	Apply Gradient, divergence and curl of a vector point function and relate different entities in engineering field.	K3
C110.3	Acquire the knowledge to solve the engineering problems in analytic functions.	K2
C110.4	Analyze and apply the different methods to solve complex integration problems.	K4
C110.5	Create and manage the projects after applying and analyzing the fundamentals of Laplace transforms.	K6

Course Code and Name: C111 & PH8201 - Physics for Civil Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Analyze the thermal performance of buildings.	K2
C111.2	Acquire knowledge on the acoustic properties of buildings.	K3
C111.3	Understand the various lighting design of buildings.	K2
C111.4	Knowledge on the properties and performance of engineering materials	K3
C111.5	Understand the Hazards of buildings.	K2

Course Code and Name: C112 & BE8251 - Basic Electrical and Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Understand the electrical circuit and their working principles	K2
C112.2	Identify the electrical components of a machines and their applications	K3
C112.3	Explain the characteristics of the electrical machines	K2
C112.4	Identify the digital electronics circuits and their components	K2
C112.5	Explain the fundamentals of communication systems	K2

Course Code and Name: C113 & GE8291 Environmental Science and Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Apply the finding and implementing scientific, technological, economic, and political solutions to environmental problems with appropriate consideration for the public health and safety, and the cultural, societal, and environmental Considerations.	K3
C113.2	Comment the impact of the professional engineering solutions in societal and environmental contexts for the importance of public participation in conservation of natural resources.	K2
C113.3	Discuss the types of natural energy sources and analyze the need for alternative fuels to solve current social problems by using engineering techniques.	K2
C113.4	Describe the concepts from unsustainable to sustainable development and urban problems related to energy, water conservation, rainwater harvesting.	K2
C113.5	Apply the basics of information technology in environment and human health function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	K3

Course Code and Name: C114 & GE8292 Engineering Mechanics		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Illustrate the vector and scalar representation of forces and moments.	K3
C114.2	Analyze the rigid body in equilibrium.	K4
C114.3	Evaluate the properties of surfaces and solids.	K5
C114.4	Calculate dynamic forces exerted in rigid body.	K3
C114.5	Determine the friction and the effects by the laws of friction.	K3

Course Code and Name: C115 & GE8261 Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Construct Electrical and Electronic circuits.	K6
C115.2	Examine different types of electronic circuits and components.	K3
C115.3	Recognize electrical safety rules, grounding, general house wiring.	K6
C115.4	Explore soldering practices.	K3
C115.1	Construct Electrical and Electronic circuits.	K3

Course Code and Name: C116 & CE8211 - Computer Aided Building Drawing Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Draft the plan, elevation and sectional views of the buildings, using computer soft wares	K3
C116.2	Draft the plan, elevation and sectional views of the industrial structures using computer soft wares	K3
C116.3	Draft the plan, elevation and sectional views of the framed buildings using computer soft wares	K3

SEMESTER 3

Course Code and Name: C201 & MA8353 Transforms and Partial Differential Equations		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Solve the given standard partial differential equations.	K3
C201.2	Identify and analyze the differential equations using Fourier series analysis in engineering applications.	K4
C201.3	Apply modern techniques of Fourier series to solve one - and two-dimensional heat flow problems and one-dimensional wave equations	K3
C201.4	Apply the engineering knowledge to manage the projects in transforms and partial differential equations to formulate and solve some of the physical engineering.	K3
C201.5	Use the effective modern mathematical tools to solve the partial differential equations by using Z transform techniques for discrete time systems.	K3

Course Code and Name: C202 & CE8301 - Strength of Materials I		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Understand the concepts of stress and strain, principal stresses and principal planes.	K2
C202.2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.	K4
C202.3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.	K4
C202.4	Apply basic equation of torsion in design of circular shafts and helical springs.	K3
C202.5	Analyze the pin jointed plane and space trusses	K4

Course Code and Name: C203 & CE8302 - Fluid Mechanics		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.	K2
C203.2	Understand and solve the problems related to equation of motion.	K3
C203.3	Gain knowledge about dimensional and model analysis.	K3
C203.4	Learn types of flow and losses of flow in pipes.	K2
C203.5	Understand and solve the boundary layer problems.	K3

Course Code and Name: C204 & CE8351 - Surveying		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	The use of various surveying instruments and mapping	K2
C204.2	Measuring Horizontal angle and vertical angle using different instruments	K3
C204.3	Methods of Leveling and setting Levels with different instruments	K2
C204.4	Understand the Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth.	K3
C204.5	Understand the Concept and principle of modern surveying.	K2

Course Code and Name: C205 & CE8391 Construction Materials		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Compare the properties of most common and advanced building materials.	K2
C205.2	Understand the typical and potential applications of lime, cement and aggregates	K2
C205.3	Know the production of concrete and also the method of placing and making of concrete elements.	K2
C205.4	Understand the applications of timbers and other materials	K2
C205.5	Understand the importance of modern material for construction.	K2

Course Code and Name: C206 & GE8392- Engineering Geology		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Explain the importance of geology and compare the geological features with engineering importance.	K2
C206.2	Explain about the types of various minerals.	K2
C206.3	Apply knowledge regarding the underline rock formation to get complete idea about igneous, sedimentary and metamorphic rock	K2
C206.4	Explain about fault, folds, unconformity and joints which are present in the strata of the earth crust, by which they can able to compare the particular area with their construction site or engineering projects.	K2
C206.5	Apply knowledge related with the dams, tunnels, bridges and reservoir with the help of these they can be able to apply their knowledge for making of their engineering projects	K2

Course Code and Name: C207 & CE8311- Construction Materials Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C207.1	The students will have the required knowledge in the area of testing of construction materials	K4
C207.2	The students will have the required knowledge in components of construction elements experimentally.	K4
C207.3	The students will have the required knowledge in the area of testing of concrete	K4

Course Code and Name: C208 & CE8361 - Survey Lab

	CO Statements	Knowledge Level
The students should be able to		
C208.1	Acquired practical knowledge on handling basic survey instruments including Theodolite, Tacheometry.	K4
C208.2	Acquired practical knowledge on handling basic survey instruments including Total Station and GPS	K4
C208.3	Knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and Location of site etc.	K4

Course Code and Name: C209 & HS8381 Interpersonal Skills/Listening & Speaking		
	CO Statements	Knowledge Level
The students should be able to		
C209.1	Speak effectively on various academic topics and respond to questions.	K2
C209.2	Converse effectively with the use of conversation starters and discourse markers.	K6
C209.3	Listen and respond to various academic dialogues and discussions	K2
C209.4	Participate confidently and appropriately in informal and formal conversations and group discussions.	K6
C209.5	Use a range of presentation tools like PPT, Videos, and Charts etc. to make an engaging presentation.	K6

SEMESTER 4

Course Code and Name: C210 & MA8491 - Numerical Methods		
	CO Statements	Knowledge Level
The students should be able to		
C210.1	Determine the solution of algebraic and transcendental system of linear equations	K3
C210.2	To interpolate the values of unknown functions using Newton's Formula	K3
C210.3	Estimate the numerical values of the derivatives and integrals of unknown function.	K3
C210.4	Solve first and second order initial value problem	K3
C210.5	Solve Numerically boundary value problem	K3

Course Code and Name: CE8401- Construction Techniques, Equipments & Practices

	CO Statements	Knowledge Level
The students should be able to		
C211.1	Explain the different construction techniques and structural systems	K2
C211.2	Understand various techniques and practices on masonry construction, flooring, and roofing.	K2
C211.3	Plan the requirements for substructure construction.	K3
C211.4	Choose the methods and techniques required for the construction of various types of super structures	K3
C211.5	Select , maintain and operate hand and power tools and equipment used in the building construction sites	K3

Course Code and Name: Ce8402 Strength of Materials II

	CO Statements	Knowledge Level
The students should be able to		
C212.1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.	K4
C212.2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.	K4
C212.3	Examine the load carrying capacity of columns and stresses induced in columns and cylinders.	K4
C212.4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure	K4
C212.5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams	K3

Course Code and Name: C213 & CE8403 Applied Hydraulic Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Apply their knowledge of fluid mechanics in addressing problems in open channels.	K3
C213.2	Solve problems in uniform, gradually varied flows in steady state conditions.	K3
C213.3	Solve problems in uniform, rapidly varied flows in steady state conditions.	K3
C213.4	Understand the principles, working and application of turbines.	K3
C213.5	Understand the principles, working and application of pumps.	K3

Course Code and Name: C214 & CE8404 Concrete Technology		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	Summarize the various requirements of cement, aggregates and water for making concrete	K2
C214.2	Illustrate the effect of admixtures on properties of concrete	K2
C214.3	Understand The concept and procedure of mix design as per IS method	K2
C214.4	Outline the properties of concrete at fresh and hardened state	K2
C214.5	Explain the importance and application of special concretes.	K2

Course Code and Name: C215 & CE8491 Soil Mechanics		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	Classify the soil and assess the engineering properties, based on index properties.	K2
C215.2	Understand the stress concepts in soils	K2
C215.3	Understand and identify the settlement in soils.	K2
C215.4	Determine the shear strength of soil	K3
C215.5	Analyze both finite and infinite slopes	K4

Course Code and Name: C216 & CE8481 Strength of Materials Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Analyze the various stresses on mild steel rod by conducting tension and torsion tests	K4
C216.2	Identify deflection test of metals and carriage springs	K3
C216.3	Test for compression strength of wood and helical springs	K4
C216.4	Compare hardness and impact strength of different metals	K4

Course Code and Name: C217 & CE8461 Applied Hydraulic Engineering Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C217.1	Identify the flow in pipes	K4
C217.2	Examine the frictional losses in pipes	K4
C217.3	Develop characteristics of pumps	K3
C217.4	Develop characteristics of turbines	K3

Course Code and Name: C218 & HS8461 Advanced Reading and Writing Lab

	CO Statements	Knowledge Level
The students should be able to		
C218.1	Strengthen the reading skills	K2
C218.2	Enhance the technical writing skills	K3
C218.3	Develop proposal writing skills	K6
C218.4	Write winning job applications.	K2

SEMESTER 5

Course Code and Name: C301 & CE8501 Design of Reinforced Concrete Structures

	CO Statements	Knowledge Level
The students should be able to		
C301.1	Understand the various design methodologies for the design of RC elements.	K3
C301.2	Analyze and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.	K4
C301.3	Analyze and design the various types of slabs and staircase by limit state method.	K4
C301.4	Analyze and design columns for axial, uniaxial and biaxial eccentric loadings.	K4
C301.5	Analyze and design of footing by limit state method.	K4

Course Code and Name: C302 & CE8502 Structural Analysis I

	CO Statements	Knowledge Level
The students should be able to		
C302.1	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method	K3
C302.2	Analyze the continuous beams and rigid frames by slope deflection method.	K3
C302.3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.	K3
C302.4	Analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.	K3
C302.5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.	K3

Course Code and Name: C303 & EN8491 Water Supply Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C303.1	Understand an insight into the structure of drinking water supply systems, including water transport, treatment and distribution	K2
C303.2	Learn about intake structure, pipe materials ,pumps	K2
C303.3	Gain knowledge in various unit operations and processes in water treatment,	K3
C303.4	Design the various functional units in water treatment(primary treatment)	K2
C303.5	Gain knowledge in various unit operations and processes in water treatment,	K3

Course Code and Name: C304 & CE8591 Foundation Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	Design the various functional units in water treatment(secondary treatment)	K2
C304.2	Understand about the water distribution system and analyse the pipe network	K3
C304.3	Design shallow footings.	K3
C304.4	Determine the load carrying capacity, settlement of pile foundation.	K3
C304.5	Determine the earth pressure on retaining walls and analysis for stability.	K3

Course Code and Name: C306 & GI8013 Advanced Surveying		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Know the astronomical surveying concepts & Various Problems.	K3
C305.2	Understand the concept of photogrammetric surveying and interpretation	K2
C305.3	Solve the field problems with Total station	K2
C305.4	Know the GPS surveying and the data processing	K2
C305.5	Design the route surveys and tunnel alignments	K3

Course Code and Name: C307 & OAI551 Environment and Agriculture		
	CO Statements	Knowledge Level
The students should be able to		
C306.1	Understand the environmental concerns in agriculture	K2
C306.2	Understand the environmental impacts in modernized agriculture	K2
C306.3	Understand the climate change and water scarcity problems in our environment	K2
C306.4	Understand the Genetically modified crops, Ecological diversity in our environment	K2
C306.5	Understand the emerging issues in global environmental concerns and alternate culture system	K2

Course Code and Name: C308 & CE8511 Soil Mechanics Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C307.1	Conduct tests to determine both the index and engineering properties of soils	K4
C307.2	Interpreting the shear strength of all types of soils by conducting lab tests	K4
C307.3	Conduct tests to determine characterize the soil based on their properties.	K4

Course Code and Name: C309 & CE8513 Survey Camp

	CO Statements	Knowledge Level
The students should be able to		
C309.1	Applying the concepts of surveying	K3
C309.2	Applying the practical experience of the realities in the field of Surveying	K3
C309.3	Applying the concepts complexities involved in the field of Surveying	K3

SEMESTER 6

Course Code and Name: C310 & CE8601 Design of Steel Structural Elements

	CO Statements	Knowledge Level
The students should be able to		
C310.1	Understand the concepts of various design philosophies	K2
C310.2	Design common bolted and welded connections for steel structures	K3
C310.3	Design tension members and understand the effect of shear lag.	K3
C310.4	Understand the design concept of axially loaded columns and column base connections.	K3
C310.5	Understand specific problems related to the design of laterally restrained and unrestrained steel beams	K3

Course Code and Name: C311 & CE8602 Structural Analysis - II

	CO Statements	Knowledge Level
The students should be able to		
C311.1	Draw influence lines for statically determinate structures and calculate critical stress resultants.	K3
C311.2	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.	K3
C311.3	Analyze of three hinged, two hinged and fixed arches.	K4
C311.4	Analyze the suspension bridges with stiffening girders	K4
C311.5	Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.	K3

Course Code and Name: C311 & CE8602 Structural Analysis - II		
	CO Statements	Knowledge Level
The students should be able to		
C311.1	Draw influence lines for statically determinate structures and calculate critical stress resultants.	K3
C311.2	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.	K3
C311.3	Analyze of three hinged, two hinged and fixed arches.	K4
C311.4	Analyze the suspension bridges with stiffening girders	K4
C311.5	Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.	K3

Course Code and Name: C312 & CE8603 Irrigation Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C312.1	Understand the knowledge and skills on crop water requirements.	K2
C312.2	Understand the methods and management of irrigation.	K2
C312.3	Gain knowledge on types of Impounding structures	K2
C312.4	Understand methods of irrigation including canal irrigation.	K2
C312.5	Get knowledge on water management on optimization of water use.	K2

Course Code and Name: C313 & CE8604 Highway Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C313.1	Understand the planning and aligning of highway.	K2
C313.2	Understand the Geometric design of highways	K3
C313.3	Understand the Design flexible and rigid pavements.	K3
C313.4	Gain the knowledge on Highway construction materials, properties, testing methods	K2
C313.5	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.	K2

Course Code and Name: C314 & EN8592 Waste Water Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Estimate sewage generation and design sewer system including sewage pumping stations, the characteristics and composition of sewage, self-purification of streams	K3
C314.2	perform basic design of the unit operations and processes - primary treatment of sewage that are used in sewage treatment	K3
C314.3	perform basic design of the unit operations and processed- secondary treatment of sewage that are used in sewage treatment	K3
C314.4	Understand the standard methods for disposal of sewage	K2
C314.5	Gain knowledge on sludge treatment and disposal.	K2

Course Code and Name: C315 & CE8611 Highway Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C315.1	Identification of the techniques to characterize various pavement materials through relevant tests.	K4
C315.2	Testing techniques and characteristics of aggregate and bituminous materials	K4

Course Code and Name: C316 & CE8612 Irrigation And Environmental Drawing Lab		
	CO Statements	Knowledge Level
The students should be able to		
C316.1	Design and draw various units of Municipal water treatment plants	K4
C316.2	Design and draw various types of a dam structures.	K4
C316.3	Design and draw various units of sewage treatment plants.	K4

Course Code and Name: C317 & HS8581 Professional Communication		
	CO Statements	Knowledge Level
The students should be able to		
C317.1	Summarize various skills such as Soft Skills, Hard skills, employability and career Skills and demonstrate values such as Time Management and general awareness of current affairs.	K2
C317.2	Demonstrate oneself before the audience by making effective presentations on introducing oneself, answering questions and visual presenting.	K3
C317.3	Demonstrate oneself by participating in group discussions, brainstorming sessions and question sessions. Develop activities to improve GD Skills	K6
C317.4	Develop interview skills so as to be successful in them.	K6
C317.5	Develop adequate Soft Skills required for the workplace and long-term career.	K6

SEMESTER 7

Course Code And Name: C401 & CE8701 Estimation, Costing and Valuation Engineering

	CO Statements	Knowledge Level
The students should be able to		
C401.1	Estimate the quantities for buildings,	K3
C401.2	Rate Analysis for all Building works, canals, and Roads and Cost Estimate.	K3
C401.3	Understand types of specifications, principles for report preparation, tender notices types.	K2
C401.4	Gain knowledge on types of contracts	K2
C401.5	Evaluate valuation for building and land.	K3

Course Code and Name: C402 & CE8702 Railway Airport, Docks and Harbour Engineering

	CO Statements	Knowledge Level
The students should be able to		
C402.1	Understand the methods of route alignment and design elements in Railway Planning and Constructions.	K2
C402.2	Understand the Construction techniques and Maintenance of Track laying and Railway stations.	K2
C402.3	Gain an insight on the planning and site selection of Airport Planning and design.	K3
C402.4	Analyze and design the elements for orientation of runways and passenger facility systems.	K3
C402.5	Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.	K2

Course Code and Name: C403 & CE8703 Structural Design and Drawing		
	CO Statements	Knowledge Level
The students should be able to		
C403.1	Design and draw reinforced concrete Cantilever and Counter fort Retaining Walls	K3
C403.2	Design and draw flat slab as per code provisions	K3
C403.3	Design and draw reinforced concrete and steel bridges	K3
C403.4	Design and draw reinforced concrete and steel water tanks	K3
C403.5	Design and detail the various steel trusses and cantry girders	K3

Course Code and Name: C404 & EN8591 Municipal Solid Waste Management		
	CO Statements	Knowledge Level
The students should be able to		
C404.1	Understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.	K2
C404.2	Reduction , reuse and recycling of waste.	K2
C404.3	Plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.	K2
C404.4	Gain knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.	K2
C404.5	Design and operation of sanitary landfill.	K2

Course Code and Name: C405.1 & CE8711 - Creative and Innovative Project		
	CO Statements	Knowledge Level
The students should be able to		
C405.1	Solve various design problems related to Civil Engineering while designing the structures.	C405.1
C405.2	Solve various design problems related to industrial and residential structures	C405.2
C405.3	Solve various design problems related to commercial structures.	C405.3

Course Code and Name: C406 & CE8712 Industrial Training		
	CO Statements	Knowledge Level
The students should be able to		
C406.1	Analyse any challenging practical problems related to civil engineering	K4
C406.2	Solve the problem from its identification and through literature reviews	K4
C406.3	Prepare project reports, presentations and to face interviews.	K3
C406.4	Develop different solution by formulating proper methodology	K5
C406.5	Synthesis and simulation of mechanism using MATLAB software.	K4

SEMESTER 8

Course Code and Name: C407 & ME8781 CE8018 Geo-Environmental Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C407.1	Assess the contamination in the soil	K3
C407.2	Understand the current practice of waste disposal	K2
C407.3	Prepare the suitable disposal system for particular waste.	K2
C407.4	Stabilize the waste and utilization of solid waste for soil improvement.	K2
C407.5	Select suitable remediation methods based on contamination	K3

Course Code and Name: C408 & CE8020 Maintenance, Repair And Rehabilitation Of Structures		
	CO Statements	Knowledge Level
The students should be able to		
C408.1	Understand the importance of maintenance and assessment method of distressed structures.	K2
C408.2	Understand the strength and durability properties, their effects due to climate and temperature.	K2
C408.3	Understand recent development in concrete	K2
C408.4	Understand the techniques for repair and protection methods	K2
C408.5	Understand repair, rehabilitation and retrofitting of structures and demolition methods	K2

Course Code and Name: C409 & CE8811 Project Work		
	CO Statements	Knowledge Level
The students should be able to		
C409.1	Analyse any challenging practical problems related to civil engineering	K4
C409.2	Solve the problem from its identification and through literature reviews	K4
C409.3	Prepare project reports, presentations and to face interviews.	K3
C409.4	Develop different solution by formulating proper methodology	K5

Course Code and Name: C410 & MG8591 Principles of Management		
	CO Statements	Knowledge Level
The students should be able to		
C409.1	Explain the purpose of management, roles and skills of Manager in local and global organization.	K2
C409.2	Describe the purpose of planning, decision making and their processes.	K2
C409.3	Demonstrate the various organizational structures and staff selection procedure.	K2
C409.4	Classify the motivational theories and communication process	K2
C409.5	Describe the scope of control and role of computer, IT in management control.	K2

Course Code and Name: C411 & IE8693 Production Planning and Control

	CO Statements	Knowledge Level
The students should be able to		
C410.1	Enumerate the activities involved in the production planning and control function.	K2
C410.2	Explain the significance and applications of work study techniques.	K2
C410.3	Describe the process planning activities with reference to production control.	K2
C410.4	Discuss the concepts of production scheduling.	K2
C410.5	Explain different types of costs in inventory system.	K2

Course Code and Name: C412 & ME8811 Project Work

	CO Statements	Knowledge Level
The students should be able to		
C411.1	Formulate a real-world problem, identify the requirement and develop the design solutions.	K3
C411.2	Identify technical ideas, strategies, and methodologies.	K3
C411.3	Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.	K3
C411.4	Test and validate through conformance of the developed prototype and analysis the cost effectiveness.	K4
C411.5	Prepare technical report and oral presentations	K3

DEPARTMENT OF CIVIL ENGINEERING

Course Code & Title:

As per Anna University Regulation 2021, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

1. List of Courses

S/N	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER-I			
1.	C101	HS3152	PROFESSIONAL ENGLISH-I
2.	C102	MA3151	MATRICES AND CALCULUS
3.	C103	PH3151	ENGINEERING PHYSICS
4.	C104	CY3151	ENGINEERING CHEMISTRY
5.	C105	GE3151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6.	C106	GE3171	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
7.	C107	BS3171	PHYSICS AND CHEMISTRY LABORATORY
8.	C108	GE3172	ENGLISH LABORATORY
SEMESTER-II			
9.	C109	HS3252	PROFESSIONAL ENGLISH- II
10.	C110	MA3251	STATISTICS AND NUMERICAL METHODS
11.	C111	PH3201	PHYSICS FOR CIVIL ENGINEERING
12.	C112	BE3252	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING
13.	C113	E3251	ENGINEERING GRAPHICS
14.	C114	GE3271	ENGINEERING PRACTICES LABORATORY
15.	C115	BE3272	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY
16.	C116	GE3272	COMMUNICATION LABORATORY/ FOREIGN LANGUAGE

SEMESTER-III			
17.	C201	MA3351	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS
18.	C202	ME3351	ENGINEERING MECHANICS
19.	C203	CE3301	FLUID MECHANICS
20.	C204	CE3302	CONSTRUCTION MATERIALS AND TECHNOLOGY
21.	C205	CE3303	WATER SUPPLY AND WASTE WATER ENGINEERING
22.	C206	CE3351	SURVEYING AND LEVELING
23.	C207	CE3361	SURVEYING AND LEVELING LABORATORY
24.	C208	CE3311	WATER AND WASTE WATER ANALYSIS LABORATORY
25.	C209	GE3361	PROFESSIONAL DEVELOPMENT
SEMESTER-IV			
26.	C210	CE3401	APPLIED HYDRAULICS ENGINEERING
27.	C211	CE3402	STRENGTH OF MATERIALS
28.	C212	CE3403	CONCRETE TECHNOLOGY
29.	C213	CE3404	SOIL MECHANICS
30.	C214	CE3405	HIGHWAY AND RAILWAY ENGINEERING
31.	C215	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
32.	C216	CE3411	HYDRAULIC ENGINEERING LABORATORY
33.	C217	CE3412	MATERIALS TESTING LABORATORY
34.	C218	CE3413	SOIL MECHANICS LABORATORY
SEMESTER-V			
35.	C301	CE3501	DESIGN OF REINFORCED CONCRETE STRUCTURAL ELEMENTS
36.	C302	CE3502	STRUCTURAL ANALYSIS I
37.	C303	CE3503	FOUNDATION ENGINEERING
38.	C304	CE3005	REHABILITATION / HERITAGE RESTORATION

39.	C305	CE3022	REMOTE SENSING CONCEPTS
40.	C306	CE3030	PAVEMENT ENGINEERING
41.	C307	MX3084	DISASTER RISK REDUCTION AND MANAGEMENT
42.	C308	CE3511	HIGHWAY ENGINEERING LABORATORY
43.	C309	CE3512	SURVEY CAMP (2 WEEKS)
SEMESTER-VI			
44.	C310	CE3601	DESIGN OF STEEL STRUCTURAL ELEMENTS
45.	C311	CE3602	STRUCTURAL ANALYSIS II
46.	C312	AG3601	ENGINEERING GEOLOGY
47.	C313	CE3003	PREFABRICATED STRUCTURES
48.	C314	CE3015	GEO ENVIRONMENTAL ENGINEERING
49.	C315	GI3491	CARTOGRAPHY AND GIS
50.	C316	OCS352	IOT CONCEPTS AND APPLICATIONS
51.	C317	MX3089	INDUSTRIAL SAFETY
52.	C318	CE3611	BUILDING DRAWING AND DETAILING LABORATORY

2. Course Outcomes

Course Outcomes with K-Level Mapping for all Courses (Regulation 2021)

Course Code & Name: C101 & HS3152 Professional English I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	To use appropriate words in a professional context	K2
C101.2	To gain understanding of basic grammatical structures and use them in right context.	K2
C101.3	To read and infer the denotative and connotative meanings of technical texts	K3
C101.4	To read and interpret information presented in tables, charts and other graphic forms	K4
C101.5	To write definitions, descriptions, narrations and essays on various topics	K4

Course Code & Name: C102 & MA3151 Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K4
C102.2	Apply differential calculus tools in solving various application problems.	K5
C102.3	Able to use differential calculus ideas on several variable functions.	K6
C102.4	Apply different methods of integration in solving practical problems.	K4
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3

Course Code & Name: C103 & PH3151 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Understand the importance of mechanics.	K4
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K3
C103.4	Understand the importance of quantum physics.	K2
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K2

Course Code & Name: C104 & CY3151 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K3
C104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K2
C104.3	To apply the knowledge of phase rule and composites for material selection requirements.	K2
C104.4	To recommend suitable fuels for engineering processes and applications.	K4
C104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K2

Course Code & Name: C105 & GE3151 Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K2
C105.2	Develop and execute simple Python programs.	K3
C105.3	Write simple Python programs using conditionals and looping for solving problems.	K3
C105.4	Decompose a Python program in to functions.	K2
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.	K3

Course Code and Name: C107 & GE3171 Problem Solving and Python Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Develop algorithmic solutions to simple computational problems	K3
C106.2	Develop and execute simple Python programs.	K3
C106.3	Implement programs in Python using conditionals and loops for solving problems.	K2
C106.4	Deploy functions to decompose a Python program.	K3
C106.5	Process compound data using Python data structures.	K6

Course Code and Name: C108 & BS3171 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Understand the functioning of various physics laboratory equipment.	K3
C107.2	Use graphical models to analyze laboratory data.	K3
C107.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K2
C107.4	Access , process and analyze scientific information.	K3
C107.5	Solve problems individually and collaboratively.	K3

Course Code and Name: C108 & GE3172 English Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	To listen to and comprehend general as well as complex academic information	K3
C108.2	To listen to and understand different points of view in a discussion	K3
C108.3	To speak fluently and accurately informal and informal communicative contexts	K2
C108.4	To describe products and processes and explain their uses and purposes clearly and accurately	K3
C108.5	To express their opinions effectively in both formal and informal discussions	K3

Course Code and Name: C109 & HS3252 Professional English II		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	To compare and contrast products and ideas in technical texts.	K3
C109.2	To identify and report cause and effects in events, industrial processes through technical texts	K2
C109.3	To analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K3
C109.4	To present their ideas and opinions in a planned and logical manner	K6
C109.5	To draft effective resumes in the context of job search.	K4

Course Code and Name: C110 & MA3251 Statistics and Numerical Methods		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K4
C110.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C110.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K2
C110.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K4
C110.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K6

Course Code and Name: C111 & PH3201 Physics for Civil Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Acquire knowledge about heat transfer through different materials, thermal performance of building and thermal insulation.	K2
C111.2	Gain knowledge on the ventilation and air conditioning of buildings	K3
C111.3	Understand the concepts of sound absorption, noise insulation and lighting designs	K2
C111.4	Now about the processing and applications of composites, metallic glasses, shape memory alloys and ceramics	K3
C111.5	Get an awareness on natural disasters such as earth quake, cyclone, fire and safety measures	K2

Course Code and Name: C112 & BE3252 - Basic Electrical, Electronics and Instrumentation Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Compute the electric circuit parameters for simple problems	K2
C112.2	Explain the concepts of domestics wiring and protective devices	K3
C112.3	Explain the working principle and applications of electrical machines	K2
C112.4	Analyze the characteristics of analog electronic devices	K2
C112.5	Explain the types and operating principles of sensors and transducers	K2

Course Code and Name: C113 & GE3251 Engineering Graphics

	CO Statements	Knowledge Level
The students should be able to		
C113.1	Use BIS conventions and specifications for engineering drawing.	K3
C113.2	Construct the conic curves, involutes and cycloid.	K2
C113.3	Solve practical problems involving projection of lines.	K2
C113.4	Draw the orthographic, isometric and perspective projections of simple solids.	K2
C113.5	Draw the development of simple solids.	K3

Course Code and Name: C114 & GE3272 Communication Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C114.1	Speak effectively in group discussions held in a-formal /semi-formal context.	K3
C114.2	Discuss , analyze and present concepts and problems from various perspectives to arrive at suitable solutions	K4
C114.3	Write emails, letters and effective job applications.	K5
C114.4	Write critical reports to convey data and information with clarity and precision	K3
C114.5	Give appropriate instructions and recommendations for safe execution of tasks	K3

Course Code and Name: C115 & GE3271 Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K6
C115.2	Wire various electrical joints in common household electrical wire work.	K3
C115.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K6
C115.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB	K3

Course Code and Name: C116 & BE3272 Basic Electrical, Electronics and Instrumentation Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Use experimental methods to verify the Ohm's law and Kirchhoff's Law and to measure three phase power	K3
C116.2	Analyze experimentally the load characteristics of electrical machines	K3
C116.3	Analyze the characteristics of basic electronic devices	K3
C116.4	Use LVDT to measure displacement	K4

Course Code and Name: C201 & MA3351 Transforms and Partial Differential Equations		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Understand how to solve the given standard partial differential equations.	K3
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	K4
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	K3
C201.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	K3
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.	K3

Course Code and Name: C202 & ME3351 Engineering Mechanics		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Illustrate the vectorial and scalar representation of forces and moments	K2
C202.2	Analyze the rigid body in equilibrium	K4
C202.3	Evaluate the properties of distributed forces	K4
C202.4	Determine the friction and the effects by the laws of friction	K3
C202.5	Calculate dynamic forces exerted in rigid body	K4

Course Code and Name: C203 & CE3301 - Fluid Mechanics		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Demonstrate the difference between solid and fluid, its properties and behavior in static conditions.	K2
C203.2	Apply the conservational laws applicable to fluids and its application through fluid kinematics and dynamics.	K3
C203.3	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.	K3
C203.4	Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.	K2
C203.5	Explain the concept of boundary layer and its application to find the drag force exerted by the fluid on the flat solid surface.	K3

Course Code and Name: C204 & CE3302 Construction Materials and Technology		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Identify the good quality brick, stone and blocks for construction.	K2
C204.2	Recognize the market forms of timber, steel, aluminum and applications of various composite materials	K3
C204.3	Identify the best construction and service practices such as thermal insulations and air conditioning of the building	K2
C204.4	Select various equipment for construction works conditioning of building	K3
C204.5	Understand the construction planning and scheduling techniques	K2

Course Code and Name: C205 & CE3303 Water Supply and Waste Water Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission	K2
C205.2	Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations	K2
C205.3	Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and biological treatment process	K2
C205.4	Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods.	K2
C205.5	Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage	K2

Course Code and Name: C206 & CE3351 Surveying and Levelling		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Introduce the rudiments of various surveying and its principles	K2
C206.2	Imparts knowledge in computation of levels of terrain and ground features	K2
C206.3	Imparts concepts of The odolite Surveying for complex surveying operations	K2
C206.4	Understand the procedure for establishing horizontal and vertical control	K2
C206.5	Imparts the knowledge on modern surveying instruments	K2

Course Code and Name: C207 & CE3361 Surveying and Levelling Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C207.1	Impart knowledge on the usage of basic surveying instruments like chain/tape, compass and levelling instruments	K4
C207.2	Able to use levelling instrument for surveying operations	K4
C207.3	Able to use the odolite for various surveying operations	K4
C207.4	Able to carry out necessary surveys for social infrastructures	
C207.5	Able to prepare plan metric maps	

Course Code and Name: C208 & CE3311 Water and Waste Water Analysis Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C208.1	Calibrate and standardize the equipment	K4
C208.2	Collect proper sample for analysis	K4
C208.3	To know the sample preservation methods	K4
C208.4	To perform field oriented testing of water, wastewater	
C208.5	To perform coli form analysis	

Course Code and Name: C209 & GE3361 Professional Development

	CO Statements	Knowledge Level
The students should be able to		
C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements	K2
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding	K6
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K2

Course Code and Name: C210 & CE3401 Applied Hydraulics Engineering

	CO Statements	Knowledge Level
The students should be able to		
C210.1	Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application	K3
C210.2	Analyze steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades.	K3
C210.3	Derive the relationship among these quant depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges.	K3
C210.4	CO4 Design turbines and explain the working principle	K3
C210.5	CO5 Differentiate pumps and explains the working principle with characteristic curves and design centrifugal and reciprocating pumps.	K3

Course Code and Name: C211 & CE3402 Strength of Materials		
	CO Statements	Knowledge Level
The students should be able to		
C211.1	Understand the concepts of stress and strain, principal stresses and principal planes.	K2
C211.2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.	K2
C211.3	Calculate the deflection of beams by different method and selection of method for determining slope or deflection.	K3
C211.4	Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.	K3
C211.5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure	K3

Course Code and Name: C212 & CE3403 Concrete Technology		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	Understand the requirements of cement, aggregates and water for concrete	K4
C212.2	Select suitable admixtures for enhancing the properties of concrete	K4
C212.3	Design concrete mixes as per IS method of mix design	K4
C212.4	Determine the properties of concrete at fresh and hardened state.	K4
C212.5	Know the importance of special concretes for specific requirements	K3

Course Code and Name: C213 & CE3404 Soil Mechanics		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems	K3
C213.2	Show the basic understanding of flow through soil medium and its impact of engineering solution	K3
C213.3	Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation	K3
C213.4	Show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear strength of soils.	K3
C213.5	Demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications.	K3

Course Code and Name: C214 & CE3405 Highway and Railway Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	Plan a highway according to the principles and standards adopted in various institutions in India.	K2
C214.2	Design the geometric features of road network and components of pavement.	K2
C214.3	Test the highway materials and construction practice methods and know its properties and able to perform pavement evaluation and management.	K2
C214.4	Understand the methods of route alignment and design elements in railway planning and constructions	K2
C214.5	Understand the construction techniques and maintenance of track laying and railway stations	K2

Course Code and Name: C215 & GE3451 Environmental Sciences and Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
C215.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
C215.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K2
C215.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K3
C215.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K4

Course Code and Name: C216 & CE3411 Hydraulic Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Apply Bernoulli equation for calibration of flow measuring devices	K4
C216.2	Measure friction factor in pipes and compare with Moody diagram	K3
C216.3	Determine the performance characteristics of rotodynamic pumps.	K4
C216.4	Determine the performance characteristics of positive displacement pumps.	K4
C216.5	Determine the performance characteristics of turbines.	

Course Code and Name: C217 & CE3412 Materials Testing Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C217.1	Determine the mechanical properties of steel.	K4
C217.2	Determine the physical properties of cement	K4
C217.3	Determine the physical properties of fine and coarse aggregate	K3
C217.4	Determine the work ability and compressive strength of concrete.	K3
C217.5	Determine the strength of brick and wood.	

Course Code and Name: C218 & CE3413 Soil Mechanics Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C218.1	Conduct tests to determine the index properties of soils	K2
C218.2	Determine the insitu density and compaction characteristics	K3
C218.3	Conduct tests to determine the compressibility, permeability and shear strength of soils	K6
C218.4	Understand the various tests on Geo synthetics	

Course Code and Name: CE3501 Design of Reinforced Concrete Structural Elements		
	CO Statements	Knowledge Level
The students should be able to		
C301.1	The students will be able to understand the various design concepts and design the RC rectangular beams by working stress and limit state methods.	K3
C301.2	The students will be able to analyze and design the flanged beam, design for shear, bending and torsion.	K4
C301.3	The students will be able to analyze and design the RC slab, staircase by limit state method.	K4
C301.4	The students will be able to analyze and design the RC column for axial, uniaxial and bi-axial bending by limit state method.	K4
C301.5	The students will be able to analyze and design the wall footing, isolated footing and combined footing by limit state method.	K4

Course Code and Name: C302 & CE3502 Structural Analysis I		
	CO Statements	Knowledge Level
The students should be able to		
C302.1	Students will be able to analyze the pin-jointed plane and space frames.	K4
C302.2	Students will be able to analyze the continuous beams and rigid frames by slope deflection method.	K4
C302.3	Students will be able to understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.	K4
C302.4	Students will be able to analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.	K4
C302.5	Students will be able to understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.	K4

Course Code and Name: C303 & CE3503 Foundation Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C303.1	The students will be able to demonstrate an ability to plan and execute a detailed site investigation to select type of foundation and design parameters.	K2
C303.2	The students will be able to design shallow foundations and compute the bearing capacity of soils.	K3
C303.3	The students will be able to design combined footings and raft foundations as per the needs and specifications.	K3
C303.4	The student will be able to demonstrate and ability to design pile foundations, its component as per the needs and specifications.	K3
C303.5	The students will be able to design retaining walls, its component or process as per the needs and specifications.	K3

Course Code and Name: C304 & CE3005 Rehabilitation / Heritage Restoration		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	The students will be able to know the importance of inspection and maintenance.	K3
C304.2	The students will be able to study the impacts of cracks, corrosion and climate on structures.	K3
C304.3	The students will be able to understand about various special concretes.	K2
C304.4	The students will be able to understand the testing techniques and various protection measures.	K2
C304.5	The students will be able to know the repair of structures and restoration of heritage structure.	K3

Course Code and Name: C306 & CE3022 Remote Sensing Concepts		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Understand and remember the basic concepts, definitions and laws related to remote sensing.	K2
C305.2	Illustrate energy interaction with atmosphere and object on earth surface.	K2
C305.3	Acquire knowledge of sensor characteristics of various RS system.	K2
C305.4	Understand functioning, data acquisition and orbit operations of missions.	K2
C305.5	Obtain knowledge of different missions and analyze their utility.	K2

Course Code and Name: C307 & CE3030 Pavement Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C306.1	Students will able to comprehend the material specifications and types of pavements.	K3
C306.2	Students will able to understand the guidelines and design of flexible pavements as per IRC-37.	K4
C306.3	Students will able to design the rigid pavement as per the guidelines of IRC-58.	K4
C306.4	Students will able acquire knowledge about the construction and maintenance of flexible and rigid pavements.	K3
C306.5	Students will able comprehend the concept of strengthening of existing pavements, testing and field control of pavements.	K4

Course Code and Name: C307 & MX3084 Disaster Risk Reduction and Management		
	CO Statements	Knowledge Level
The students should be able to		
C307.1	Understand the concepts of Disaster, Vulnerability & Disaster Risk Reduction.	K2
C307.2	Enhance understanding on hazards, Vulnerability and Disaster Risk Assessment prevention & risk reduction	K2
C307.3	Develop disaster response skills by adopting relevant tools and technology.	K2
C307.4	Enhance awareness of institutional process for Disaster response in the country.	K2
C307.5	Develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live with due sensitivity.	K2

Course Code and Name: C308 & CE3511 Highway Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C308.1	Students will able to characterize the pavement aggregate through relevant test.	K3
C308.2	Students will able to as certain the Quality of Bitumen.	K4
C308.3	Students will able to determine the Optimum Binder Content Using Marshall Method.	K3
C308.4	Students will able to evaluate the consistency and properties of bitumen.	K4
C308.5	Students will able to determine the bitumen content in the bituminous mixes.	K4

Course Code and Name: C309 & CE3512 Survey Camp		
	CO Statements	Knowledge Level
The students should be able to		
C309.1	Handle modern surveying instruments like Total Station and GPS.	K3
C309.2	Apply modern surveying techniques in field to establish horizontal control.	K3
C309.3	Understand the surveying techniques in field to establish vertical control.	K3
C309.4	Apply different survey adjustment techniques.	K3
C309.5	Carry out different setting out works in the field.	K5

Course Code and Name: C310 & CE3601 Design of Steel Structural Elements		
	CO Statements	Knowledge Level
The students should be able to		
C310.1	Understand the design philosophy behind steel structures, distinguish various failure modes in bolted and welded connections, and ascertain their respective design strengths.	K3
C310.2	Choose the optimal section shape and dimensions for tension and compression members as well as beams, adhering to specific design criteria.	K3
C310.3	Implement principles, procedures, and current code requirements in the analysis and design of steel tension members, columns, column bases, and beams.	K3
C310.4	Identify and calculate the design loads acting on industrial structures and gantry girders.	K3
C310.5	Determine the ultimate load-bearing capacity of steel beams and portal frames through the application of plastic analysis techniques.	K3

Course Code and Name: C311 & CE3602 Structural Analysis II

	CO Statements	Knowledge Level
The students should be able to		
C311.1	Students will be able to analyze the pin-jointed plane and space frames.	K4
C311.2	Students will be able to analyze the continuous beams and rigid frames by slope deflection method.	K4
C311.3	Students will be able to understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.	K4
C311.4	Students will be able to analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.	K4
C311.5	Students will be able to understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.	K4

Course Code and Name: C312 & AG3601 Engineering Geology

	CO Statements	Knowledge Level
The students should be able to		
C312.1	Knowing the internal structure of earth and its relation to earthquakes. Landforms created by various geological agents and their importance in civil engineering	K2
C312.2	Getting knowledge on various minerals and rocks that can be used as construction materials and road aggregates. In addition, testing the suitability of rocks for foundation purposes	K2
C312.3	Studying various geological structures and their impact in engineering constructions. Further, learning the geomechanical properties of rocks and their significance in engineering projects.	K2
C312.4	Gaining knowledge on the role of geological mapping, remote sensing and geophysics for surface and subsurface investigations. In addition, students will also gain knowledge on borehole logging techniques and their applications in civil engineering	K2
C312.5	Applying geological knowledge for designing and constructing major civil engineering structures, and also mitigating various geological hazards such as earthquakes, landslides and tsunamis.	K2

Course Code and Name: C313 & CE3003 Prefabricated Structures		
	CO Statements	Knowledge Level
The students should be able to		
C313.1	The students will be able to understand concepts about principles of prefabrication, production, transportation and erection.	K2
C313.2	The students will be able to explain the panel systems, slabs, beams, shear walls and columns used in precast construction.	K2
C313.3	The students will be able to interpret the design of cross-section, joint flexibility.	K2
C313.4	The students will be able to choose the appropriate joints and connections for precast construction.	K3
C313.5	The students will be able to apply the concept of structural stability in precast construction.	K3

Course Code and Name: C314 & CE3015 Geo environmental Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Understand the various causes and consequences of waste interaction with soil and their modification.	K2
C314.2	Understand the various mechanism of transport of contaminants into the subsurface and characterization of contaminated sites and their risk analysis.	K2
C314.3	Understand on how to decontaminate the site so as to reuse the site for human settlement	K2
C314.4	Understand how to safely dispose the waste through different containment process.	K2
C314.5	Expose on how to convert the waste into a resource material through soil waste stabilization techniques with or without chemical stabilization	K2

Course Code and Name: C315 & GI3491 Cartography and GIS		
	CO Statements	Knowledge Level
The students should be able to		
C315.1	Be familiar with appropriate map projection and co-ordinate system for production of Maps and shall able to compile and design maps for their required purpose.	K2
C315.2	Be familiar with co-ordinate and Datum transformations	K2
C315.3	Understand the basic concepts and components of GIS, the techniques used for storage of spatial data and data compression	K2
C315.4	Understand the concepts of spatial data quality and data standard	K2
C315.5	Understand the concept of spatial data inputs	K2

Course Code and Name: C316 & OCS352 IoT Concepts and Applications		
	CO Statements	Knowledge Level
The students should be able to		
C316.1	Explain the concept of IoT.	K2
C316.2	Understand the communication models and various protocols for IoT.	K2
C316.3	Design portable IoT using Arduino/Raspberry Pi /open platform.	K6
C316.4	Apply data analytics and use cloud offerings related to IoT.	K3
C316.5	Analyze applications of IoT in real-time scenarios.	K4

Course Code and Name: C317 & MX3089 Industrial Safety

	CO Statements	Knowledge Level
The students should be able to		
C317.1	Understand the basic concept of safety.	K2
C317.2	Obtain knowledge of Statutory Regulations and standards.	K2
C317.3	Know about the safety Activities of the Working Place.	K2
C317.4	Analyze on the impact of Occupational Exposures and their Remedies	K2
C317.5	Obtain knowledge of Risk Assessment Techniques.	K2

Course Code and Name: C317 & CE3611 Building Drawing and Detailing Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C318.1	The students will be able to draft the plan, elevation and sectional view of the load-bearing and framed buildings.	K6
C318.2	The students will be able to draw the structural detailing of RCC elements.	K6
C318.3	The students will be able to draw the structural detailing of RCC footings.	K6
C318.4	The students will be able to draw the structural detailing of steel structures.	K6
C318.5	The students will be able to draw building information modeling.	K6

DEPARTMENT OF CIVIL ENGINEERING

Course Code & Title:

As per Autonomous Regulation 2023, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S/ N.	COURSE CODE (NBA)	COURSE CODE (Autonomous)	TITLE OF THE COURSE
SEMESTER – I			
1.	C101	23HS101	PROFESSIONAL ENGLISH-I
2.	C102	23MA101	MATRICES AND CALCULUS
3.	C103	23PH101	ENGINEERING PHYSICS
4.	C104	23CY101	ENGINEERING CHEMISTRY
5.	C105	23GE102	PROBLEM SOLVING AND PYTHON PROGRAMMING
7.	C106	23GE111	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8.	C107	23BS111	PHYSICS AND CHEMISTRY LABORATORY
9.	C108	23GE112	ENGLISH LABORATORY - I
SEMESTER – II			
10.	C109	23HS201	PROFESSIONAL ENGLISH-II
11.	C110	23MA201	STATISTICS AND NUMERICAL METHODS
12.	C111	23PH204	MATERIALS SCIENCE AND TECHNOLOGY
13.	C112	23BE201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
14.	C113	23ME201	ENGINEERING MECHANICS
15.	C114	23GE202	ENGINEERING GRAPHICS
17.	C115	23GE211	ENGINEERING PRACTICES LABORATORY
18.	C116	23BE212	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY
19.	C117	23GE212	ENGLISH LABORATORY - II

Course Outcomes with K-Level Mapping for all Courses (Regulation 2023)

SEMESTER1

Course Code & Name: C101 & 23HS101 Professional English-I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	Gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	Read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	Write definitions, descriptions, narrations and essays on various topics.	K6
C101.5	Express their opinions effectively in both oral and written medium of communication.	K6

Course Code & Name: C102 & 23MA101 Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Able to use differential calculus ideas on several variable functions.	K3
C102.3	Apply integral calculus and multiple integral tools in solving various application problems.	K3
C102.4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	K2
C102.5	Apply various techniques in solving ordinary differential equations.	K3

Course Code & Name: C103 & 23PH101 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Infer the characteristics of laser for various Engineering applications and expand the understanding of optical fibers use in communications.	K2
C103.4	Apply quantum theory's sophisticated physics notions to the matter's characterization.	K3
C103.5	Know the fundamentals of crystal formations and growth methods.	K3

Course Code & Name: C104 & 23CY101 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Summarize the water related problems in boilers and their treatment techniques.	K1
C104.2	Discuss the applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.	K2
C104.3	Discuss the types, properties and applications of polymers and composites.	K3
C104.4	Summarize the fuels used for engineering processes and applications of fuels.	K2
C104.5	Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.	K3

Course Code & Name: C105 & 23GE102 Problem Solving and Python Programming

	CO Statements	Knowledge Level
The students should be able to		
C105.1	Understand the concepts of computational thinking and algorithmic problem-solving techniques.	K2
C105.2	Develop simple python programs for applying the concepts of data types, expressions, and python statements.	K3
C105.3	Develop Python programs for solving real-time computational problems by using conditionals, looping, functions, and strings.	K3
C105.4	Understand the concepts of compound data using Python lists, tuples, and dictionaries.	K2
C105.5	Develop python programs for solving computational problems by using modules, files, and python packages.	K3

Course Code and Name: C106 & 23GE111 Problem Solving and Python Programming Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C106.1	Develop simple python programs for applying the concepts of data types, expressions, and python statements.	K3
C106.2	Develop Python programs using conditionals, looping, functions, and strings for solving real-time computational problems.	K3
C106.3	Understand the concepts of compound data using Python lists, tuples, and dictionaries.	K2
C106.4	Develop python programs for solving problems by using modules, files, and python packages.	K3
C106.5	Utilize Python packages for developing real-world software applications.	K3

Course Code and Name: C107 & 23BS111 Physics and Chemistry Laboratory		
	(PHYSICS) CO Statements	Knowledge Level
The students should be able to		
C107.1	Apprehend the concepts of interference, diffraction of light and recognize the resonance concept of waves.	K2
C107.2	Apply the principles of operations of optical fibers, semiconductor using simple circuits and interaction of electromagnetic waves and crystalline solids.	K3
C107.3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
C107.4	Experiment the relationship between the light and matter & properties of liquids.	K4
C107.5	Estimate the thermal properties and thermal behavior of the material.	K2

Course Code and Name: C107 & 23BS111 Physics and Chemistry Laboratory		
	(CHEMISTRY) CO Statements	Knowledge Level
The students should be able to		
C107.1	Analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C107.2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	K3
C107.3	Analyze and determine the composition of alloys.	K4
C107.4	Learn simple method of synthesis of nanoparticles	K2
C107.5	Quantitatively analyze the impurities in solution by electro analytical methods.	K4

Course Code and Name: C108 & 23GE112 English Laboratory - I		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Listen to and comprehend general as well as complex academic information.	K2
C108.2	Listen to and understand different points of view in a discussion.	K2
C108.3	Speak fluently and accurately informal and informal communicative contexts.	K3
C108.4	Describe products and processes and explain their uses and purposes clearly and accurately.	K6
C108.5	Express their opinions effectively in both formal and informal discussions.	K6

SEMESTER2

Course Code and Name: C109 & 23HS201 Professional English-II		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	Compare and contrast products and ideas in technical texts and write analytical essays.	K2
C109.2	Identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C109.3	Analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	Present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C109.5	Draft effective resumes in the context of job application.	K6

Course Code and Name: C110 & 23MA201 Statistics and Numerical Methods		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C110.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C110.3	Apply the basic concepts and Techniques of solving algebraic and transcendental equations.	K3
C110.4	Understand the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K2
C110.5	Solve the ordinary differential equations with initial conditions by using certain techniques with engineering applications.	K4

Course Code and Name: C111 & 23PH204 Materials Science and Technology		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Inferring the fundamental knowledge in phase diagrams and explain its application in the field of materials science and engineering.	K2
C111.2	Interpret the fundamentals of the Fe-Fe ₃ C phase diagram, diverse microstructures, and alloys for engineering designs.	K2
C111.3	Understand the fundamental Civil properties of materials and their methods of measurement.	K2
C111.4	Gain knowledge on dielectric, super conducting and their properties.	K2
C111.5	Apply the suitable nanomaterials and shape memory alloys for specific engineering applications.	K3

Course Code and Name: C112 & 23BE201 Basic Electrical and Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Compute the electric circuit parameters for simple problems	K3
C112.2	Examine the working principle and applications of electrical machines	K2
C112.3	Illustrate the characteristics of analog electronic devices	K2
C112.4	Examine the basic concepts of digital electronics	K4
C112.5	Apply the concepts of principles of measuring instruments for real time applications	K2

Course Code and Name: C113 & 23ME201 Engineering Mechanics

	CO Statements	Knowledge Level
The students should be able to		
C113.1	Identify various force system in a plane.	K2
C113.2	Solve equilibrium of rigid bodies in two dimensions.	K3
C113.3	Calculate the centroid, areas and mass moment of inertia for surface and solids.	K3
C113.4	Apply the concept of dynamics for particle motions.	K3
C113.5	Determine the friction of elements and dynamics of rigid bodies.	K3

Course Code and Name: C114 & 23GE202 Engineering Graphics

	CO Statements	Knowledge Level
The students should be able to		
C114.1	Construct the conic curves, involutes and cycloid.	K3
C114.2	Solve practical problems involving projection of lines, points and plane surfaces	K3
C114.3	Draw orthographic projection of solids and freehand sketch of simple objects.	K3
C114.4	Draw the sectioning and development of simple solids.	K3
C114.5	Draw isometric and perspective projections of simple solids.	K3

Course Code and Name: C115 & 23GE211 Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K3
C115.2	Wire various electrical joints in common household electrical wire work.	K3
C115.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple Civil assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K3
C115.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K4

Course Code and Name: C116 & 23BE212 Basic Electrical and Electronics Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Perform the Verification of Ohm's and Kirchhoff's Laws for DC circuits.	K3
C116.2	Analyze experimentally the load characteristics of electrical machines	K4
C116.3	Analyze the characteristics of basic electronic devices	K4
C116.4	Demonstrate use of DSO to measure the various parameters	K3

Course Code and Name: C117 & 23GE212 & English Laboratory - II		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Speak effectively in group discussions held in a formal/semi formal context.	K6
C117.2	Discuss , analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C117.3	Make effective presentations in an attractive way using appropriate vocabulary.	K3
C117.4	Attend job interviews and be successful in them.	K6
C117.5	Develop adequate Soft Skills required for the workplace.	K3

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Code & Title:

As per Anna University Regulation 2017, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	HS8151	COMMUNICATIVE ENGLISH
2	C102	MA8151	ENGINEERING MATHEMATICS - I
3	C103	PH8151	ENGINEERING PHYSICS
4	C104	CY8151	ENGINEERING CHEMISTRY
5	C105	GE8151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6	C106	GE8152	ENGINEERING GRAPHICS
7	C107	GE8161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8	C108	BS8161	PHYSICS AND CHEMISTRY LABORATORY
SEMESTER - II			
10	C110	HS8251	TECHNICAL ENGLISH
11	C111	MA8251	ENGINEERING MATHEMATICS - II
12	C112	PH8252	PHYSICS FOR INFORMATION SCIENCE
13	C113	BE8255	BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING
14	C114	GE8291	ENVIRONMENTAL SCIENCE AND ENGINEERING
15	C115	CS8251	PROGRAMMING IN C
16	C116	GE8261	ENGINEERING PRACTICES LABORATORY
17	C117	CS8261	C PROGRAMMING LABORATORY

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - III			
18.	C201	MA8351	DISCRETE MATHEMATICS
19.	C202	CS8351	DIGITAL PRINCIPLES AND SYSTEM DESIGN
20.	C203	CS8391	DATA STRUCTURES
21.	C204	CS8392	OBJECT ORIENTED PROGRAMMING
22.	C205	EC8395	COMMUNICATION ENGINEERING
23.	C206	CS8381	DATA STRUCTURES LABORATORY
24.	C207	CS8383	OBJECT ORIENTED PROGRAMMING LABORATORY
25.	C208	CS8382	DIGITAL SYSTEMS LABORATORY
26.	C209	HS8381	INTERPERSONAL SKILLS/LISTENING & SPEAKING
SEMESTER - IV			
27.	C210	MA8402	PROBABILITY AND QUEUEING THEORY
28.	C211	CS8491	COMPUTER ARCHITECTURE
29.	C212	CS8492	DATABASE MANAGEMENT SYSTEMS
30.	C213	CS8451	DESIGN AND ANALYSIS OF ALGORITHMS
31.	C214	CS8493	OPERATING SYSTEMS
32.	C215	CS8494	SOFTWARE ENGINEERING
33.	C216	CS8481	DATABASE MANAGEMENT SYSTEMS LABORATORY
34.	C217	CS8461	OPERATING SYSTEMS LABORATORY
35.	C218	HS8461	ADVANCED READING AND WRITING

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - V			
36.	C301	MA8551	ALGEBRA AND NUMBER THEORY
37.	C302	CS8591	COMPUTER NETWORKS
38.	C303	EC8691	MICROPROCESSORS AND MICROCONTROLLERS
39.	C304	CS8501	THEORY OF COMPUTATION
40.	C305	CS8592	OBJECT ORIENTED ANALYSIS AND DESIGN
41.	C306	OMD553	TELEHEALTH TECHNOLOGY
42.	C307	EC8681	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY
43.	C308	CS8582	OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY
44.	C309	CS8581	NETWORKS LABORATORY
SEMESTER - VI			
45.	C310	CS8651	INTERNET PROGRAMMING
46.	C311	CS8691	ARTIFICIAL INTELLIGENCE
47.	C312	CS8601	MOBILE COMPUTING
48.	C313	CS8602	COMPILER DESIGN
49.	C314	CS8603	DISTRIBUTED SYSTEMS
50.	C315	IT8076	SOFTWARE TESTING
51.	C316	CS8661	INTERNET PROGRAMMING LABORATORY
52.	C317	CS8662	MOBILE APPLICATION DEVELOPMENT LABORATORY
53.	C318	CS8611	MINI PROJECT
54.	C319	HS8581	PROFESSIONAL COMMUNICATION

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - VII			
55.	C401	MG8591	PRINCIPLES OF MANAGEMENT
56.	C402	CS8792	CRYPTOGRAPHY AND NETWORK SECURITY
57.	C403	CS8791	CLOUD COMPUTING
58.	C404	GE8077	TOTAL QUALITY MANAGEMENT
59.	C405	CS8079	HUMAN COMPUTER INTERACTION
60.	C406	IT8761	SECURITY LABORATORY
61.	C407	CS8711	CLOUD COMPUTING LABORATORY
SEMESTER - VIII			
62.	C408	GE8076	PROFESSIONAL ETHICS IN ENGINEERING
63.	C409	CS8078	GREEN COMPUTING
64.	C410	CS8811	PROJECT WORK

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & HS8151 Communicative English		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Read articles of a general kind in magazines and newspapers.	K3
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.	K2
C101.3	Comprehend conversations and short talks delivered in English	K3
C101.4	Write short essays of a general kind and personal letters and emails in English.	K6

Course Code & Title: C102 & MA8151 Engineering Mathematics – I		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use both the limit definition and rules of differentiation to differentiate functions.	K3
C102.2	Apply differentiation to solve maxima and minima problems.	K3
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.	K3
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K2
C102.5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	K3
C102.6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.	K2
C102.7	Apply various techniques in solving differential equations.	K3

Course Code & Title: C103 &PH8151 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Understand the importance of mechanics	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K2
C103.4	Understand the importance of quantum physics.	K3
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K2

Course Code & Title: C104 &CY3151 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K1
C104.2	To identify and apply basic concepts of nano science and nanotechnology in designing the synthesis of nano materials for engineering and technology applications.	K2
C104.3	To apply the knowledge of phase rule and composites for material selection requirements.	K3
C104.4	To recommend suitable fuels for engineering processes and applications.	K2
C104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K3

Course Code & Title: C105 & GE3151 Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K2
C105.2	Develop and execute simple Python programs.	K3
C105.3	Write simple Python programs using conditionals and loops for solving problems.	K3
C105.4	Decompose a Python program into functions.	K3
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.	K3
C105.6	Read and write data from/to files in Python programs.	K3

Course Code & Title: C107&GE3171 Problem Solving and Python Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Develop algorithmic solutions to simple computational problems	K2
C107.2	Develop and execute simple Python programs.	K3
C107.3	Implement programs in Python using conditionals and loops for solving problems.	K3
C107.4	Deploy functions to decompose a Python program.	K4
C107.5	Process compound data using Python data structures.	K2
C107.6	Utilize Python packages in developing software applications.	K2

Course Code & Title: C108 & BS3171 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Understand the functioning of various physics laboratory equipment.	K2
C108.2	Use graphical models to analyze laboratory data.	K2
C108.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality	K3
C108.4	Access , process and analyze scientific information.	K6
C108.5	Solve problems individually and collaboratively.	K6

Course Code & Title: C109 & GE3172 English Laboratory - I		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	To listen to and comprehend general as well as complex academic information	K2
C109.2	To listen to and understand different points of view in a discussion	K2
C109.3	To speak fluently and accurately in formal and informal communicative contexts	K3
C109.4	To describe products and processes and explain their uses and purposes clearly and accurately	K6
C109.5	To express their opinions effectively in both formal and informal discussions	K6

SEMESTER 2

Course Code & Title: C110 & HS8251 Technical English		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.	K2
C110.2	Foster their ability to write convincing job applications and effective reports.	K6
C110.3	Develop their speaking skills to make technical presentations, participate in group discussions.	K4
C110.4	Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialization.	K6

Course Code & Title: C111 & MA8251 – Engineering Mathematics – II		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	K2
C111.2	Gradient , divergence and curl of a vector point function and related identities.	K3
C111.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.	K2
C111.4	Analytic functions, conformal mapping and complex integration.	K3
C111.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	K3

Course Code & Title: C112 & PH8252- Physics for Information Science		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Gain knowledge on classical and quantum electron theories, and energy band structures	K2
C112.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices,	K3
C112.3	Get knowledge on magnetic properties of materials and their applications in data storage,	K3
C112.4	Have the necessary understanding on the functioning of optical materials for optoelectronics	K2
C112.5	Understand the basics of quantum structures and their applications in carbon electronics.	K2

Course Code & Title: C113 & BE8255- Basic Electrical, Electronics and Measurement Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Discuss the essentials of electric circuits and analysis.	K3
C113.2	Discuss the basic operation of electric machines and transformers	K2
C113.3	Introduction of renewable sources and common domestic loads.	K2
C113.4	Introduction to measurement and metering for electric circuits.	K4

Course Code & Title: C114 & GE291 - Environmental Science and Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.	K1
C114.2	Public awareness of environmental is at infant stage.	K2
C114.3	Ignorance and incomplete knowledge has lead to misconceptions	K3
C114.4	Development and improvement in std. of living has lead to serious environmental disasters	K2

Course Code & Title: C115 & CS251 - Programming In C		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Develop simple applications in C using basic constructs	K2
C115.2	Design and implement applications using arrays and strings	K3
C115.3	Develop and implement applications in C using functions and pointers.	K3
C115.4	Develop applications in C using structures.	K3
C115.5	Design applications using sequential and random access file processing.	K4

Course Code & Title: C116 & GE8261 Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Fabricate carpentry components and pipe connections including plumbing works. Use welding equipments to join the structures. Carry out the basic machining operations Make the models using sheet metal works Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings Carry out basic home electrical works and appliances Measure the electrical quantities Elaborate on the components, gates, soldering practices.	K3

Course Code & Title: C117& CS8261 – C Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Develop C programs for simple applications making use of basic constructs, arrays and strings.	K2
C117.2	Develop C programs involving functions, recursion, pointers, and structures.	K3
C117.3	Design applications using sequential and random access file processing.	K3

SEMESTER 3

Course Code & Title: C201 & MA8351 Discrete Mathematics		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Have knowledge of the concepts needed to test the logic of a program.	K4
C201.2	Have an understanding in identifying structures on many levels.	K2
C201.3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	K2
C201.4	Be aware of the counting principles.	K3
C201.5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	K2

Course Code & Title: C202 & CS8351 Digital Principles and System Design		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Simplify Boolean functions using KMap	K6
C202.2	Design and Analyze Combinational and Sequential Circuits	K6
C202.3	Implement designs using Programmable Logic Devices	K1
C202.4	Write HDL code for combinational and Sequential Circuits	K4

Course Code & Title: C203 & CS8391 Data Structures		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Implement abstract data types for linear data structures.	K1
C203.2	Apply the different linear and non-linear data structures to problem solutions.	K2
C203.3	Critically analyze the various sorting algorithms.	K2

Course Code & Title: C204 & CS8392 Object Oriented Programming		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Develop Java programs using OOP principles	K2
C204.2	Develop Java programs with the concepts inheritance and interfaces	K4
C204.3	Build Java applications using exceptions and I/O streams	K4
C204.4	Develop Java applications with threads and generics classes	K3
C204.5	Develop interactive Java programs using swings	K4

Course Code & Title: C205 & EC8395 Communication Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Ability to comprehend and appreciate the significance and role of this course in the present contemporary world	K3
C205.2	Apply analog and digital communication techniques.	K3
C205.3	Use data and pulse communication techniques.	K3
C205.4	Analyze Source and Error control coding.	K3

Course Code & Title: C206 & CS8381 Data Structures Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Write functions to implement linear and non-linear data structure operations	K3
C206.2	Suggest appropriate linear / non-linear data structure operations for solving a given problem	K4
C206.3	Appropriately use the linear / non-linear data structure operations for a given problem	K4
C206.4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval	K4

Course Code & Title: C207 & CS8383 Object Oriented Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C207.1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.	K6
C207.2	Develop and implement Java programs with arraylist, exception handling and multi threading .	K3
C207.3	Design applications using file processing, generic programming and event handling.	K3

Course Code & Title: C208 & CS8382 Digital Systems Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C208.1	Implement simplified combinational circuits using basic logic gates	K3
C208.2	Implement combinational circuits using MSI devices	K3
C208.3	Implement sequential circuits like registers and counters	K3
C208.4	Simulate combinational and sequential circuits using HDL	K3

Course Code & Title: C209 & HS8381 Interpersonal Skills/ Listening & Speaking		
	CO Statements	Knowledge Level
The students should be able to		
C209.1	Listen and respond appropriately.	K3
C209.2	Participate in group discussions	K3
C209.3	Make effective presentations	K3
C209.4	Participate confidently and appropriately in conversations both formal and informal	K3

SEMESTER 4

Course Code & Title: C210 & MA8402 Probability and Queuing Theory		
	CO Statements	Knowledge Level
The students should be able to		
C210.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K3
C210.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.	K3
C210.3	Apply the concept of random processes in engineering disciplines.	K6
C210.4	Acquire skills in analyzing queuing models.	K6
C210.5	Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner	K6

Course Code & Title: C211& CS8491 Computer Architecture		
	CO Statements	Knowledge Level
The students should be able to		
C211.1	Understand the basics structure of computers, operations and instructions.	K3
C211.2	Design arithmetic and logic unit.	K6
C211.3	Understand pipelined execution and design control unit.	K3
C211.4	Understand parallel processing architectures.	K4
C211.5	Understand the various memory systems and I/O communication.	K5

Course Code & Title: C212& CS8492 Database Management Systems		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	Classify the modern and futuristic database applications based on size and complexity	K3
C212.2	Map ER model to Relational model to perform database design effectively	K6
C212.3	Write queries using normalization criteria and optimize queries	K6
C212.4	Compare and contrast various indexing strategies in different database systems	K6
C212.5	Appraise how advanced databases differ from traditional databases.	K3

Course Code & Title: C213 & CS8451 Design and Analysis of Algorithms		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Design algorithms for various computing problems.	K4
C213.2	Analyze the time and space complexity of algorithms.	K2
C213.3	Critically analyze the different algorithm design techniques for a given problem.	K4
C213.4	Modify existing algorithms to improve efficiency.	K2

Course Code & Title: C214 & CS8493 Operating Systems		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	Analyze various scheduling algorithms.	K2
C214.2	Understand deadlock, prevention and avoidance algorithms.	K4
C214.3	Compare and contrast various memory management schemes.	K3
C214.4	Understand the functionality of file systems.	K3
C214.5	Perform administrative tasks on Linux Servers.	K2
C214.6	Compare iOS and Android Operating Systems.	K2

Course Code & Title: C215 & CS8494 Software Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	Identify the key activities in managing a software project.	K3
C215.2	Compare different process models.	K4
C215.3	Concepts of requirements engineering and Analysis Modeling.	K4
C215.4	Apply systematic procedure for software design and deployment.	K2
C215.5	Compare and contrast the various testing and maintenance.	K3
C215.6	Manage project schedule, estimate project cost and effort required.	K3

Course Code & Title: C216 & CS8481 Database Management Systems Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Use typical data definitions and manipulation commands.	K6
C216.2	Design applications to test Nested and Join Queries	K3
C216.3	Implement simple applications that use Views	K3
C216.4	Implement applications that require a Front-end Tool	K6
C216.5	Critically analyze the use of Tables, Views, Functions and Procedures	K3

Course Code & Title: C217 & CS8461 Operating Systems Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C217.1	Compare the performance of various CPU Scheduling Algorithms	K6
C217.2	Implement Deadlock avoidance and Detection Algorithms	K3
C217.3	Implement Semaphores	K3
C217.4	Create processes and implement IPC	K6
C217.5	Analyze the performance of the various Page Replacement Algorithms	K3
C217.6	Implement File Organization and File Allocation Strategies	K3

Course Code & Title: C218 & HS8461 Advanced Reading and Writing		
	CO Statements	Knowledge Level
The students should be able to		
C218.1	Write different types of essays.	K6
C218.2	Write winning job applications.	K3
C218.3	Read and evaluate texts critically.	K3
C218.4	Display critical thinking in various professional contexts.	K6

SEMESTER 5

Course Code & Title: C301 & MA8551 Algebra and Number Theory		
	CO Statements	Knowledge Level
The students should be able to		
C301.1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.	K6
C301.2	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.	K6
C301.3	Demonstrate accurate and efficient use of advanced algebraic techniques.	K6
C301.4	Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.	K6
C301.5	Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.	K4

Course Code & Title: C302 & CS8591 Computer Networks		
	CO Statements	Knowledge Level
The students should be able to		
C302.1	Understand the basic layers and its functions in computer networks.	K3
C302.2	Evaluate the performance of a network.	K3
C302.3	Understand the basics of how data flows from one node to another.	K6
C302.4	Analyze and design routing algorithms.	K6
C302.5	Design protocols for various functions in the network.	K6
C302.6	Understand the working of various application layer protocols.	K6

Course Code & Title: C303 & EC8691 Microprocessors and Microcontrollers		
	CO Statements	Knowledge Level
The students should be able to		
C303.1	Understand and execute programs based on 8086 microprocessor	K3
C303.2	Design Memory Interfacing circuits.	K6
C303.3	Design and interface I/O circuits.	K3
C303.4	Design and implement 8051 microcontroller based systems.	K4

Course Code & Title: C304 & CS8501 Theory of Computation		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	Construct automata, regular expression for any pattern.	K2
C304.2	Write Context free grammar for any construct.	K3
C304.3	Design Turing machines for any language.	K3
C304.4	Propose computation solutions using Turing machines.	K3
C304.5	Derive whether a problem is decidable or not.	K2

Course Code & Title: C305 & CS8592 Object Oriented Analysis and Design		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Express software design with UML diagrams	K4
C305.2	Design software applications using OO concepts.	K2
C305.3	Identify various scenarios based on software requirements	K4
C305.4	Transform UML based software design into pattern based design using design patterns	K2
C305.5	Understand the various testing methodologies for OO software	K4

Course Code & Title: C307 & EC8681 Microprocessors and Microcontrollers Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C307.1	Write ALP Programmes for fixed and Floating Point and Arithmetic operations	K3
C307.2	Interface different I/Os with processor	K4
C307.3	Generate waveforms using Microprocessors	K4
C307.4	Execute Programs in 8051	K2
C307.5	Explain the difference between simulator and Emulator	K3

Course Code & Title: C308&CS8582 Object Oriented Analysis and Design Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C308.1	Perform OO analysis and design for a given problem specification.	K3
C308.2	Identify and map basic software requirements in UML mapping.	K4
C308.3	Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns	K4
C308.4	Test the compliance of the software with the SRS.	K2

Course Code & Title: C309 & CS8581 Networks Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C309.1	Implement various protocols using TCP and UDP.	K3
C309.2	Compare the performance of different transport layer protocols.	K4
C309.3	Use simulation tools to analyze the performance of various network protocols.	K4
C309.4	Analyze various routing algorithms.	K2
C309.5	Implement error correction codes.	K3

SEMESTER 6

Course Code & Title: C310 & CS8651 Internet Programming		
	CO Statements	Knowledge Level
The students should be able to		
C310.1	Construct a basic website using HTML and Cascading Style Sheets.	K6
C310.2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.	K6
C310.3	Develop server side programs using Servlets and JSP.	K6
C310.4	Construct simple web pages in PHP and to represent data in XML format.	K6
C310.5	Use AJAX and web services to develop interactive web applications	K4

Course Code & Title: C311 & CS8691 Artificial Intelligence		
	CO Statements	Knowledge Level
The students should be able to		
C311.1	Use appropriate search algorithms for any AI problem	K3
C311.2	Represent a problem using first order and predicate logic	K3
C311.3	Provide the apt agent strategy to solve a given problem	K6
C311.4	Design software agents to solve a problem	K6
C311.5	Design applications for NLP that use Artificial Intelligence.	K6

Course Code & Title: C312 & CS8601 Mobile Computing		
	CO Statements	Knowledge Level
The students should be able to		
C312.1	Explain the basics of mobile telecommunication systems	K3
C312.2	Illustrate the generations of telecommunication systems in wireless networks	K6
C312.3	Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network	K3
C312.4	Explain the functionality of Transport and Application layers	K4
C312.5	Develop a mobile application using android/blackberry/ios/Windows SDK	K5

Course Code & Title: C313 & CS8602 Compiler Design		
	CO Statements	Knowledge Level
The students should be able to		
C313.1	Understand the different phases of compiler	K2
C313.2	Design a lexical analyzer for a sample language.	K3
C313.3	Apply different parsing algorithms to develop the parsers for a given grammar.	K3
C313.4	Understand syntax-directed translation and run-time environment.	K3
C313.5	Learn to implement code optimization techniques and a simple code generator.	K2
C313.6	Design and implement a scanner and a parser using LEX and YACC tools.	K2

Course Code & Title: C314 & CS8603 Distributed Systems		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Elucidate the foundations and issues of distributed systems	K4
C314.2	Understand the various synchronization issues and global state for distributed systems.	K2
C314.3	Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems	K4
C314.4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems.	K2
C314.5	Describe the features of peer-to-peer and distributed shared memory systems	K4

Course Code & Title: C315 & IT8076 Software Testing		
	CO Statements	Knowledge Level
The students should be able to		
C315.1	Design test cases suitable for a software development for different domains.	K2
C315.2	Identify suitable tests to be carried out.	K4
C315.3	Prepare test planning based on the document.	K3
C315.4	Document test plans and test cases designed.	K3
C315.5	Use automatic testing tools.	K2
C315.6	Develop and validate a test plan.	K2

Course Code & Title: C316 & CS8661 Internet Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C316.1	Construct Web pages using HTML/XML and style sheets.	K3
C316.2	Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.	K4
C316.3	Develop dynamic web pages using server side scripting.	K4
C316.4	Use PHP programming to develop web applications.	K2
C316.5	Construct web applications using AJAX and web services.	K3

Course Code & Title: C317& CS8662 Mobile Application Development Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C317.1	Develop mobile applications using GUI and Layouts.	K3
C317.2	Develop mobile applications using Event Listener.	K4
C317.3	Develop mobile applications using Databases.	K4
C317.4	Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS.	K2
C317.5	Analyze and discover own mobile app for simple needs.	K3

Course Code & Title: C319 & HS8581 Professional Communication		
	CO Statements	Knowledge Level
The students should be able to		
C319.1	Make effective presentations	K3
C319.2	Participate confidently in Group Discussions.	K4
C319.3	Attend job interviews and be successful in them.	K4
C319.4	Develop adequate Soft Skills required for the workplace	K2

SEMESTER 7

Course Code & Title: C401 & MG8591 Principles of Management		
	CO Statements	Knowledge Level
The students should be able to		
C401.1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, le	K6

Course Code & Title: C402 & CS8792 Cryptography and Network Security		
	CO Statements	Knowledge Level
The students should be able to		
C402.1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities	K3
C402.2	Apply the different cryptographic operations of symmetric cryptographic algorithms	K3
C402.3	Apply the different cryptographic operations of public key cryptography	K6
C402.4	Apply the various Authentication schemes to simulate different applications.	K6
C402.5	Understand various Security practices and System security standards	K6

Course Code & Title: C403 & CS8791 Cloud Computing		
	CO Statements	Knowledge Level
The students should be able to		
C403.1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.	K3
C403.2	Learn the key and enabling technologies that help in the development of cloud.	K6
C403.3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.	K3
C403.4	Explain the core issues of cloud computing such as resource management and security.	K4
C403.5	Be able to install and use current cloud technologies.	K5
C4.3.6	Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.	K5

Course Code & Title: C404 & GE8077 Total Quality Management		
	CO Statements	Knowledge Level
The students should be able to		
C404.1	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	K2

Course Code & Title: C405 & CS8079 Human Computer Interaction		
	CO Statements	Knowledge Level
The students should be able to		
C405.1	Design effective dialog for HCI .	K4
C405.2	Design effective HCI for individuals and persons with disabilities	K2
C405.3	Assess the importance of user feedback.	K4
C405.4	Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.	K2
C405.5	Develop meaningful user interface.	K4

Course Code & Title: C406 & IT8761 Security Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C406.1	Develop code for classical Encryption Techniques to solve the problems.	K2
C406.2	Build cryptosystems by applying symmetric and public key encryption algorithms.	K4
C406.3	Construct code for authentication algorithms.	K3
C406.4	Develop a signature scheme using Digital signature standard.	K3
C406.5	Demonstrate the network security system using open source tools	K2

Course Code & Title: C407 & CS8711 Cloud Computing Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C407.1	Configure various virtualization tools such as Virtual Box, VMware workstation.	K3
C407.2	Design and deploy a web application in a PaaS environment.	K4
C407.3	Learn how to simulate a cloud environment to implement new schedulers.	K4
C407.4	Install and use a generic cloud environment that can be used as a private cloud.	K2
C407.5	Manipulate large data sets in a parallel environment.	K3

SEMESTER 8

Course Code & Title: C408 & GE8076 Professional Ethics In Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C408.1	Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.	K6

Course Code & Title: C409 & CS8078 Green Computing		
	CO Statements	Knowledge Level
The students should be able to		
C409.1	Acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.	K3
C409.2	Enhance the skill in energy saving practices in their use of hardware.	K3
C409.3	Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.	K6
C409.4	Understand the ways to minimize equipment disposal requirements .	K6

Course Code & Title: C410 & CS8811 Project Work		
	CO Statements	Knowledge Level
The students should be able to		
C410.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	K3

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Code & Title:

As per Anna University Regulation 2021, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	HS3152	PROFESSIONAL ENGLISH - I
2	C102	MA3151	MATRICES AND CALCULUS
3	C103	PH3151	ENGINEERING PHYSICS
4	C104	CY3151	ENGINEERING CHEMISTRY
5	C105	GE3151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6	C106	GE3152	HERITAGE OF TAMILS
7	C107	GE3171	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8	C108	BS3171	PHYSICS AND CHEMISTRY LABORATORY
9	C109	GE3172	ENGLISH LABORATORY
SEMESTER - II			
10	C110	HS3252	PROFESSIONAL ENGLISH - II
11	C111	MA3251	STATISTICS AND NUMERICAL METHODS
12	C112	PH3256	PHYSICS FOR INFORMATION SCIENCE
13	C113	BE3251	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
14	C114	GE3251	ENGINEERING GRAPHICS
15	C115	CS3251	PROGRAMMING IN C
16	C116	GE3252	TAMILS AND TECHNOLOGY
17	C117	GE3271	ENGINEERING PRACTICES LABORATORY
18	C118	CS3271	PROGRAMMING IN C LABORATORY
19	C119	GE3272	COMMUNICATION LABORATORY / FOREIGN LANGUAGE

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - III			
1	C201	MA3354	DISCRETE MATHEMATICS
2	C202	CS3351	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION
3	C203	CS3352	FOUNDATIONS OF DATA SCIENCE
4	C204	CS3301	DATA STRUCTURES
5	C205	CS3391	OBJECT ORIENTED PROGRAMMING
6	C206	CS3311	DATA STRUCTURES LABORATORY
7	C207	CS3381	OBJECT ORIENTED PROGRAMMING LABORATORY
8	C208	CS3361	DATA SCIENCE LABORATORY
SEMESTER - IV			
10	C209	CS3452	THEORY OF COMPUTATION
11	C210	CS3491	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
12	C211	CS3492	DATABASE MANAGEMENT SYSTEMS
13	C212	IT3401	ALGORITHMS
14	C213	CS3451	INTRODUCTION TO OPERATING SYSTEMS
15	C214	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
16	C215	CS3461	OPERATING SYSTEMS LABORATORY
17	C216	CS3481	DATABASE MANAGEMENT SYSTEMS LABORATORY

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - V			
1	C301	CS3591	COMPUTER NETWORKS
2	C302	CS3501	COMPILER DESIGN
3	C303	CB3491	CRYPTOGRAPHY AND CYBER SECURITY
4	C304	CS3551	DISTRIBUTED COMPUTING
5	C305	CCS335	CLOUD COMPUTING
6	C306	CCS366	SOFTWARE TESTING AND AUTOMATION
7	C307	MX3084	DISASTER RISK REDUCTION AND MANAGEMENT
SEMESTER - VI			
10	C308	CCS356	OBJECT ORIENTED SOFTWARE ENGINEERING
11	C309	CS3691	EMBEDDED SYSTEMS AND IOT
12	C310	OIE351	INTRODUCTION TO INDUSTRIAL ENGINEERING
13	C311	CCS334	BIG DATA ANALYTICS
14	C312	CCS332	APP DEVELOPMENT
15	C313	CCS354	NETWORK SECURITY
16	C314	CCS370	UI AND UX DESIGN
17	C315	MX3089	INDUSTRIAL SAFETY

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & 23HS101 Professional English -I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	To use appropriate words in a professional context	K3
C101.2	To gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	To read and infer the denotative and connotative meanings of technical texts	K3
C101.4	To write definitions, descriptions, narrations and essays on various topics	K6

Course Code & Title: C102 & MA3151 Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Apply differential calculus tools in solving various application problems.	K3
C102.3	Able to use differential calculus ideas on several variable functions.	K3
C102.4	Apply different methods of integration in solving practical problems.	K2
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3

Course Code & Title: C103 & PH3151 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Understand the importance of mechanics	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K2
C103.4	Understand the importance of quantum physics.	K3
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K2

Course Code & Title: C104 & CY3151 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K1
C104.2	To identify and apply basic concepts of nano science and nanotechnology in designing the synthesis of nano materials for engineering and technology applications.	K2
C104.3	To apply the knowledge of phase rule and composites for material selection requirements.	K3
C104.4	To recommend suitable fuels for engineering processes and applications.	K2
C104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K3

Course Code & Title: C105 & GE3151 Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K2
C105.2	Develop and execute simple Python programs.	K3
C105.3	Write simple Python programs using conditionals and loops for solving problems.	K3
C105.4	Decompose a Python program into functions.	K3
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.	K3
C105.6	Read and write data from/to files in Python programs.	K3

Course Code & Title: C107 & GE3171 Problem Solving and Python Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Develop algorithmic solutions to simple computational problems	K2
C107.2	Develop and execute simple Python programs.	K3
C107.3	Implement programs in Python using conditionals and loops for solving problems.	K3
C107.4	Deploy functions to decompose a Python program.	K4
C107.5	Process compound data using Python data structures.	K2
C107.6	Utilize Python packages in developing software applications.	K2

Course Code & Title: C108 & BS3171 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Understand the functioning of various physics laboratory equipment.	K2
C108.2	Use graphical models to analyze laboratory data.	K2
C108.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality	K3
C108.4	Access , process and analyze scientific information.	K6
C108.5	Solve problems individually and collaboratively.	K6

Course Code & Title: C109 & GE3172 English Laboratory -I		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	To listen to and comprehend general as well as complex academic information	K2
C109.2	To listen to and understand different points of view in a discussion	K2
C109.3	To speak fluently and accurately in formal and informal communicative contexts	K3
C109.4	To describe products and processes and explain their uses and purposes clearly and accurately	K6
C109.5	To express their opinions effectively in both formal and informal discussions	K6

SEMESTER 2

Course Code & Title: C110 & HS3252 Professional English –II		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	To compare and contrast products and ideas in technical texts.	K2
C110.2	To identify and report cause and effects in events, industrial processes through technical texts	K6
C110.3	To analyses problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C110.4	To present their ideas and opinions in a planned and logical manner	K6
C110.5	To draft effective resumes in the context of job search.	K6

Course Code & Title: C111 & MA3251 – Statistics and Numerical Methods		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Apply the concept of testing of hypothesis for small and large samples in real life problems	K2
C111.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C111.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K2
C111.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
C111.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3

Course Code & Title: C112 & PH3256 - Physics for Information Science		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Gain knowledge on classical and quantum electron theories, and energy band structures	K2
C112.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices	K3
C112.3	Get knowledge on magnetic properties of materials and their applications in data storage,	K3
C112.4	Have the necessary understanding on the functioning of optical materials for optoelectronics	K2
C112.5	Understand the basics of quantum structures and their applications and basics of quantum computing	K2

Course Code & Title: C113 & BE3251 - Basic Electrical and Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Compute the electric circuit parameters for simple problems	K3
C113.2	Explain the working principle and applications of electrical machines	K2
C113.3	Analyze the characteristics of analog electronic devices	K2
C113.4	Explain the basic concepts of digital electronics	K4
C113.5	Explain the operating principles of measuring instruments	K2

Course Code & Title: C114 & GE3251- Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Use BIS conventions and specifications for engineering drawing.	K1
C114.2	Construct the conic curves, involutes and cycloid.	K2
C114.3	Solve practical problems involving projection of lines.	K3
C114.4	Draw the orthographic, isometric and perspective projections of simple solids	K2
C114.5	Draw the development of simple solids.	K3

Course Code & Title: C115 & CS3251 - Programming In C		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Demonstrate knowledge on C Programming constructs	K2
C115.2	Develop simple applications in C using basic constructs	K3
C115.3	Design and implement applications using arrays and strings	K3
C115.4	Develop and implement modular applications in C using functions.	K3
C115.5	Develop applications in C using structures and pointers	K4
C115.6	Design applications using sequential and random access file processing.	K4

Course Code & Title: C117 & GE3271 Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K3
C117.2	Wire various electrical joints in common household electrical wire work.	K3
C117.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K3
C117.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K4

Course Code & Title: C118 & CS3271 – Programming in C Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C118.1	Demonstrate knowledge on C programming constructs.	K2
C118.2	Develop programs in C using basic constructs.	K3
C118.3	Develop programs in C using arrays	K3
C118.4	Develop applications in C using strings, pointers, functions.	K3
C118.5	Develop applications in C using structures	K3
C118.6	Develop applications in C using file processing.	K3

Course Code & Title: C118 & GE3272 - Communication Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C119.1	Speak effectively in group discussions held in a formal/semi formal contexts.	K6
C119.2	Discuss , analyze and present concepts and problems from various perspectives to arrive at suitable solutions	K4
C119.3	Write emails, letters and effective job applications.	K3
C119.4	Write critical reports to convey data and information with clarity and precision	K6
C119.5	Give appropriate instructions and recommendations for safe execution of tasks	K3

SEMESTER 3

Course Code & Title: C201 & MA3354 Discrete Mathematics		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Have knowledge of the concepts needed to test the logic of a program	K4
C201.2	Have an understanding in identifying structures on many levels	K2
C201.3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	K2
C201.4	Be aware of the counting principles	K3
C201.5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	K2

Course Code & Title: C202 & CS3351 Digital Principles and Computer Organization		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Design various combinational digital circuits using logic gates	K6
C202.2	Design sequential circuits and analyze the design procedure	K6
C202.3	State the fundamentals of computer systems and analyze the execution of an instruction	K1
C202.4	Analyze different types of control design and identify hazards	K4
C202.5	Identify the characteristics of various memory systems and I/O communication	K1

Course Code & Title: C203 & CS3352 Foundations of Data Science		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Define the data science process	K1
C203.2	Understand different types of data description for data science process	K2
C203.3	Gain knowledge on relationships between data	K2
C203.4	Use the Python Libraries for Data Wrangling	K3
C203.5	Apply visualization Libraries in Python to interpret and explore data	K3

Course Code & Title: C204 & CS3301 Data Structures		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Define linear and non-linear data structures.	K2
C204.2	Implement linear and non-linear data structure operations.	K4
C204.3	Use appropriate linear/non-linear data structure operations for solving a given problem.	K4
C204.4	Apply appropriate graph algorithms for graph applications.	K3
C204.5	Analyze the various searching and sorting algorithms.	K4

Course Code & Title: C205 & CS3391 Object Oriented Programming		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Apply the concepts of classes and objects to solve simple problems	K3
C205.2	Develop programs using inheritance, packages and interfaces	K3
C205.3	Make use of exception handling mechanisms and multithreaded model to solve real world problems	K3
C205.4	Build Java applications with I/O packages, string classes, Collections and generics concepts	K3
C205.5	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications	K3

Course Code & Title: C206 & CS3311 Data Structures Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Implement Linear data structure algorithms.	K3
C206.2	Implement applications using Stacks and Linked lists	K4
C206.3	Implement Binary Search tree and AVL tree operations.	K4
C206.4	Implement graph algorithms.	K4
C206.5	Analyze the various searching and sorting algorithms.	K4

Course Code & Title: C207 & CS3381 Object Oriented Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C207.1	Design and develop java programs using object-oriented programming concepts	K6
C207.2	Develop simple applications using object-oriented concepts such as package, exceptions	K3
C207.3	Implement multithreading, and generics concepts	K3
C207.4	Create GUIs and event driven programming applications for real world problems	K6
C207.5	Implement and deploy web applications using Java	K3

Course Code & Title: C208 & CS3361 Data Science Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C208.1	Make use of the python libraries for data science	K3
C208.2	Make use of the basic Statistical and Probability measures for data science.	K3
C208.3	Perform descriptive analytics on the benchmark data sets.	K3
C208.4	Perform correlation and regression analytics on standard data sets	K3
C208.5	Present and interpret data using visualization packages in Python.	K3

SEMESTER 4

Course Code & Title: C209 & CS3452 Theory of Computation		
	CO Statements	Knowledge Level
The students should be able to		
C209.1	Construct automata theory using Finite Automata	K6
C209.2	Write regular expressions for any pattern	K6
C209.3	Design context free grammar and Pushdown Automata	K6
C209.4	Design Turing machine for computational functions	K6
C209.5	Differentiate between decidable and undecidable problems	K4

Course Code & Title: C210 & CS3491 Artificial Intelligence and Machine Learning		
	CO Statements	Knowledge Level
The students should be able to		
C210.1	Use appropriate search algorithms for problem solving	K3
C210.2	Apply reasoning under uncertainty	K3
C210.3	Build supervised learning models	K6
C210.4	Build ensembling and unsupervised models	K6
C210.5	Build deep learning neural network models	K6

Course Code & Title: C211 & CS3492 Database Management Systems		
	CO Statements	Knowledge Level
The students should be able to		
C211.1	Construct SQL Queries using relational algebra	K3
C211.2	Design database using ER model and normalize the database	K6
C211.3	Construct queries to handle transaction processing and maintain consistency of the database	K3
C211.4	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database	K4
C211.5	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.	K5

Course Code & Title: C212 & CS3492 Algorithms		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	Apply JavaScript, HTML and CSS effectively to create interactive and dynamic websites.	K3
C212.2	Create simple PHP scripts	K6
C212.3	Design and deploy simple web-applications.	K6
C212.4	Create simple database applications.	K6
C212.5	Handle multimedia components	K3

Course Code & Title: C213 & CS3451 Introduction to Operating Systems		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Analyze various scheduling algorithms and process synchronization.	K4
C213.2	Explain deadlock prevention and avoidance algorithms.	K2
C213.3	Compare and contrast various memory management schemes.	K4
C213.4	Explain the functionality of file systems, I/O systems, and Virtualization	K2
C213.5	Compare iOS and Android Operating Systems.	K4

Course Code & Title: C214 & GE3451 Environmental Sciences and Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
C214.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K4
C214.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K3
C214.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K3
C214.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K2

Course Code & Title: C215 & CS3461 Operating Systems Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	Define and implement UNIX Commands.	K3
C215.2	Compare the performance of various CPU Scheduling Algorithms.	K4
C215.3	Compare and contrast various Memory Allocation Methods.	K4
C215.4	Define File Organization and File Allocation Strategies.	K2
C215.5	Implement various Disk Scheduling Algorithms.	K3

Course Code & Title: C216 & CS3481 Database Management Systems Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Create databases with different types of key constraints.	K6
C216.2	Construct simple and complex SQL queries using DML and DCL commands.	K3
C216.3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.	K3
C216.4	Create an XML database and validate with meta-data (XML schema).	K6
C216.5	Create and manipulate data using NOSQL database.	K3

SEMESTER 5

Course Code & Title: C301 & CS3591 Computer Networks		
	CO Statements	Knowledge Level
The students should be able to		
C301.1	Explain the basic layers and its functions in computer networks.	K6
C301.2	Understand the basics of how data flows from one node to another.	K6
C301.3	Analyze routing algorithms.	K6
C301.4	Describe protocols for various functions in the network.	K6
C301.5	Analyze the working of various application layer protocols.	K4

Course Code & Title: C302 & CS3501 Compiler Design		
	CO Statements	Knowledge Level
The students should be able to		
C302.1	Understand the techniques in different phases of a compiler.	K3
C302.2	Design a lexical analyser for a sample language and learn to use the LEX tool.	K3
C302.3	Apply different parsing algorithms to develop a parser and learn to use YACC tool	K6
C302.4	Understand semantics rules (SDT), intermediate code generation and run-time environment.	K6
C302.5	Implement code generation and apply code optimization techniques.	K6

Course Code & Title: C303 & CB3491 Cryptography and Cyber Security		
	CO Statements	Knowledge Level
The students should be able to		
C303.1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities	K3
C303.2	Apply the different cryptographic operations of symmetric cryptographic algorithms	K6
C303.3	Apply the different cryptographic operations of public key cryptography	K3
C303.4	Apply the various Authentication schemes to simulate different applications.	K4
C303.5	Understand various cyber crimes and cyber security.	K5

Course Code & Title: C304 & CS3551 Distributed Computing		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	Explain the foundations of distributed systems.	K2
C304.2	Solve synchronization and state consistency problems.	K3
C304.3	Use resource sharing techniques in distributed systems.	K3
C304.4	Apply working model of consensus and reliability of distributed systems.	K3
C304.5	Explain the fundamentals of cloud computing.	K2

Course Code & Title: C305 & CCS335 Cloud Computing		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Understand the design challenges in the cloud.	K4
C305.2	Apply the concept of virtualization and its types.	K2
C305.3	Experiment with virtualization of hardware resources and Docker.	K4
C305.4	Develop and deploy services on the cloud and set up a cloud environment.	K2
C305.5	Explain security challenges in the cloud environment.	K4

Course Code & Title: C306 & CCS336 Software Testing and Automation		
	CO Statements	Knowledge Level
The students should be able to		
C306.1	Understand the basic concepts of software testing and the need for software testing	K2
C306.2	Design Test planning and different activities involved in test planning	K4
C306.3	Design effective test cases that can uncover critical defects in the application	K3
C306.4	Carry out advanced types of testing	K3
C306.5	Automate the software testing using Selenium and TestNG	K2

Course Code & Title: C307 & MX3084 Disaster Risk Reduction and Management

	CO Statements	Knowledge Level
The students should be able to		
C307.1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)	K3
C307.2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction	K4
C307.3	To develop disaster response skills by adopting relevant tools and technology	K4
C307.4	Enhance awareness of institutional processes for Disaster response in the country	K2
C307.5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity	K3

SEMESTER 6

Course Code & Title: C308 & CCS356 Object Oriented Software Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C308.1	Compare various Software Development Lifecycle Models	K6
C308.2	Evaluate project management approaches as well as cost and schedule estimation strategies.	K6
C308.3	Perform formal analysis on specifications.	K6
C308.4	Use UML diagrams for analysis and design.	K6
C308.5	Architect and design using architectural styles and design patterns, and test the system	K4

Course Code & Title: C309 & CS3691 Embedded Systems and IOT		
	CO Statements	Knowledge Level
The students should be able to		
C309.1	Explain the architecture of embedded processors.	K3
C309.2	Write embedded C programs.	K3
C309.3	Design simple embedded applications.	K6
C309.4	Compare the communication models in IOT	K6
C309.5	Design IoT applications using Arduino/Raspberry Pi /open platform.	K6

Course Code & Title: C310 & OIE351 Introduction to Industrial Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C310.1	Ability To define the concepts of productivity and productivity measurement approaches.	K3
C310.2	Ability to evaluate appropriate location models for various facility types and design various facility layouts	K6
C310.3	Ability To conduct a method study and time study to improve the efficiency of the system.	K3
C310.4	Ability to Control the quality of processes using control charts in manufacturing/service industries.	K4
C310.5	Ability to define the Planning strategies and Material Requirement Plan.	K5

Course Code & Title: C311 & CCS334 Big Data Analytics		
	CO Statements	Knowledge Level
The students should be able to		
C311.1	Describe big data and use cases from selected business domains.	K2
C311.2	Explain NoSQL big data management.	K3
C311.3	Install , configure, and run Hadoop and HDFS.	K3
C311.4	Perform map-reduce analytics using Hadoop.	K3
C311.5	Use Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics.	K2

Course Code & Title: C312 & CCS332 App Development

	CO Statements	Knowledge Level
The students should be able to		
C312.1	Develop Native applications with GUI Components.	K4
C312.2	Develop hybrid applications with basic event handling.	K2
C312.3	Implement cross-platform applications with location and data storage capabilities.	K4
C312.4	Implement cross platform applications with basic GUI and event handling.	K2
C312.5	Develop web applications with cloud database access.	K4

Course Code & Title: C313 & CCS354 Network Security

	CO Statements	Knowledge Level
The students should be able to		
C313.1	Classify the encryption techniques	K2
C313.2	Illustrate the key management technique and authentication.	K4
C313.3	Evaluate the security techniques applied to network and transport layer	K3
C313.4	Discuss the application layer security standards.	K3
C313.5	Apply security practices for real time applications.	K2

Course Code & Title: C314 & CCS370 UI and UX Design		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Build UI for user Applications	K3
C314.2	Evaluate UX design of any product or application	K4
C314.3	Demonstrate UX Skills in product development	K4
C314.4	Implement Sketching principles	K2
C314.5	Create Wireframe and Prototype	K3

Course Code & Title: C315 & MX3089 Industrial Safety		
	CO Statements	Knowledge Level
The students should be able to		
C315.1	Understand the basic concept of safety	K3
C315.2	Obtain knowledge of Statutory Regulations and standards.	K4
C315.3	Know about the safety Activities of the Working Place.	K4
C315.4	Analyze on the impact of Occupational Exposures and their Remedies	K2
C315.5	Obtain knowledge of Risk Assessment Techniques	K3

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Code & Title:

As per Autonomous Regulation 2023, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (Autonomous)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	23HS101	PROFESSIONAL ENGLISH -I
2	C102	23MA101	MATRICES AND CALCULUS
3	C103	23PH101	ENGINEERING PHYSICS
4	C104	23CY101	ENGINEERING CHEMISTRY
5	C105	23GE101	PROBLEM SOLVING AND C PROGRAMMING
6	C106	23GE103	HERITAGE OF TAMILS
7	C108	23BS111	PHYSICS AND CHEMISTRY LABORATORY
8	C109	23GE112	ENGLISH LABORATORY -I
SEMESTER - II			
10	C110	23HS201	PROFESSIONAL ENGLISH –II
11	C111	23MA901	PROBABILITY AND STATISTICS
12	C112	23PH203	PHYSICS FOR INFORMATION SCIENCE
13	C113	23BE201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
14	C114	23GE901	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
15	C115	23CS201	PYTHON PROGRAMMING
16	C116	23GE201	தமிழரும் தொழில்நுட்பமும் / TAMILS AND TECHNOLOGY
17	C117	23GE211	ENGINEERING PRACTICES LABORATORY
18	C118	23CS211	PYTHON PROGRAMMING LABORATORY
19	C119	23GE212	ENGLISH LABORATORY - II

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 &23HS101 Professional English -I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	To use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	To gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	To read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	To write definitions, descriptions, narrations and essays on various topics.	K6
C101.5	To express their opinions effectively in both oral and written medium of communication.	K6

Course Code & Title: C102 &23MA101 Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Able to use differential calculus ideas on several variable functions.	K3
C102.3	Apply integral calculus and multiple integral tools in solving various application problems.	K3
C102.4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	K2
C102.5	Apply various techniques in solving ordinary differential equations.	K3

Course Code & Title: C103 &23PH101 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Infer the characteristics of laser for various Engineering applications and expand the understanding of optical fibers use in communications.	K2
C103.4	Apply quantum theory's sophisticated physics notions to the matter characterization.	K3
C103.5	Know the fundamentals of crystal formations and growth methods.	K2

Course Code & Title: C104 &23CY101 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Summarize the water related problems in boilers and their treatment techniques.	K1
C104.2	Discuss the applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.	K2
C104.3	Discuss the types, properties and applications of polymers and composites.	K3
C104.4	Summarize the fuels used for engineering processes and applications of fuels.	K2
C104.5	Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.	K3

Course Code & Title: C105 & 23GE101 Problem Solving and C Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Understand the basic concepts of Problem solving and C programming constructs	K2
C105.2	Construct and implement C programs for solving computational Problems using arrays and strings	K3
C105.3	Implement simple real-time applications in C using functions and pointers	K3
C105.4	Implement the applications in C using structures	K3
C105.5	Implement the applications using file handling.	K3

Course Code & Title: C108 & 23BS112 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Apprehend the concepts of interference, diffraction of light and recognize the resonance concept of waves.	K2
C108.2	Apply the principles of operations of optical fibers, semiconductor using simple circuits and interaction of electromagnetic waves and crystalline solids.	K3
C108.3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
C108.4	Experiment the relationship between the light and matter & properties of liquids.	K4
C108.5	Estimate the velocity of sound and compressibility of liquid.	K2
C108.1	Analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C108.2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	K3
C108.3	Analyze and determine the composition of alloys.	K4
C108.4	Learn simple method of synthesis of nanoparticles	K2
C108.5	Quantitatively analyze the impurities in solution by electro analytical methods.	K4

Course Code & Title: C109 & 23GE112 English Laboratory -I

	CO Statements	Knowledge Level
The students should be able to		
C109.1	To listen to and comprehend general as well as complex academic information.	K2
C109.2	To listen to and understand different points of view in a discussion.	K2
C109.3	To speak fluently and accurately in formal and informal communicative contexts.	K3
C109.4	To describe products and processes and explain their uses and purposes clearly and accurately.	K6
C109.5	To express their opinions effectively in both formal and informal discussions.	K6

SEMESTER 2

Course Code & Title: C110 & 23HS201 Professional English –II

	CO Statements	Knowledge Level
The students should be able to		
C110.1	To compare and contrast products and ideas in technical texts and write analytical essays.	K2
C110.2	To identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C110.3	To analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C110.4	To present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C110.5	To draft effective resumes in the context of job application.	K6

Course Code & Title: C111 & 23MA901 – PROBABILITY AND STATISTICS

	CO Statements	Knowledge Level
The students should be able to		
C111.1	To Understand the fundamental concepts of probability.	K2
C111.2	By applying the knowledge of one-dimensional random variables to standard distributions which can describe real life phenomenon.	K3
C111.3	Understand the basic concepts of two-dimensional random variables and apply in engineering applications.	K2
C111.4	Apply the concept of testing of hypothesis for small and large samples in real life Problems.	K3
C111.5	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3

Course Code & Title: C112& 23PH203- Physics For Information Science		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	To recognize the fundamental ideas behind different free-electron theories and establish the solids' electrical characteristics	K2
C112.2	To evaluate the functions of semiconductors and their uses	K3
C112.3	To employing quantum principles to examine the mechanisms at work in magnetic materials.	K3
C112.4	To understand about the uses of superconducting and Optical properties of materials.	K2
C112.5	To show the fundamentals of how micro- and nano-electronic equipment functions	K2

Course Code & Title: C113 & 23BE201-Basic Electrical And Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Compute the electric circuit parameters for simple problems	K3
C113.2	Examine the working principle and applications of electrical machines	K2
C113.3	Illustrate the characteristics of analog electronic devices	K2
C113.4	Examine the basic concepts of digital electronics	K4
C113.5	Apply the concepts of principles of measuring instruments for real time applications	K2

Course Code & Title: C114 & 23GE901-ENVIRONMENTAL SCIENCES AND SUSTAINABILITY		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K1
C114.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society	K2
C114.3	To identify the causes, effects of natural disasters and contribute to the preventive measures in the society	K3
C114.4	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K2
C114.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3

Course Code & Title: C115 & 23CS201- PYTHON PROGRAMMING		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Understanding of Abstract Data Types (ADTs) and their practical implementations.	K2
C115.2	Apply the Design and Implementation of Lists, Stacks, and Queues to Address Real-World Challenges	K3
C115.3	Apply In-Depth Understanding of Sorting, Searching, and Hashing Algorithms for Effective Problem Solving	K3
C115.4	Apply Profound Understanding of Trees to Effectively Manage Hierarchical and Interconnected Data	K3
C115.5	Analyze, Synthesize, and Innovate with Graph Structures for Complex Interconnected Data and Network Solution	K4

Course Code & Title: C117& 23GE211 ENGINEERING PRACTICES LABORATORY		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; Make joints in wood materials used in common household wood work	K3
C117.2	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K3
C117.3	Wire various electrical joints in common household electrical wire work.	K3
C117.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K4

Course Code & Title: C118 & 23CS211 – PYTHON PROGRAMMING LABORATORY		
	CO Statements	Knowledge Level
The students should be able to		
C118.1	Understand the concepts of data types, expressions and statements of python	K2
C118.2	Implement the Python programs using conditionals, looping, functions and strings for solving real-time computational Problems.	K3
C118.3	Implement the Python programs using lists, tuples and dictionaries	K3
C118.4	Implement the python programs for solving Problems by using modules, files and python packages	K3
C118.5	Utilize the Python packages for developing real-world software applications	K3

Course Code & Title: C118& 23GE212 English Laboratory –II		
	CO Statements	Knowledge Level
The students should be able to		
C119.1	Speak effectively in group discussions held in a formal/semiformal contexts.	K6
C119.2	Discuss, analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C119.3	Make effective presentations in an attractive way using appropriate vocabulary.	K3
C119.4	Attend job interviews and be successful in them.	K6
C119.5	Develop adequate Soft Skills required for the workplace.	K3

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Code & Title:

As per Anna University Regulation 2017, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	HS8151	COMMUNICATIVE ENGLISH
2	C102	MA8151	ENGINEERING MATHEMATICS - I
3	C103	PH851	ENGINEERING PHYSICS
4	C104	CY8151	ENGINEERING CHEMISTRY
5	C105	GE8151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6	C106	GE8152	ENGINEERING GRAPHICS
7	C107	GE8161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8	C108	BS8161	PHYSICS AND CHEMISTRY LABORATORY
SEMESTER - II			
9	C109	HS8251	TECHNICAL ENGLISH
10	C110	MA8251	ENGINEERING MATHEMATICS - II
11	C111	PH8253	PHYSICS FOR ELECTRICAL ENGINEERING
12	C112	BE8252	BASIC CIVIL AND MECHANICAL ENGINEERING
13	C113	EE8251	CIRCUIT THEORY
14	C114	GE8291	ENVIRONMENTAL SCIENCE AND ENGINEERING
15	C115	EE8261	ELECTRIC CIRCUIT LABORATORY
16	C116	GE8261	ENGINEERING PRACTICES LABORATORY
SEMESTER - III			
17	C201	MA8353	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS
18	C202	EE8351	DIGITAL LOGIC CIRCUITS
19	C203	EE8391	ELECTROMAGNETIC THEORY
20	C204	EE8301	ELECTRICAL MACHINES - I
21	C205	EC8353	ELECTRONIC DEVICES AND CIRCUITS
22	C206	ME8792	POWER PLANT ENGINEERING
23	C207	EC8311	ELECTRONICS LABORATORY

24	C208	EE8311	ELECTRICAL MACHINES LABORATORY – I
SEMESTER - IV			
25	C209	MA8491	NUMERICAL METHODS
26	C210	EE8401	ELECTRICAL MACHINES - II
27	C211	EE8402	TRANSMISSION AND DISTRIBUTION
28	C212	EE8304	MEASUREMENTS AND INSTRUMENTATION
29	C213	EE8451	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS
30	C214	IC8451	CONTROL SYSTEMS
31	C215	EE8411	ELECTRICAL MACHINES LABORATORY-II
32	C216	EE8461	LINEAR AND DIGITAL INTEGRATED CIRCUITS LABORATORY
33	C219	EE8412	TECHNICAL SEMINAR
SEMESTER - V			
37	C301	EE8501	POWER SYSTEM ANALYSIS
38	C302	EE8551	MICROPROCESSOR AND MICROCONTROLLERS
39	C303	EE8552	POWER ELECTRONICS
40	C304	EE8591	DIGITAL SIGNAL PROCESSING
41	C305	CS8392	OBJECT ORIENTED PROGRAMMING
42	C306	OMD551	BASIC OF BIOMEDICAL INSTRUMENTATION
43	C307	EE8511	CONTROL AND INSTRUMENTATION LABORATORY
44	C308	HS8581	PROFESSIONAL COMMUNICATION
45	C309	CS8383	OBJECT ORIENTED PROGRAMMING LABORATORY
SEMESTER - VI			
46	C310	EE8601	SOLID STATE DRIVES
47	C311	EE8602	PROTECTION AND SWITCHGEAR
48	C312	EE8691	EMBEDDED SYSTEMS
49	C313	EE8004	MODERN POWER CONVERTERS
50	C314	EE8005	SPECIAL ELECTRICAL MACHINES
51	C315	EE8661	POWER ELECTRONICS AND DRIVES LABORATORY
52	C316	EC8681	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY
53	C317	EE8611	MINI PROJECT
SEMESTER - VII			
54	C401	EE8701	HIGH VOLTAGE ENGINEERING

55	C402	EE8702	POWER SYSTEM OPERATION AND CONTROL
56	C403	EE8703	RENEWABLE ENERGY SYSTEMS
57	C404	OML751	TESTING OF MATERIALS
58	C405	EI8075	FIBER OPTICS AND LASER INSTRUMENTATION
59	C406	EE9010	POWER SYSTEMS TRANSIENTS
60	C407	EE8711	POWER SYSTEM SIMULATION LABORATORY
61	C408	EE8712	RENEWABLE ENERGY SYSTEMS LABORATORY
SEMESTER - VIII			
62	C409	MG8591	PRINCIPLES OF MANAGEMENT
63	C410	EE8019	SMART GRID
64	C411	EE8811	PROJECT WORK

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & HS8151 - Communicative English		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Enhance their reading and technical writing skills in the first year itself	K2
C101.2	Comfortably read and understand articles in science and Engineering journals and articles in dailies	K2
C101.3	Get themselves involved in an active manner during informal conversations, state opinions and express willingness	K3
C101.4	Communicate effectively in short conversations and talks uttered in English	K4
C101.5	Draft essays related to their subjects and write personal letters and emails in comfortable manner for lifelong learning	K4

Course Code & Title: C102 & MA8151 - Engineering Mathematics - I		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Analyze and apply the Engineering knowledge in differentiation to solve maxima and minima problems.	K4
C102.2	Solve the problems of integrals using different methods of calculus.	K5
C102.3	Design and develop the problems of integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K6
C102.4	Analyze the problems of integrals by using various methods of integration, such as substitution, partial fractions and integration by parts.	K4
C102.5	Apply various tools in solving the differential equations to recognize the need for life-long learning.	K3

Course Code & Title: C103 & PH8151 - Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Analyse the problems in columns and beams and gain the engineering knowledge in properties of matter to formulate.	K4
C103.2	Understand the fundamental concepts and applications of waves, lasers and fiber optics to give theoretical approaches to design modern devices.	K2
C103.3	Interpret the knowledge in thermal properties of materials and can determine expansion joints and heat exchangers in devices.	K3
C103.4	Understand the fundamental concepts of quantum theory and how modern electron microscope techniques use it to make predictions in the field of physics.	K2
C103.5	Describe the behavior of solids, the fundamentals of crystals, their structures and the various crystal development processes.	K2

Course Code & Title: C104 & CY8151 - Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Apply the water treatment techniques in the industries and domestic water using the latest techniques by using engineering knowledge.	K3
C104.2	Understand the adsorption methods used in the field of water and air pollution purification to assess societal, health, safety and cultural issues in the environmental.	K2
C104.3	Know the significance of alloying and the behavior of one component and two component systems using phase diagram and apply appropriate techniques in the field of metallurgy.	K2
C104.4	Discuss the types of fuels, calorific value calculations, and analyze the need for alternative fuels to solve current social problems by using engineering techniques.	K4
C104.5	Apply the water treatment techniques in the industries and domestic water using the latest techniques by using engineering knowledge.	K3

Course Code & Title: C105 & GE8151 - Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Understand the concepts of computational thinking and algorithmic problem-solving techniques.	K2
C105.2	Develop simple python programs for applying the concepts of data types, expressions, and python statements.	K3
C105.3	Develop Python programs for solving real-time computational problems by using conditionals, looping, functions, and strings.	K3
C105.4	Understand the concepts of compound data using Python lists, tuples, and dictionaries.	K2
C105.5	Develop python programs for solving computational problems by using modules, files and python packages.	K3

Course Code & Title: C106 & GE8152- Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Sketch the conic sections, special curves, and draw orthographic views from pictorial views and models.	K4
C106.2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.	K3
C106.3	Sketch the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.	K4
C106.4	Practice the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its lateral surfaces.	K3
C106.5	Sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.	K4

Course Code & Title: C107 & GE8161- Problem Solving and Python Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Develop simple python programs for applying the concepts of data types, expressions and python statements.	K3
C107.2	Develop Python programs using conditionals, looping, functions and strings for solving real-time computational problems.	K3
C107.3	Understand the concepts of compound data using Python lists, tuples and dictionaries.	K2
C107.4	Develop python programs for solving problems by using modules, files and python packages.	K3
C107.5	Utilize Python packages for developing real-world software applications.	K6

Course Code & Title: C108 & BS8161 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Manipulate the fundamental concepts like torque, elasticity and bending moment of beams for various engineering applications by the determination of rigidity modulus of the wire and young's modulus of the material of the beam by non-uniform bending.	K3
C108.2	Practice the fundamentals of thermal properties of material of the bad conductor by Lee's disc method.	K3
C108.3	Understand the basic knowledge and estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer.	K2
C108.4	Dramatize the strength of an acid using pH meter and conduct meter for applications in the field of engineering.	K3
C108.5	Experiment the estimation of total, permanent and temporary hardness of water for our environment.	K3

SEMESTER 2

Course Code & Title: C109 & HS8251 - Technical English

	CO Statements	Knowledge Level
The students should be able to		
C109.1	Read and write their technical and area-specific texts in an effortless manner.	K3
C109.2	Listen comfortably and respond confidently to lectures and talks pertaining to their domain skills.	K2
C109.3	Speak in an appropriate manner in both formal and informal situations for lifelong learning.	K3
C109.4	Create CVs and draft Job applications in confident manner.	K6
C109.5	Communicate confidently by using all the four skills with their peers and in real life situations.	K4

Course Code & Title: C110& MA8251 - Engineering Mathematics - II

	CO Statements	Knowledge Level
The students should be able to		
C110.1	Analyze the different types of matrices for solving practical problems.	K4
C110.2	Apply gradient, divergence and curl of a vector point function and related identities in engineering field.	K3
C110.3	Acquire the knowledge to solve the engineering problems in analytic functions.	K2
C110.4	Analyze and apply the different methods to solve complex integration problems.	K4
C110.5	Create and manage the projects after applying and analyzing the fundamentals of Laplace transforms.	K4

Course Code & Title: C111& PH8253 - Physics for Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Comprehend the materials for their diverse applications, it is necessary to grasp the energy band structures and the classical and quantum electron theories.	K3
C111.2	Provide a balanced understanding of diverse semiconductor electronic devices, such as hall devices, ohmic contacts, Schottky diodes, and power transistors, by explaining the fundamental principles of semiconductor physics.	K2
C111.3	Interpret the properties of magnetic and dielectric materials, manipulate them and then analyze them for the purposes for which they are used in modern devices.	K3
C111.4	Understand the fundamental properties of optical materials in optoelectronics which is essential to comprehend the theoretical methods for designing modern optoelectronic devices.	K2
C111.5	Comprehend the fundamentals of quantum structures and the nano scale manipulation of modern materials in spintronics and carbon electronics.	K2

Course Code & Title: C112& BE8252 - Basic Civil and Mechanical Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Appreciate the Civil and Mechanical Engineering components of Projects	K2
C112.2	Measure distances and area by surveying	K3
C112.3	Explain the usage of construction material and proper selection of construction materials.	K3
C112.4	Identify the components used in power plant cycle, demonstrate working principles of petrol and diesel engine.	K2
C112.5	Elaborate the components of refrigeration and Air conditioning cycle.	K2

Course Code & Title: C113 & EE8251- Circuit Theory		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Apply Kirchhoff's current and voltage laws to simple circuits and Solve complex circuits using Mesh & Nodal Methods.	K3
C113.2	Apply Network theorems to linear circuits and to solve simple and complex problems	K3
C113.3	Analyze the Transient response of RLC circuits under DC and AC excitation using Laplace Transform	K4
C113.4	Analyze three phase balanced and unbalanced star, delta network	K4
C113.5	Compute the frequency response of Series and Parallel resonance and analyze tuned circuits	K2

Course Code & Title: C114 & GE8291 - Environmental Science and Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Apply the finding and implementing scientific, technological, economic and political solutions to environmental problems with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations	K3
C114.2	Understand the impact of the professional engineering solutions in societal and environmental contexts for the importance of public participation in conservation of natural resources	K2
C114.3	Discuss the types of natural energy sources and analyze the need for alternative fuels to solve current social problems by using engineering techniques	K2
C114.4	Learning the concepts from unsustainable to sustainable development and urban problems related to energy, water conservation, rain water harvesting.	K2
C114.5	Apply the basics of information technology in environment and human health function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	K3

Course Code & Title: C115 & EE8261 – Electric Circuits Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Solve the circuit problems using laws and theorem concepts	K6
C115.2	Simulate electrical circuits and to experimentally verify various theorems for circuit designing purposes.	K5
C115.3	Experiment the frequency response and transients in passive elements.	K4
C115.4	Simulate the resonance circuits for several applications such as designing of tuning circuit, signal processing and voltage magnification.	K5
C115.5	Make the simulation of three phase circuits using suitable simulation for both balanced and unbalanced condition	K6

Course Code & Title: C116 & GE8261 - Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Fabricate carpentry joints.	K6
C116.2	Use Welding equipment's to join the structures.	K3
C116.3	Perform sheet metal works.	K6
C116.4	Perform basic fitting operations and plumbing.	K3
C116.5	Carryout basic home electrical works and appliances.	K3

SEMESTER 3

Course Code & Title: C201 & MA8353 - Transforms and Partial Differential Equations		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Understand to solve the given standard partial differential equations.	K3
C201.2	Identify and analyze the differential equations using Fourier series analysis in engineering applications.	K4
C201.3	Create using modern techniques of Fourier series to solve one- and two-dimensional heat flow problems and one-dimensional wave equation	K5
C201.4	Apply the engineering knowledge to manage the projects in transforms and partial differential equations to formulate and solve some of the physical engineering problems	K6
C201.5	Use the effective modern mathematical tools to solve the partial differential equations by using Z transform techniques for discrete time systems	K3

Course Code & Title: C202 & EE8351 - Digital Logic Circuits		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Understand the various number systems and study the characteristics of the digital logic family circuits	K2
C202.2	Apply the Boolean functions, K maps and implementation of combinational logic circuits..	K3
C202.3	Analyze the various synchronous and asynchronous sequential circuits.	K4
C202.4	Implement Boolean logic equations with Programmable logic Device	K3
C202.5	Develop VHDL code for combinational and Sequential Logic Circuits	K3

Course Code & Title: C203 & EE8391 - Electromagnetic Theory

	CO Statements	Knowledge Level
The students should be able to		
C203.1	Comprehend the basic mathematical concepts related to vector calculus, coordinate system, Gauss's law and applications.	K2
C203.2	Realize the concepts of electrical potential and apply the boundary conditions and their application	K3
C203.3	Develop the concepts of magneto statics and apply the boundary conditions and their application	K3
C203.4	Understand the concepts of Faradays law, induced emf and Maxwell's equations to study the electrodynamics fields.	K2
C203.5	Examine the basic fundamental concepts of electromagnetic waves, parameters and systems.	K4

Course Code & Title: C204 & EE8301 -Electrical Machines – I

	CO Statements	Knowledge Level
The students should be able to		
C204.1	Comprehend the fundamental laws in the magnetic circuits and its performance for all electrical machines.	K2
C204.2	Explore the equivalent circuit of transformers at different loading condition and apply the voltage regulation and efficiency	K3
C204.3	Interpret the electric and magnetic field interactions in electromechanical devices and machines	K2
C204.4	Understand the DC machines based on their type of excitation.	K2
C204.5	Acquire the type of speed control of DC motor in different application	K3

Course Code & Title: C205 & EC8353- Electron Devices and Circuits

	CO Statements	Knowledge Level
The students should be able to		
C205.1	Explain the basic structure and operation of basic electronic devices such and its characteristics.	K2
C205.2	Illustrate the basic function and working of various electronic devices such as transistors and thyristors. .	K2
C205.3	Choose the various modes of operation in gain and frequency response and small signal amplifier circuits	K2
C205.4	Perform the different stages of amplifier, differential amplifier cascade amplifier and power amplifier	K2
C205.5	Understand the parameters of feedback amplifiers and oscillator circuits	K2

Course Code & Title: C206 & ME8792 - Power Plant Engineering

	CO Statements	Knowledge Level
The students should be able to		
C206.1	Describe the modern coal-based power plant and components used in thermal plant.	K2
C206.2	Explain the fundamental of various cycles and diesel, gas and combined cycle power plant.	K2
C206.3	Discuss the layout and working of various Nuclear Power Plants	K2
C206.4	Understand the construction and working of hydroelectric and various nonconventional power plants	K2
C206.5	Analyze energy, economic and environmental issues of power plant.	K4

Course Code & Title: C207 & EC8311-Electronics Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C207.1	Understand the fundamental operation and characteristics of semiconductor devices.	K2
C207.2	Formulate the basic parameters of semiconductor devices and their limiting factors	K3
C207.3	Apply the BJT amplifiers in various configuration techniques.	K3
C207.4	Design the frequency response characteristics of amplifiers	K4
C207.5	Design the basic electronic circuits with application to diodes, field-effect transistors and bipolar junction transistors.	K4

Course Code & Title: C208 & EE8311 -Electrical Machines Laboratory – I		
	CO Statements	Knowledge Level
The students should be able to		
C208.1	Analyze the performance of various D.C. Generators and understand its applications.	K4
C208.2	Analyze the operation of D.C. Generators and D.C motor on no load and load condition	K4
C208.3	Analyze the performance characteristics of various D.C. Motors and understand its applications.	K4
C208.4	Analyze the performance of DC motor by conducting suitable tests	K4
C208.5	Evaluate the voltage regulation and predetermine the performance of the single phase and three phase transformers	K5

SEMESTER 4

Course Code & Title: C209 & MA8491- Numerical Methods

	CO Statements	Knowledge Level
The students should be able to		
C209.1	Apply the fundamental techniques of solving algebraic and transcendental equations.	K4
C209.2	Apply the numerical techniques of interpolation and error approximations in various intervals in real life situations.	K3
C209.3	Apply the engineering knowledge to solve the differentiation and integration problems.	K3
C209.4	Identify and apply the modern tools for solving first and second order ordinary differential equations	K4
C209.5	Identify the problem and solve the partial and ordinary differential equations with initial and boundary conditions by using modern tools for project management	K6

Course Code & Title: C210 & EE8401- Electrical Machines – II

	CO Statements	Knowledge Level
The students should be able to		
C210.1	Analyze the performance of salient and non-salient pole synchronous generator of construction, working principle.	K4
C210.2	Understand the concept, principle and the performance of synchronous motor.	K4
C210.3	Illustrate the construction, working principle and performance of three phase induction motor and its types.	K2
C210.4	Analyze the different types of starters and speed control methods of three phase induction motor.	K4
C210.5	Understand the construction, principle and analyze the performance of single-phase induction motors and special electrical machines.	K4

Course Code & Title: C211 & EE8402- Transmission and Distribution		
	CO Statements	Knowledge Level
The students should be able to		
C211.1	Design the transmission line parameters for specific performance and estimate the voltage drop.	K4
C211.2	Design equivalent circuits for the transmission lines based on distance and to calculate the voltage regulation and efficiency for public safety.	K3
C211.3	Analyze the design of transmission lines insulator rings and to improve the efficiency.	K4
C211.4	Explain the types of cables and the methods of grading of cables	K3
C211.5	Describe the distribution systems, substations, groundings, fundamentals of EHVAC, HVDC and FACTS systems	K3

Course Code & Title: C212 & EE8403- Measurements and Instrumentation		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	Acquire the basic knowledge on functional elements of instruments and errors in measurement system	K2
C212.2	Explain the suitable instrument for measuring electrical and electronics parameters	K2
C212.3	Apply a suitable bridge circuit used for measuring different electrical quantities.	K3
C212.4	Understand the construction, operating principles of different storage and display devices.	K2
C212.5	Apply the concepts and operational features of transducer and Data Acquisition System.	K3

Course Code & Title: C213 & EE8451-Linear Integrated Circuits and Applications		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Know the fundamental knowledge in IC fabrication procedure.	K2
C213.2	Understand the characteristics of op-amps and signal analysis using op-amp.	K2
C213.3	Understand the importance of signal analysis and applications of op-amp based circuits.	K2
C213.4	Understand the functional blocks and the applications of special ICs like timers, PLL circuits.	K2
C213.5	Understand the operation of application ICs like voltage regulator and switching regulator.	K2

Course Code & Title: C214 & IC8451- Control Systems		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	Apply the transfer function models for analysis of physical system and control system components.	K3
C214.2	Analyze the time response of various linear systems and steady state errors.	K4
C214.3	Apply the frequency response of the system in open and closed loop response.	K3
C214.4	Apply the concepts of system stability to analyze performance of closed loop systems.	K3
C214.5	Apply the basic concepts of state variable analysis of systems and effect of state feedback of system	K3

Course Code & Title: C215 & EE8411-Electrical Machines Laboratory - II		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	Analyze the regulation of Alternators by EMF, MMF and ZPF Methods	K4
C215.2	Analyze the Characteristics of synchronous motor using V and inverted V curve.	K4
C215.3	Analyze the separation of losses in Induction Motor	K4
C215.4	Analyze the efficiency and performance characteristics of single phase induction motor	K4
C215.5	Analyze the efficiency and performance characteristics of three phase induction motor	K4

Course Code & Title: C216 & EE8461- Linear and Digital Integrated Circuits Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Evaluate the boolean functions and develop adder, subtractor circuits.	K5
C216.2	Analyze the various code converters to understand the importance of code conversion.	K4
C216.3	Analyze and implement 4-bit Shift Registers	K4
C216.4	Develop Op-Amp in various application circuits	K3
C216.5	Formulate the counters using specific counter IC.	K2

Course Code & Title: C217 & EE8412- Technical Seminar		
	CO Statements	Knowledge Level
The students should be able to		
C217.1	Understand the effective and recent advancement presentation on Engineering & technology	K2
C217.2	Apply and prepare the State-of-art technologies in the present-day technological growths.	K3
C217.3	Formulate the presentation using the concepts of ordering and determining the central, main and supporting ideas	K2
C217.4	Present any topic in any recent advancement with good communicative skill in front of peers and faculty members	K3
C217.5	Perform well in placement recruitment drive with good technical skills and communication skills	K2

SEMESTER 5

Course Code & Title: C301 & EE8501 -Power System Analysis

	CO Statements	Knowledge Level
The students should be able to		
C301.1	Classify the power system components and per unit values under steady state operating condition	K2
C301.2	Apply the power flow solution for power system problem by GS and NR techniques	K3
C301.3	Apply the Thevenin's theorem and bus impedance matrix for power system under symmetrical fault conditions.	K3
C301.4	Analyze the power system network under L-L and L-L-G fault condition using symmetrical components.	K4
C301.5	Analyze the power system stability using equal area criterion and to modified Euler's methods to solve the swing equation	K4

Course Code & Title: C302 & EE8551-Microprocessors and Microcontrollers

	CO Statements	Knowledge Level
The students should be able to		
C302.1	Describe the architecture and working of 8085 with timing diagram	K2
C302.2	Describe and implement the different instructions using addressing modes.	K2
C302.3	Understand the architecture and working of various blocks with timing diagram in 8081 microcontrollers	K2
C302.4	Understand the various peripherals interfaced with 8085 microprocessors	K2
C302.5	Apply the basic knowledge of microcontroller programming and its different applications	K3

Course Code & Title: C303 & EE8552 - Power Electronics		
	CO Statements	Knowledge Level
The students should be able to		
C303.1	Describe the types of semiconductor devices and their switching characteristics.	K2
C303.2	Analyze the various AC to DC converters.	K4
C303.3	Sketch the fundamental switching topologies of DC-to-DC converters and their applications.	K3
C303.4	Interpret the modulation and harmonic reduction techniques in DC to AC Converters.	K3
C303.5	Illustrate the operation of AC voltage controller and to implement cycloconverter design for their applications	K2

Course Code & Title: C304 & EE8591-Digital Signal Processing		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	Analyze the various types of signal and systems, sampling in time signal.	K4
C304.2	Understand and apply discrete time Linear Time Invariant systems using Z transform and Discrete Time Fourier Transform.	K3
C304.3	Apply the concepts of Discrete Fourier Transform and Fast Fourier Transform to solve Problems	K3
C304.4	Apply Finite impulse response and Infinite impulse response digital filters.	K3
C304.5	Understand the various types of architecture of digital signal processors.	K2

Course Code & Title: C305 & CS8392- Object Oriented Programming		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Design and implement java simple application that make use of classes, packages and interfaces	K2
C305.2	Develop a java application using class and its members and also implement java converter applications.	K4
C305.3	Apply the java string programs using string operations using array list, abstract classes	K4
C305.4	Develop a java program to implement user defined exceptions, reading and writing a file	K4
C305.5	Develop a java program for multi-threaded applications and generic function	K4

Course Code & Title: C306 & OMD551- Basic of Biomedical Instrumentation		
	CO Statements	Knowledge Level
The students should be able to		
C306.1	Learn the different bio potential and its propagation	K2
C306.2	Familiarize the different electrode placement for various physiological recording	K3
C306.3	Design bio amplifier for various physiological recording	K4
C306.4	Understand various technique non electrical physiological measurements	K2
C306.5	Understand the different biochemical measurements	K2

Course Code & Title: C307 & EE8511-Control and Instrumentation Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C307.1	Analyze the characteristics of P, PI and PID controllers experimentally and analyze the stability of the control system using MATLAB	K4
C307.2	Analyze the various types of ADC, DAC converters.	K4
C307.3	Analyze the response of lag, lead and lag-lead compensators.	K4
C307.4	Analyze the basics of bridge networks and signal conditioning circuits.	K4
C307.5	Analyze the response and stability of control systems using simulation package.	K4

Course Code & Title: C308 & HS8581 - Professional Communication		
	CO Statements	Knowledge Level
The students should be able to		
C308.1	Enhance the employability and career skills in engineering domain	K3
C308.2	Improve professional communication	K4
C308.3	Build confidence in employability skills	K4
C308.4	Face interviews with necessary skills	K5
C308.5	Acquire required skills to excel in their career	K3

Course Code & Title: C309 & CS8383- Object Oriented Programming Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C309.1	Design and implement java simple application that make use of classes, packages and interface	K2
C309.2	Develop a java application using class and its members and also implement java converter applications.	K4
C309.3	Apply the java string programs using string operations using array list, abstract classes	K4
C309.4	Develop a java program to implement user defined exceptions, reading and writing a file	K4
C309.5	Develop a java program for multi-threaded applications and generic function.	K4

SEMESTER 6

Course Code & Title: C310 & EE8601- Solid State Drives

	CO Statements	Knowledge Level
The students should be able to		
C310.1	Explain the fundamental of steady state and dynamics of a drive system	K2
C310.2	Illustrate the operation of the converter / chopper fed dc drive to solvesimple problems	K3
C310.3	Demonstrate the operation of classical and modern induction motor drives	K3
C310.4	Analyze the operation and performance of synchronous motor drives.	K4
C310.5	Design the current and speed controllers for a closed loop solid-state DC motor drive	K3

Course Code & Title: C311 & EE8602- Protection and Switchgear		
	CO Statements	Knowledge Level
The students should be able to		
C311.1	Comprehend the fundamental knowledge on various faults and protective schemes in power system.	K2
C311.2	Assimilate the various electromagnetic relays and its application	K2
C311.3	Choose the protection scheme for various faults in motor, generator, transformer, bus bar, transmission line	K2
C311.4	Know the various static relays and numerical relays and its application	K2
C311.5	Understand the concepts and principle of various circuit breakers	K2

Course Code & Title: C312 & EE8691- Embedded Systems		
	CO Statements	Knowledge Level
The students should be able to		
C312.1	Explain the building process and hardware, software tools in embedded systems	K2
C312.2	Analyze the types of I/O device ports, bus and relate processor in embedded system	K4
C312.3	Apply the embedded development strategies to develop the embedded firmware environment.	K3
C312.4	Comprehend the fundamental concepts of various techniques in Real Time Operating System.	K2
C312.5	Apply the knowledge of concepts of embedded system for various applications such as economic, environmental and society.	K3

Course Code & Title: C313 & EE8004 - Modern Power Converters		
	CO Statements	Knowledge Level
The students should be able to		
C313.1	Understand the concepts of Switched mode DC power supplies.	K2
C313.2	Know the operation of phase Controlled Rectifiers and apply the inverters and essentiality of harmonic control in power electronic circuits	K3
C313.3	Apply the AC-AC converters with and without DC link harmonic control in power electronic circuits.	K3
C313.4	Understand the concepts of ZVS, ZCS, Quasi resonant converters.	K2
C313.5	Apply the converters for AC-DC conversion and SMPS	K3

Course Code & Title: C314 & EE8005 Special Electrical Machines		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Understand the operation of synchronous reluctance motors and its characteristics	K2
C314.2	Describe the construction, operation and methods of stepping motor	K2
C314.3	Understand the operation of switched reluctance motor and its characteristics.	K2
C314.4	Illustrate the construction, operation and performance characteristics of permanent magnet synchronous motors.	K2
C314.5	Choose the fundamental of PMSM and its power controllers.	K2

Course Code & Title: C315 & EE8661- Power Electronics and Drives Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C315.1	Demonstrate the gate pulse generation using various configurations.	K2
C315.2	Analyze the characteristics of SCR, TRIAC, MOSFET & IGBT.	K4
C315.3	Analyze the performance parameters of DC – AC, DC – DC converter circuits.	K4
C315.4	Analyze the performance of AC – DC, AC – AC converter circuits.	K4
C315.5	Simulate of various power electronic converter circuits	K3

Course Code & Title: C316 & EC8681- Microprocessors and Microcontrollers Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C316.1	Apply the arithmetic operations, logic operations and sorting using 8085 microprocessors.	K3
C316.2	Analyze the program for ADC, DAC conversion, finding the maximum and minimum numbers in a series	K4
C316.3	Analyze the operations of peripheral interfacing with 8085 microprocessors	K4
C316.4	Apply the arithmetic, logic operations and branching operation using 8051 microcontrollers	K3
C316.5	Apply the program for peripheral interfacing with 8051 microcontrollers.	K3

Course Code & Title: C317 & EE8611 - Mini Project		
	CO Statements	Knowledge Level
The students should be able to		
C317.1	Apply the fundamental knowledge within the technical area to a given problem, analyze previous researcher's work	K3
C317.2	Analyze the engineering solutions to complex problems and conduct experiments.	K4
C317.3	Apply appropriate technology tools for communication, teamwork, conclusion support and attitudes of a professional engineer.	K3
C317.4	Interact with team members in a qualified manner, to ensure a collective project environment and also apply a strong working knowledge of ethics.	K3
C317.5	Document and present one's own work for a given target group with good oral and written presentation skills and also recognize the need for life-long learning by undergoing the project work	K3

SEMESTER 7

Course Code & Title: C401 & EE8701 - High Voltage Engineering

	CO Statements	Knowledge Level
The students should be able to		
C401.1	Understand the overvoltage causes, effects & protection in power system.	K2
C401.2	Describe the various dielectric breakdown mechanism	K2
C401.3	Understand the various types of generating for HVAC and HVDC.	K2
C401.4	Explore the different overvoltage AC and DC measuring at appropriate method	K2
C401.5	Apply the fundamental of test for transformer, insulator, CB and electrical apparatus.	K3

Course Code & Title: C402 & EE8702 - Power System Operation and Control

	CO Statements	Knowledge Level
The students should be able to		
C402.1	Apply the fundamental structure and operation of power system	K3
C402.2	Apply the power frequency controller design for single and two area system	K3
C402.3	Analyze the reactive power control and maintain the voltage profile for varying the load.	K4
C402.4	Analyze and apply the unit commitment and economic dispatch problem.	K4
C402.5	Understand the computer control and its real time applications.	K2

Course Code & Title: C403 & EE8703 - Renewable Energy Systems

	CO Statements	Knowledge Level
The students should be able to		
C403.1	Explain the environment aspect, awareness and to get acceptable inputs about renewable Energy resources and technologies.	K2
C403.2	Describe the working of various types of wind energy conversion system	K2
C403.3	Discuss the solar energy conversion system and different types of solar plants system.	K2
C403.4	Understand the basic of energy conversion system like Hydro, biomass and Geothermal power plants.	K2
C403.5	Explain the basic of various renewable energy resources and technologies and their applications.	K2

Course Code & Title: C404 & OML751 - Testing of Materials

	CO Statements	Knowledge Level
The students should be able to		
C404.1	Learn about different type of materials, classification and Testing Standards.	K2
C404.2	Analyze engineering components using various mechanical testing procedure.	K4
C404.3	Describe about Principles, Techniques, Advantages and Limitations, Applications of Non-Destructive Testing.	K2
C404.4	Exploit Principles, Types, Advantages and Limitations, Applications of materials characterization process.	K4
C404.5	Compare the types of Thermal testing and contrast the chemical testing of materials	K4

Course Code & Title: C405 & EI8075 - Fiber Optics and Laser Instrumentation

	CO Statements	Knowledge Level
The students should be able to		
C405.1	Understand the principle, attenuation characteristics of optical fibers.	K2
C405.2	Describe the knowledge of optical fibres and its industrial applications.	K2
C405.3	Classify the principle, operation and characteristics of various types of lasers	K2
C405.4	Apply the appropriate theory and specific industrial application of laser.	K3
C405.5	Discuss the fundamental of hologram and its medical applications.	K3

Course Code & Title: C406 & EE8010- Power Systems Transients

	CO Statements	Knowledge Level
The students should be able to		
C406.1	Comprehend the importance of transients and its effect on power system.	K2
C406.2	Understand the overvoltage due to switching transients.	K2
C406.3	Discuss the importance of lighting transients and its interaction with power system.	K2
C406.4	Understand the traveling waves concepts in transmission line.	K2
C406.5	Comprehend the integrated power system using qualitative application of EMTP for transient computation.	K2

Course Code & Title: C407 & EE8711 - Power System Simulation Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C407.1	Analyze the appropriate program for transmission line parameters and its performance	K4
C407.2	Formulate the bus admittance and impedance matrices and derive the solution for electrical network problems	K5
C407.3	Analyze the fault analysis for a given power system under symmetrical and unsymmetrical fault.	K4
C407.4	Analyze the stability of the power system by simulation using appropriate techniques	K4
C407.5	Formulate a suitable program to solve economic dispatch problem and load frequency dynamics of interconnected power system	K5

Course Code & Title: C408 & EE8712 - Renewable Energy Systems Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C408.1	Analyze the concept of renewable energy resources and technologies.	K4
C408.2	Analyze the characteristics of solar PV and wind energy system	K4
C408.3	Evaluate the performance of micro wind generation and Hybrid systems	K5
C408.4	Analyze the simulation technique in solar PV system, wind and hybrid energy systems.	K4
C408.5	Analyze the importance of intelligent controllers for hybrid energy generation systems.	K4

SEMESTER 8

Course Code & Title: C409 & MG8591 - Principles of Management

	CO Statements	Knowledge Level
The students should be able to		
C409.1	Understand the definition of management, evolution of management, types of business organization and role of managers in a business entity.	K2
C409.2	Understand the planning strategy, setting an objective oriented planning, tools and techniques applied for planning and decision	K2
C409.3	Understand the organization structure, roles, delegation of authority. Understand the human resource planning, recruitment process, training and development	K2
C409.4	Understand the importance of directing workforce, motivation to employees, job enrichment, essentials of communication between entities of business.	K2
C409.5	Understand and generate budget controls, productivity improvement and control framework for achieving the above objectives.	K2

Course Code & Title: C410 & EE8019 - Smart Grid

	CO Statements	Knowledge Level
The students should be able to		
C410.1	Realize the basic concepts of smart grid and latest developments.	K2
C410.2	Apply the several characteristics of the smart grid such as technologies, components, architectures and applications	K3
C410.3	Apply the appropriate knowledge about various smart meters and advanced metering infrastructure.	K3
C410.4	Apply the knowledge of power quality management in Smart Grids	K3
C410.5	Apply more understanding on LAN, WAN and Cloud Computing for Smart Grid applications	K3

Course Code & Title: C411 & EE8811 - Project Work		
	CO Statements	Knowledge Level
The students should be able to		
C411.1	Develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.	K6
C411.2	Analyze a new method to solve the related problems	K4
C411.3	Apply the fundamental engineering knowledge & skills to solving the problem.	K3
C411.4	Agree and work as a team to come to a common conclusion	K5
C411.5	Design engineering solutions to complex problems in a systematic approach	K6

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Code & Title:

As per Anna University Regulation 2021, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	HS3151	PROFESSIONAL ENGLISH - I
2	C102	MA3151	MATRICES AND CALCULUS
3	C103	PH3151	ENGINEERING PHYSICS
4	C104	CY3151	ENGINEERING CHEMISTRY
5	C105	GE3151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6	C106	GE3171	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
7	C107	BS3171	PHYSICS AND CHEMISTRY LABORATORY
8	C108	GE3172	ENGLISH LABORATORY
SEMESTER - II			
9	C109	HS3251	PROFESSIONAL ENGLISH -II
10	C110	MA3251	STATISTICS AND NUMERICAL METHODS
11	C111	PH3202	PHYSICS FOR ELECTRICAL ENGINEERING
12	C112	BE3255	BASIC CIVIL AND MECHANICAL ENGINEERING
13	C113	GE3251	ENGINEERING GRAPHICS
14	C114	EE3251	ELECTRIC CIRCUIT ANALYSIS
15	C115	GE3271	ENGINEERING PRACTICES LABORATORY
16	C116	EE3271	ELECTRIC CIRCUIT LABORATORY
17	C117	GE3272	COMMUNICATION LABORATORY
SEMESTER - III			
18	C201	MA3303	PROBABILITY AND COMPLEX FUNCTIONS
19	C202	EE3301	ELECTROMAGNETIC FIELDS
20	C203	EE3302	DIGITAL CIRCUIT ANALYSIS
21	C204	EC3301	ELECTRONIC DEVICES AND CIRCUITS
22	C205	EE3303	ELECTRICAL MACHINES - I
23	C206	CS3353	C PROGRAMMING AND DATA STRUCTURES
24	C207	EC3311	ELECTRONIC DEVICES AND CIRCUITS LABORATORY

25	C208	EE3311	ELECTRICAL MACHINES LABORATORY - I
26	C209	CS3362	C PROGRAMMING AND DATASTRUCTURES LABORATORY
27	C210	GE3361	PROFESSIONAL DEVELOPMENT
SEMESTER - IV			
28	C211	EE3401	TRANSMISSION AND DISTRIBUTION
29	C212	EE3402	LINEAR INTEGRATED CIRCUITS
30	C213	EE3403	MEASUREMENTS AND INSTRUMENTATION
31	C214	EE3404	MICROPROCESSOR AND MICRO CONTROLLER
32	C215	EE3405	ELECTRICAL MACHINES - II
33	C216	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
34	C217	EE3411	ELECTRICAL MACHINES LABORATORY-II
35	C218	EE3412	LINEARAND DIGITAL CIRCUITS LABORATORY
36	C219	EE3413	MICROPROCESSOR AND MICRO CONTROLLER LABORATORY
SEMESTER - V			
37	C301	EE3501	POWER SYSTEM ANALYSIS
38	C302	EE3502	POWER ELECTRONICS
39	C303	EE3503	CONTROL SYSTEMS
40	C304	EE3001	UTILIZATION AND CONSERVATION OF ELECTRICAL ENERGY
41	C305	EE30007	SMART GRID
42	C306	EE3014	POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEM
43	C307	MX3084	DISASTER RISK REDUCTION AND MANAGEMENT
44	C308	EE3511	POWER ELECTRONICS LABORATORY
45	C309	EE3512	CONTROL AND INSTRUMENTATION LABORATORY
SEMESTER - VI			
46	C310	EE3601	PROTECTION AND SWITCHGEAR
47	C311	EE3602	POWER SYSTEM OPERATION AND CONTROL
48	C312	EE3012	ELECTRICAL DRIVES
49	C313	EE3006	POWER QUALITY
50	C314	EE3025	ELECTRIC VEHICLE ARCHITECTURE
51	C315	OCS352	IOT CONCEPTS AND APPLICATIONS
52	C316	MX3085	WELL, BEING WITH TRADITIONAL PRACTICES - YOGA, AYURVEDA AND SIDDHA
53	C317	EE3611	POWER SYSTEM LABORTORY

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & HS3151 - Professional English - I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Use appropriate words in a professional context.	K3
C101.2	Describe the basic grammatical structures and use them in right context.	K2
C101.3	Read and infer the denotative and connotative meanings of technical texts.	K1
C101.4	Visualize definitions, descriptions, narrations and essays on various topics.	K1

Course Code & Title: C102 & MA3151 - Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K2
C102.2	Apply differential calculus tools in solving various application problems.	K3
C102.3	Use differential calculus ideas on several variable functions	K2
C102.4	Apply different methods of integration in solving practical problems.	K3
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3

Course Code & Title: C103 & PH3151 - Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Understand the importance of mechanics.	K2
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K2
C103.4	Understand the importance of quantum physics.	K2
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K2

Course Code & Title: C104 & CY3151 - Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K4
C104.2	Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K2
C104.3	Apply the knowledge of phase rule and composites for material selection requirements.	K3
C104.4	Select suitable fuels for engineering processes and applications.	K2
C104.5	Recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K2

Course Code & Title: C105 & GE3151- Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K2
C105.2	Develop and execute simple Python programs.	K3
C105.3	Writes simple Python programs using conditionals and loops for solving problems	K3
C105.4	Decompose a Python program into function	K2
C105.5	Represent compound data using Python lists, tuples, dictionaries	K2

Course Code & Title: C106 & GE3171- Problem Solving and Python Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Develop algorithmic solutions to simple computational problems	K3
C106.2	Develop and execute simple Python programs	K3
C106.3	Implement programs in Python using conditionals and loops for solving problems.	K4
C106.4	Deploy functions to decompose a Python program	K3
C106.5	Utilize Python packages for developing real-world software applications.	K6

Course Code & Title: C107 & BS3171 - Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Understand the functioning of various physics laboratory equipment.	K3
C107.2	Use graphical models to analyze laboratory data.	K4
C107.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality	K3
C107.4	Access , process and analyze scientific information	K4
C107.5	Solve problems individually and collaboratively.	K5

Course Code & Title: C108 & GE3172 - English Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Listen to and comprehend general as well as complex academic information	K2
C108.2	Listen to and understand different points of view in a discussion	K2
C108.3	Speak fluently and accurately in formal and informal communicative contexts	K3
C108.4	Describe products and processes and explain their uses and purposes clearly and accurately	K2
C108.5	Express their opinions effectively in both formal and informal discussions	K2

SEMESTER 2

Course Code & Title: C109 & HS3251 - Professional English -II		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	Compare and contrast products and ideas in technical texts.	K4
C109.2	Identify and report cause and effects in events, industrial processes through technical texts.	K2
C109.3	Analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	Present their ideas and opinions in a planned and logical manner.	K2
C109.5	Draft effective resumes in the context of job search.	K3

Course Code & Title: C110 & MA3251 - Statistics and Numerical Methods		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C110.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C110.3	Appropriate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K3
C110.4	Understand the knowledge various techniques and methods for solving first and second order ordinary differential equations.	K2
C110.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K5

Course Code & Title: C111 & PH3202 - Physics for Electrical Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Know basics of dielectric materials and insulation	K2
C111.2	Gain knowledge on the electrical and magnetic properties of materials and their applications	K3
C111.3	Understand clearly of semiconductor physics and functioning of semiconductor devices	K2
C111.4	Understand the optical properties of materials and working principles of various optical devices	K3
C111.5	Appreciate the importance of nanotechnology and nanodevices.	K3

Course Code & Title: C112 & BE3255 - Basic Civil and Mechanical Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Understanding profession of Civil and Mechanical engineering.	K2
C112.2	Summaries the planning of building, infrastructure and working of Machineries.	K2
C112.3	Apply the knowledge gained in respective discipline	K3
C112.4	Illustrate the ideas of Civil and Mechanical Engineering applications	K4
C112.5	Appraise the material, Structures, machines and energy	K3

Course Code & Title: C113 & GE3251- Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Use BIS conventions and specifications for engineering drawing Use BIS conventions and specifications for engineering drawing	K2
C113.2	Construct the conic curves, involutes and cycloid	K2
C113.3	Solve practical problems involving projection of lines.	K5
C113.4	Draw the orthographic, isometric and perspective projections of simple solids.	K2
C113.5	Draw the development of simple solids	K2

Course Code & Title: C114 & EE3251 -Electric Circuit Analysis		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Explain circuit's behavior using circuit laws	K2
C114.2	Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit	K3
C114.3	Compute the transient response of first order and second order systems to step and sinusoidal input	K3
C114.4	Compute power, line/ phase voltage and currents of the given three phase circuit	K3
C114.5	Explain the frequency response of series and parallel RLC circuits	K2

Course Code & Title: C115 & GE3271 - Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work	K4
C115.2	Wire various electrical joints in common household electrical wire work.	K4
C115.3	Study and analyse the various electrical equipment's in common household applications	K4
C115.4	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipment's; Make a tray out of metal sheet using sheet metal work.	K4
C115.5	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K3

Course Code & Title: C116 & EE3271 – Electric Circuit Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit	K5
C116.2	Use simulation and experimental methods to verify the various electrical theorems.	K5
C116.3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental method	K4
C116.4	Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods	K4
C116.5	Analyze the performance of the given three-phase circuit using simulation and experimental methods	K4

Course Code & Title: C117 & GE3272 - Communication Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Prepare effectively in group discussions held in formal/semi formal contexts.	K3
C117.2	Analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C117.3	Write emails, letters and effective job applications.	K6
C117.4	Make critical reports to convey data and information with clarity and precision.	K6
C117.5	Examine appropriate instructions and recommendations for safe execution of tasks.	K3

SEMESTER3

Course Code & Title: C201 & MA3303 - Probability and Complex Functions		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon	K2
C201.2	Understand the basic concepts of one- and two-dimensional random variables and apply in engineering applications.	K2
C201.3	Develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.	K3
C201.4	Familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.	K4
C201.5	Acquaint the students with Differential Equations which are significantly used in engineering problems.	K3

Course Code & Title: C202 & EE3301 Electromagnetic Fields		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Visualize and explain Gradient, Divergence, and Curl operations on electromagnetic vector fields and identify the electromagnetic sources and their effects.	K2
C202.2	Compute and analyse electrostatic fields, electric potential, energy density along with their applications.	K4
C202.3	Compute and analyse magneto static fields, magnetic flux density, vector potential along with their applications.	K4
C202.4	Explain different methods of emf generation and Maxwell's equations	K2
C202.5	Explain the concept of electromagnetic waves and characterizing parameters	K2

Course Code & Title: C203 & EE3302 - Digital Logic Circuits		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Explain various number systems and characteristics of digital logic families	K2
C203.2	Apply K-maps and Quine McCluskey methods to simplify the given Boolean expressions	K3
C203.3	Explain the implementation of combinational circuit such as multiplexers and demultiplexers - code converters, adders, subtractors, Encoders and Decoders	K2
C203.4	Design various synchronous and asynchronous circuits using Flip Flops	K4
C203.5	Use VHDL for simulating and testing RTL, combinatorial and sequential circuits	K4

Course Code & Title: C204 & EC3301 - Electron Devices and Circuits		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Explain the structure and operation of PN junction devices (diode, Zener diode, LED and Laser diode)	K2
C204.2	Design clipper, clamper, half wave and full wave rectifier, regulator circuits using PN junction diodes.	K4
C204.3	Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT	K4
C204.4	Analyze the performance of various configurations of BJT and MOSFET based amplifier	K4
C204.5	Explain the operation of various feedback amplifiers and oscillators	K2

Course Code & Title: C205 & EE3303 - Electrical Machines - I		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems.	K2
C205.2	Explain the construction and working principle of DC machines	K2
C205.3	Compute various performance parameters of the machine, by conducting suitable tests.	K2
C205.4	Draw the equivalent circuit of transformer and predetermine the efficiency and regulation	K2
C205.5	Describe the working principle of auto transformer, three phase transformer with different types of connections	K2

Course Code & Title: C206 & CS3353 - C Programming and Data Structures		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Develop C programs for any real world/technical application	K3
C206.2	Apply advanced features of C in solving problems	K3
C206.3	Suggest and use appropriate linear/non-linear data structure operations for solving a given problem.	K2
C206.4	Appropriately use sort and search algorithms for a given application	K3
C206.5	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval	K3

Course Code & Title: C207 & EC3311 Electronic Devices and Circuits Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C207.1	Analyze the characteristics of PN, Zener diode and BJT in CE,CC,CB configurations experimentally	K4
C207.2	Analyze the characteristics of JFET and UJT experimentally.	K4
C207.3	Analyze frequency response characteristics of a Common Emitter amplifier experimentally.	K4
C207.4	Analyze the characteristics of half-wave and full-wave rectifier with and without filters experimentally.	K4
C207.5	Analyze the frequency response characteristics of passive filters experimentally	K4

Course Code & Title: C208 & EE3311 Electrical Machines Laboratory – I		
	CO Statements	Knowledge Level
The students should be able to		
C208.1	Construct the circuit with appropriate connections for the given DC machine/transformer.	K4
C208.2	Experimentally determine the characteristics of different types of DC machines and speed control	K4
C208.3	Identify suitable methods for testing of transformer and DC machines.	K4
C208.4	Predetermine the performance parameters of transformers and DC motor.	K4
C208.5	Understand DC motor starters and 3-phase transformer connections.	K5

Course Code & Title: C209 & CS3362 C Programming and Data Structures Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C209.1	Use different constructs of C and develop applications	K4
C209.2	Write functions to implement linear and non-linear data structure operations	K2
C209.3	Suggest and use the appropriate linear / non-linear data structure operations for a given problem	K4
C209.4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval	K4
C209.5	Implement Sorting and searching algorithms for a given application	K5

Course Code & Title: C210 & GE3361 - Professional Development

	CO Statements	Knowledge Level
The students should be able to		
C210.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements.	K3
C210.2	Analyze themselves actively involved in group discussion activities. 2:Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding.	K4
C210.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K3

SEMESTER 4

Course Code & Title: C211 & EE3401 - Transmission and Distribution		
	CO Statements	Knowledge Level
The students should be able to		
C211.1	Understand the structure of power system, computation of transmission line parameters for different configurations.	K2
C211.2	Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance.	K3
C211.3	Do Mechanical design of transmission lines, grounding and to understand about the insulators in transmission system.	K4
C211.4	Design the underground cables and understand the performance analysis of underground cable.	K4
C211.5	Understand the modelling, performance analysis and modern trends in distribution system.	K2

Course Code & Title: C212 & EE3402 - Linear Integrated Circuits		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	Explain monolithic IC fabrication process of diodes, capacitance, resistance, FETs and PV Cell.	K2
C212.2	Analyze the characteristics and basic applications (inverting/non-inverting amplifier, summer, differentiator, integrator, V/I and I/V converter) of Op-Amp	K2
C212.3	Explain circuit and applications of op-amp based instrumentation amplifier, log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converters	K3
C212.4	Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs	K2
C212.5	Explain the applications of ICs in Instrumentation amplifier, fixed and variable voltage regulator, SMPS and function generator	K3

Course Code & Title: C213 & EE3403 - Measurements and Instrumentation		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Understand the fundamental art of measurement in engineering.	K2
C213.2	Understand the structural elements of various instruments.	K2
C213.3	Understand the importance of bridge circuits.	K2
C213.4	Understand about various transducers and their characteristics by experiments	K2
C213.5	Understand the concept of digital instrumentation and virtual instrumentation by experiments.	K2

Course Code & Title: C214 & EE3404 - Microprocessor and Microcontroller		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	write assembly language program for microprocessor and microcontroller	K2
C214.2	design and implement interfacing of peripheral with microprocessor and microcontroller	K5
C214.3	analyze , comprehend, design and simulate microprocessor-based systems used for control and monitoring.	K4
C214.4	analyze , comprehend, design and simulate microcontroller based systems used for control and monitoring.	K4
C214.5	understand and appreciate advanced architecture evolving microprocessor field	K2

Course Code & Title: C215 & EE3405 - Electrical Machines - II		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	Understand the construction and working principle of Synchronous generator	K2
C215.2	Understand the construction and working principle of Synchronous Motor	K2
C215.3	Understand the construction and working principle of Three Phase Induction Motor	K2
C215.4	Acquire knowledge about the starting and speed control of induction motors.	K3
C215.5	Gain knowledge about the basic principles and working of Single-phase induction motors and Special Electrical Machines.	K3

Course Code & Title: C216 & GE3451 - Environmental Sciences and Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
C216.2	Identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
C216.3	Identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations	K2
C216.4	Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K1
C216.5	Demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3

Course Code & Title: C217 & EE3411 Electrical Machines Laboratory - II

	CO Statements	Knowledge Level
The students should be able to		
C217.1	Understand and analyze EMF and MMF methods	K4
C217.2	Analyze the characteristics of V and Inverted V curves	K4
C217.3	Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines	K4
C217.4	Acquire hands on experience of conducting various tests on induction motors and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors	K4
C217.5	Acquire knowledge on separation of losses	K4

Course Code & Title: C218 & EE3412 Linear and Digital Circuits Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C218.1	Understand and implement Boolean Functions.	K2
C218.2	Understand the importance of code conversion.	K2
C218.3	Design and implement circuits with digital ICs like decoders, multiplexers, register.	K5
C218.4	Acquire knowledge on Application of Op-Amp	K4
C218.5	Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters.	K5

Course Code & Title: C219 & EE3413 Microprocessor and Microcontroller Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C219.1	Write assembly language program for microprocessor	K2
C219.2	Write assembly language program for microcontroller	K2
C219.3	Design and implement interfacing of peripheral with microprocessor and microcontroller	K5
C219.4	Analyze , comprehend, design and simulate microprocessor-based systems used for control and monitoring	K4
C219.5	Analyze , comprehend, design and simulate microcontroller-based systems used for control and monitoring.	K4

SEMESTER 5

Course Code & Title: C301 & EE3501 Power System Analysis

	CO Statements	Knowledge Level
The students should be able to		
C301.1	Model the power system under steady state operating condition	K3
C301.2	Carry out power flow analysis using iterative methods	K3
C301.3	Infer the significance of short circuit studies in designing circuit breakers	K3
C301.4	Analyze the state of the power system for various unsymmetrical faults.	K4
C301.5	Analyze the stability of power system using different methods.	K4

Course Code & Title: C302 & EE3591 - Power Electronics

	CO Statements	Knowledge Level
The students should be able to		
C302.1	Understand the operation of semiconductor devices and dynamic characteristics and to design & analyze the low power SMPS	K2
C302.2	Analyze the various uncontrolled rectifiers and design suitable filter circuits	K4
C302.3	Analyze the operation of the n-pulse converters and evaluate the performance parameters	K4
C302.4	Understand various PWM techniques and apply voltage control and harmonic elimination methods to inverter circuits.	K2
C302.5	Understand the operation of AC voltage controllers and its applications.	K2

Course Code & Title: C303 & EE3503 Control Systems		
	CO Statements	Knowledge Level
The students should be able to		
C303.1	Represent simple systems in transfer function and state variable forms.	K3
C303.2	Analyze simple systems in time domain	K4
C303.3	Analyze simple systems in frequency domain	K4
C303.4	Infer the stability of systems in time and frequency domain.	K3
C303.5	Interpret characteristics of the system and find out solution for simple control problems	K3

Course Code & Title: C304 & EE3001 - Utilization and Conservation of Electrical Energy		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	Choose suitable electric drives for different applications	K2
C304.2	Design the illumination systems for energy saving	K4
C304.3	Demonstrate the utilization of electrical energy for heating and welding purposes	K2
C304.4	Know the effective usage of solar and wind energies for electrical applications	K2
C304.5	Illustrate the need for energy conservation and to simulate three phase power control	K4

Course Code & Title: C305 & EE3007 - Smart Grid		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Understand the importance and objectives of Power System Grid.	K2
C305.2	Know and understand the concept of a smart grid	K2
C305.3	Identify and discuss smart metering devices and associated technologies.	K2
C305.4	Able to get an overview of Microgrid and Electric Vehicle Technology.	K2
C305.5	Able to have an up-to-date knowledge on the various computing technologies; to understand the role of Big Data and IoT for effective and efficient operation of Smart Grid.	K2

Course Code & Title: C306 & EE3014 - Power Electronics for Renewable Energy System		
	CO Statements	Knowledge Level
The students should be able to		
C306.1	Examine the available renewable energy sources. .	K3
C306.2	Demonstrate the working principles of electrical machines and power converters used for wind energy conversion system	K3
C306.3	Demonstrate the principles of power converters used for solar PV systems	K3
C306.4	Examine the available hybrid renewable energy systems	K3
C306.5	Simulate AC-DC converters, buck/boost converters, AC-AC converters and PWM inverters. .	K5

Course Code & Title: C307 & MX3084 - Disaster Risk Reduction and Management		
	CO Statements	Knowledge Level
The students should be able to		
C307.1	Impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)	K2
C307.2	Enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction	K2
C307.3	Develop disaster response skills by adopting relevant tools and technology	K3
C307.4	Enhance awareness of institutional processes for Disaster response in the country	K2
C307.5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity	K3

Course Code & Title: C308 & EE3511 - Power Electronics Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C308.1	Determine the characteristics of SCR, IGBT, TRIAC, MOSFET and IGBT	K3
C308.2	Find the transfer characteristics of full converter, semi converter, step up and step down choppers by simulation experimentation	K4
C308.3	Analyze the voltage waveforms for PWM inverter using various modulation techniques	K4
C308.4	Design and experimentally verify the performance of basic DC/DC converter topologies used for SMPS.	K5
C308.5	Understand the performance of AC voltage controllers by simulation and experimentation	K3

Course Code & Title: C309 & EE3512 - Control and Instrumentation Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C309.1	Model and analyze simple physical systems and simulate the performance in analog and digital platform. .	K4
C309.2	Design and implement simple controllers in standard forms.	K5
C309.3	Design compensators based on time and frequency domain specifications.	K5
C309.4	Design a complete closed control loop and evaluate its performance for simple physical systems.	K5
C309.5	Analyze the stability of a physical system in both continuous and discrete domains	K4

SEMESTER 6

Course Code & Title: C310 & EE3601 - Protection And Switchgear

	CO Statements	Knowledge Level
The students should be able to		
C310.1	Understand and select proper protective scheme and type of earthing	K2
C310.2	Explain the operating principles of various relays.	K2
C310.3	Suggest suitable protective scheme for the protection of various power system apparatus.	K2
C310.4	Analyze the importance of static relays and numerical relays in power system Protection.	K4
C310.5	Summarize the merits and demerits and application areas of various circuit breakers	K2

Course Code & Title: C311 & EE3602 - Power System Operation and Control

	CO Statements	Knowledge Level
The students should be able to		
C311.1	Understand the day – to – day operation of power system	K2
C311.2	Model and analyse the control actions that are implemented to meet the minute-to minute variation of system real power demand.	K3
C311.3	Model and analyze the compensators for reactive power control and various devices used for voltage control.	K3
C311.4	Prepare day ahead and real time economic generation scheduling.	K4
C311.5	Understand the necessity of computer control of power systems	K2

Course Code & Title: C312 & EE3012 - Electrical Drives		
	CO Statements	Knowledge Level
The students should be able to		
C312.1	Understand the basic requirements of motor selection for different load profiles	K2
C312.2	Analyse the steady state behavior and stability aspects of drive systems	K4
C312.3	Analyse the dynamic performance of the DC drive using converter and chopper	K4
C312.4	Simulate the AC drive.	K4
C312.5	Design the controller for electrical drives.	K5

Course Code & Title: C313 & EE3006 - Power Quality		
	CO Statements	Knowledge Level
The students should be able to		
C313.1	Use various definitions of power quality for power quality issues.	K4
C313.2	Describe the concepts related with single phase / three phase, linear / nonlinear loads and single phase / three phase sinusoidal, non-sinusoidal source	K3
C313.3	Solve problems related with mitigation of Power System Harmonics	K4
C313.4	Use DSTATCOM for load compensation	K4
C313.5	Demonstrate the role of DVR, SAFs UPQC in power distribution systems.	K3

Course Code & Title: C314 & EE3025 - Electric Vehicle Architecture		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Summarize the History and Evolution of EVs, Hybrid and Plug-In Hybrid EVs	K3
C314.2	Describe the various EV components	K3
C314.3	Describe the concepts related in the Plug-In Hybrid Electric Vehicles	K3
C314.4	Analyse the details and Specifications for the various EVs developed.	K4
C314.5	Describe the hybrid vehicle control strategy.	K3

Course Code & Title: C315 & OCS352 IOT - Concepts and Applications		
	CO Statements	Knowledge Level
The students should be able to		
C315.1	Explain the concept of IoT.	K2
C315.2	Understand the communication models and various protocols for IoT.	K2
C315.3	Design portable IoT using Arduino/Raspberry Pi /open platform	K5
C315.4	Apply data analytics and use cloud offerings related to IoT.	K3
C315.5	Analyze applications of IoT in real time scenario	K4

Course Code & Title: C316 & MX3085 Well Being With Traditional Practices -Yoga, Ayurveda And Siddha		
	CO Statements	Knowledge Level
The students should be able to		
C316.1	Learn the importance of different components of health	K2
C316.2	Gain confidence to lead a healthy life	K3
C316.3	Learn new techniques to prevent lifestyle health disorders	K3
C316.4	Understand the importance of diet and workouts in maintaining	K2

Course Code & Title: C317 & EE3611 Power System Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C317.1	Model and analyze the performance of the transmission lines.	K4
C317.2	Perform power flow, short circuit, and stability analysis for any power system network.	K4
C317.3	Design , and analyze the load frequency control mechanism..	K5
C317.4	Perform optimal scheduling of generators and compute the state of the power system	K4
C317.5	Understand , analyze, and apply the relays for power system protection	K4

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Code & Title:

As per Autonomous Regulation 2023, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (Autonomous)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	23HS101	PROFESSIONAL ENGLISH - I
2	C102	23MA101	MATRICES AND CALCULUS
3	C103	23PH101	ENGINEERING PHYSICS
4	C104	23CY101	ENGINEERING CHEMISTRY
5	C105	23GE101	PROBLEM SOLVING AND PYTHON PROGRAMMING
6	C106	23GE103	தமிழர் மரபு /HERITAGE OF TAMILS
7	C107	23BS112	PHYSICS AND CHEMISTRY LABORATORY
8	C108	23GE112	ENGLISH LABORATORY -I
SEMESTER - II			
9	C109	23HS201	PROFESSIONAL ENGLISH – II
10	C110	23MA202	TRANSFORMS AND NUMERICAL METHODS
11	C111	23PH202	PHYSICS FOR ELECTRICAL ENGINEERING
12	C112	23BE203	BASIC CIVIL AND MECHANICAL ENGINEERING
13	C113	23GE202	ENGINEERING GRAPHICS
14	C114	23EE201	ANALYSIS OF ELECTRIC CIRCUITS
15	C115	23GE201	தமிழரும் தொழில்நுட்பமும் / TAMILS AND TECHNOLOGY
16	C116	23GE211	ELECTRONIC PRACTICE LABORATORY
17	C117	23EE211	ELECTRIC CIRCUIT LABORATORY
18	C118	23GE212	ENGLISH LABORATORY –II

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & 23HS101 Professional English - I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	To use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	To gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	To read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	To write definitions, descriptions, narrations and essays on various topics.	K6
C101.5	To express their opinions effectively in both oral and written medium of communication.	K6

Course Code & Title: C102 & 23MA101 Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Able to use differential calculus ideas on several variable functions.	K3
C102.3	Apply integral calculus and multiple integral tools in solving various application problems.	K3
C102.4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	K2
C102.5	Apply various techniques in solving ordinary differential equations.	K3

Course Code & Title: C103 & 23PH101 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Infer the characteristics of laser for various Engineering applications and expand the understanding of optical fibers use in communications.	K2
C103.4	Apply quantum theory's sophisticated physics notions to the matter characterization.	K3
C103.5	Know the fundamentals of crystal formations and growth methods.	K2

Course Code & Title: C104 & 23CY101 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Summarize the water related problems in boilers and their treatment techniques.	K1
C104.2	Discuss the applications of nano materials in medicine, agriculture, energy, electronics and catalysis.	K2
C104.3	Discuss the types, properties and applications of polymers and composites.	K3
C104.4	Summarize the fuels used for engineering processes and applications of fuels.	K2
C104.5	Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.	K3

Course Code & Title: C105 & 23GE101 Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K2
C105.2	Develop simple applications using basic constructs.	K2
C105.3	Write programs using arrays and strings.	K3
C105.4	Design and implement applications using functions, pointers and structures	K6
C105.5	Design applications using sequential and random access file processing.	K6

Course Code & Title: C107 & 23BS112 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Apprehend the concepts of interference, diffraction of light and recognize the resonance concept of waves.	K2
C107.2	Apply the principles of operations of optical fibers, semiconductor using simple circuits and interaction of electromagnetic waves and crystalline solids.	K3
C107.3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
C107.4	Experiment the relationship between the light and matter & properties of liquids.	K4
C107.5	Estimate the velocity of sound and compressibility of liquid.	K2

Course Code & Title: C107 & 23BS112 Physics and Chemistry Laboratory
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	CO Statements	Knowledge Level
The students should be able to		
C107.1	Analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C107.2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	K3
C107.3	Analyze and determine the composition of alloys.	K4
C107.4	Learn simple method of synthesis of nanoparticles+	K2
C107.5	Quantitatively analyze the impurities in solution by electro analytical methods.	K4

Course Code & Title: C108 & 23GE112 English Laboratory -I		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	To listen to and comprehend general as well as complex academic information.	K2
C108.2	To listen to and understand different points of view in a discussion.	K2
C108.3	To speak fluently and accurately in formal and informal communicative contexts.	K3
C108.4	To describe products and processes and explain their uses and purposes clearly and accurately.	K6
C108.5	To express their opinions effectively in both formal and informal discussions.	K6

SEMESTER 2

Course Code & Title: C109 & 23HS201 Professional English – II		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	To compare and contrast products and ideas in technical texts and write analytical essays.	K2
C109.2	To identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C109.3	To analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	To present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C109.5	To draft effective resumes in the context of job application.	K6

Course Code & Title: C110 & 23MA202 Transforms and Numerical Methods		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	To apply Laplace Transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	K3
C110.2	To understand general periodic functions and apply in problems of Fourier series, which are sums of sines and cosines.	K2
C110.3	To use the Fourier Transform as the tool to connect the time domain and frequency domain in signal processing.	K3
C110.4	Understand the basic concepts and Techniques of solving algebraic and transcendental equations.	K2
C110.5	Solve the ordinary differential equations with initial conditions by using certain techniques with engineering applications.	K4

Course Code & Title: C111 & 223PH202 -Physics for Electrical Engineering
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	CO Statements	Knowledge Level
The students should be able to		
C111.1	To understand about the creation of energy band structures, free electron theory, and quantum theory and gain knowledge about magnetic materials and its applications.	K2
C111.2	To evaluate the functions of semiconductors and their uses.	K2
C111.3	To apply the knowledge of dielectric materials, as well as the applications.	K3
C111.4	To understand about the uses of superconducting and Optical properties of materials.	K2
C111.5	To describe the basic principles behind the operation of nano electronic devices.	K2

Course Code & Title: C112 & 23BE203 – Basic Civil and Mechanical Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Understanding profession of Civil and Mechanical engineering.	K2
C112.2	Illustrate the Basics in surveying and material used in construction.	K2
C112.3	Summaries the planning of building, infrastructure and Building components	K3
C112.4	Illustrate working principles of IC Engine, different types of power plant and turbines.	K3
C112.5	Elaborate the components and working principles of Refrigeration and Air conditioning system.	K3

Course Code & Title: C113 & 23GE202 Engineering Graphics
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	CO Statements	Knowledge Level
The students should be able to		
C113.1	Construct the conic curves, involutes and cycloid.	K2
C113.2	Solve practical problems involving projection of lines, points and plane surfaces.	K2
C113.3	Draw orthographic projection of solids and freehand sketch of simple objects.	K5
C113.4	Draw the sectioning and development of simple solids.	K2
C113.5	Draw isometric and perspective projections of simple solids.	K2

Course Code & Title: C114 & 23EE201 Analysis of Electric Circuits

	CO Statements	Knowledge Level
The students should be able to		
C114.1	Explain circuit's behavior using circuit laws.	K1
C114.2	Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit.	K2
C114.3	Compute the transient response of first order and second order systems to step and sinusoidal input.	K3
C114.4	Compute power, line/ phase voltage and currents of the given three phase circuit.	K3
C114.5	Comprehend the frequency response of series and parallel RLC circuits.	K2

Course Code & Title: C116 & 23GE211 - Engineering Practices Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C116.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work	K4
C116.2	Wire various electrical joints in common household electrical wire work.	K4
C116.3	Study and analyse the various electrical equipment's in common household applications	K4
C116.4	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipment's; Make a tray out of metal sheet using sheet metal work.	K4
C116.5	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K3

Course Code & Title: C117 & 23EE211 – Electric Circuit Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit	K5
C117.2	Use simulation and experimental methods to verify the various electrical theorems.	K5
C117.3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental method	K4
C117.4	Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods	K4
C117.5	Analyze the performance of the given three-phase circuit using simulation and experimental methods	K4

Course Code & Title: C118 & 23GE212 English Laboratory –II

	CO Statements	Knowledge Level
The students should be able to		
C118.1	Speak effectively in group discussions held in a formal/semi-formal contexts.	K6
C118.2	Discuss , analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C118.3	Make effective presentations in an attractive way using appropriate vocabulary.	K3
C118.4	Attend job interviews and be successful in them.	K6
C118.5	Develop adequate Soft Skills required for the workplace.	K3

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code & Title:

As per Anna University Regulation 2017, the list of courses for the batch 2020 - 2024 is given in the Table 1.1.

Table 1.1 - List of Courses with Course Code:

S/ N	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1.	C101	HS8151	COMMUNICATIVE ENGLISH
2.	C102	MA8151	ENGINEERING MATHEMATICS – I
3.	C103	PH8151	ENGINEERING PHYSICS
4.	C104	CY8151	ENGINEERING CHEMISTRY
5.	C105	GE8151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6.	C106	GE8152	ENGINEERING GRAPHICS
7.	C107	GE8161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8.	C108	BS8161	PHYSICS AND CHEMISTRY LABORATORY
SEMESTER - II			
9.	C109	HS8251	TECHNICAL ENGLISH
10.	C110	MA8251	ENGINEERING MATHEMATICS – II
11.	C111	PH8253	PHYSICS FOR ELECTRONICS ENGINEERING
12.	C112	BE8254	BASIC ELECTRICAL AND INSTRUMENTATION ENGINEERING
13.	C113	EC8251	CIRCUIT ANALYSIS
14.	C114	EC8252	ELECTRONIC DEVICES
15.	C115	EC8261	CIRCUITS AND DEVICES LABORATORY
16.	C116	GE8261	ENGINEERING PRACTICES LABORATORY
SEMESTER - III			
17.	C201	MA8352	LINEAR ALGEBRA AND PARTIAL DIFFERENTIAL EQUATIONS
18.	C202	EC8393	FUNDAMENTALS OF DATA STRUCTURES IN C
19.	C203	EC8351	ELECTRONIC CIRCUITS-I
20.	C204	EC8352	SIGNALS AND SYSTEMS

21.	C205	EC8392	DIGITAL ELECTRONICS
22.	C206	EC8391	CONTROL SYSTEM ENGINEERING
23.	C207	EC8381	FUNDAMENTALS OF DATA STRUCTURES IN C LABORATORY
24.	C208	EC8361	ANALOG AND DIGITAL CIRCUITS LABORATORY
25.	C209	HS8381	INTERPERSONAL SKILLS/LISTENING & SPEAKING
SEMESTER - IV			
26.	C210	MA8451	PROBABILITY AND RANDOM PROCESSES
27.	C211	EC8452	ELECTRONIC CIRCUITS-II
28.	C212	EC8491	COMMUNICATION THEORY
29.	C213	EC8451	ELECTROMAGNETIC FIELDS
30.	C214	EC8453	LINEAR INTEGRATED CIRCUITS
31.	C215	GE8291	ENVIRONMENTAL SCIENCE AND ENGINEERING
32.	C216	EC8461	CIRCUITS DESIGN AND SIMULATION LABORATORY
33.	C217	EC8462	LINEAR INTEGRATED CIRCUITS LABORATORY
SEMESTER - V			
34.	C301	EC8501	DIGITAL COMMUNICATION
35.	C302	EC8553	DISCRETE-TIME SIGNAL PROCESSING
36.	C303	EC8552	COMPUTER ARCHITECTURE AND ORGANIZATION
37.	C304	EC8551	COMMUNICATION NETWORKS
38.	C305	GE8077	TOTAL QUALITY MANAGEMENT
39.	C306	OMD551	BASICS OF BIOMEDICAL INSTRUMENTATION
40.	C307	EC8562	DIGITAL SIGNAL PROCESSING LABORATORY
41.	C308	EC8561	COMMUNICATION SYSTEMS LABORATORY
42.	C309	EC8563	COMMUNICATION NETWORKS LABORATORY
SEMESTER - VI			
43.	C310	EC8691	MICROPROCESSORS AND MICROCONTROLLERS
44.	C311	EC8095	VLSI DESIGN
45.	C312	EC8652	WIRELESS COMMUNICATION

46.	C313	MG8591	PRINCIPLE OF MANAGEMENT
47.	C314	EC8651	TRANSMISSION LINES AND RF SYSTEMS
48.	C315	EC8004	WIRELESS NETWORKS
49.	C316	EC8681	MICROPROCESSORS AND MICROCONTROLLERS LABORATORY
50.	C317	EC8661	VLSI DESIGN LABORATORY
51.	C318	EC8611	TECHNICAL SEMINAR
52.	C319	HS8581	PROFESSIONAL COMMUNICATION

SEMESTER - VII

53.	C401	EC8701	ANTENNAS AND MICROWAVE ENGINEERING
54.	C402	EC8751	OPTICAL COMMUNICATION
55.	C403	EC8791	EMBEDDED AND REAL TIME SYSTEMS
56.	C404	EC8702	ADHOC AND WIRELESS SENSOR NETWORKS

57.	C406	OIC751	INDUSTRIAL SAFETY
58.	C407	EC8711	EMBEDDED LABORATORY
59.	C408	EC8761	ADVANCED COMMUNICATION LABORATORY

SEMESTER - VIII

60.	C409	GE8076	PROFESSIONAL ETHICS IN ENGINEERING
61.	C410	EC8094	SATELLITE COMMUNICATION
62.	C411	EC8811	PROJECT WORK

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & HS8151 - Communicative English

	CO Statements	Knowledge Level
The students should be able to		
C101.1	Enhance their reading and technical writing skills in the first year itself.	K2
C101.2	Read comfortably and understand articles in Science and Engineering journals and articles in dailies.	K2
C101.3	Get themselves involved in an active manner during informal conversations, state opinions and express willingness.	K3
C101.4	Communicate effectively in short conversations and talks uttered in English.	K4
C101.5	Draft essays related to their subjects and write personal letters and emails in comfortable manner for lifelong learning.	K4

Course Code & Title: C102 & MA8151 - Engineering Mathematics - I

	CO Statements	Knowledge Level
The students should be able to		
C102.1	Analyze and apply the Engineering knowledge in differentiation to solve maxima and minima problems.	K4
C102.2	Solve the problems of integrals using different methods of calculus.	K4
C102.3	Design and develop the problems of integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K4
C102.4	Analyze the problems of integrals by using various methods of integration, such as substitution, partial fractions and integration by parts.	K4
C102.5	Apply various tools in solving the differential equations to recognize the need for life-long learning.	K3

Course Code & Title: C103 & PH8151 - Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Analyse the problems in columns and beams and gain the engineering knowledge in properties of matter to formulate.	K4
C103.2	Understand the fundamental concepts and applications of waves, lasers and fiber optics to give theoretical approaches to design modern devices.	K2
C103.3	Interpret the knowledge in thermal properties of materials and can determine expansion joints and heat exchangers in devices.	K3
C103.4	Understand the fundamental concepts of quantum theory and how modern electron microscope techniques use it to make predictions in the field of physics.	K2
C103.5	Describe the behavior of solids, the fundamentals of crystals, their structures and the various crystal development processes.	K2

Course Code & Title: C104 & CY8151 - Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Apply the water treatment techniques in the industries and domestic water using the latest techniques by using engineering knowledge.	K3
C104.2	Understand the adsorption methods used in the field of water and air pollution purification to assess societal, health, safety and cultural issues in the environmental.	K2
C104.3	Know the significance of alloying and the behavior of one component and two component systems using phase diagram and apply appropriate techniques in the field of metallurgy.	K2
C104.4	Discuss the types of fuels, calorific value calculations, and analyze the need for alternative fuels to solve current social problems by using engineering techniques.	K4
C104.5	Review the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells with appropriate consideration for the societal and environmental considerations.	K2

Course Code & Title: C105 & GE8151- Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Understand the concepts of computational thinking and algorithmic problem-solving techniques.	K2
C105.2	Develop simple python programs for applying the concepts of data types, expressions, and python statements.	K3
C105.3	Develop Python programs for solving real-time computational problems by using conditionals, looping, functions, and strings.	K3
C105.4	Understand the concepts of compound data using Python lists, tuples, and dictionaries.	K2
C105.5	Develop python programs for solving computational problems by using modules, files and python packages.	K3

Course Code & Title: C106 & GE8152- Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Sketch the conic sections, special curves, and draw orthographic views from pictorial views and models.	K4
C106.2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.	K3
C106.3	Sketch the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.	K4
C106.4	Practice the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its lateral surfaces.	K3
C106.5	Sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.	K4

Course Code & Title: C107 & GE8161- Problem Solving and Python Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Develop simple python programs for applying the concepts of data types, expressions and python statements.	K3
C107.2	Develop Python programs using conditionals, looping, functions and strings for solving real-time computational problems.	K3
C107.3	Understand the concepts of compound data using Python lists, tuples and dictionaries.	K2
C107.4	Develop python programs for solving problems by using modules, files and python packages.	K3
C107.5	Utilize Python packages for developing real-world software applications.	K6

Course Code & Title: C108 & BS8161 - Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Manipulate the fundamental concepts like torque, elasticity and bending moment of beams for various engineering applications by the determination of rigidity modulus of the wire and young's modulus of the material of the beam by non-uniform bending.	K3
C108.2	Practice the fundamentals of thermal properties of material of the bad conductor by Lee's disc method.	K3
C108.3	Understand the basic knowledge and estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer.	K2
C108.4	Dramatize the strength of an acid using pH meter and conduct meter for applications in the field of engineering.	K3
C108.5	Experiment the estimation of total, permanent and temporary hardness of water for our environment.	K3

SEMESTER 2

Course Code & Title: C109 & HS8251 - Technical English

	CO Statements	Knowledge Level
The students should be able to		
C109.1	Read and write their technical and area-specific texts in an effortless manner.	K3
C109.2	Listen comfortably and respond confidently to lectures and talks pertaining to their domain skills.	K2
C109.3	Speak in an appropriate manner in both formal and informal situations for lifelong learning.	K3
C109.4	Create CVs and draft Job applications in confident manner.	K6
C109.5	Communicate confidently by using all the four skills with their peers and in real life situations.	K4

Course Code & Title: C110 & MA8251 - Engineering Mathematics - II

	CO Statements	Knowledge Level
The students should be able to		
C110.1	Analyze the different types of matrices for solving practical problems.	K4
C110.2	Apply gradient, divergence and curl of a vector point function and related identities in engineering field.	K3
C110.3	Acquire the knowledge to solve the engineering problems in analytic functions.	K2
C110.4	Analyze and apply the different methods to solve complex integration problems.	K4
C110.5	Create and manage the projects after applying and analyzing the fundamentals of Laplace transforms.	K4

Course Code & Title: C111 & PH8253 - Physics for Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Comprehend the materials for their diverse applications, it is necessary to grasp the energy band structures and the classical and quantum electron theories.	K3
C111.2	Provide a balanced understanding of diverse semiconductor electronic devices, such as hall devices, ohmic contacts, Schottky diodes, and power transistors, by explaining the fundamental principles of semiconductor physics.	K2
C111.3	Interpret the properties of magnetic and dielectric materials, manipulate them and then analyze them for the purposes for which they are used in modern devices.	K3
C111.4	Understand the fundamental properties of optical materials in optoelectronics which is essential to comprehend the theoretical methods for designing modern optoelectronic devices.	K2
C111.5	Comprehend the fundamentals of quantum structures and the nano scale manipulation of modern materials in spintronics and carbon electronics.	K2

Course Code & Title: C112 & BE8254 - Basic Electrical and Instrumentation Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Understand the operation of three phase electrical circuits and power system.	K2
C112.2	Analyse the regulation and efficiency of transformers.	K4
C112.3	Understand the characteristics of DC Generator and Motor.	K2
C112.4	Analyse the performance of AC and DC machines.	K4
C112.5	Apply the concepts of measurements and instruments for real time applications.	K3

Course Code & Title: C113 & EC8251- Circuit Analysis		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Understand the basic concepts of circuit elements and fundamental laws applied for circuits.	K2
C113.2	Apply circuit theorems for DC and AC circuits to find the electrical parameters.	K3
C113.3	Understand the concept of resonant theory and coupled circuits.	K2
C113.4	Analyze the transient response of DC and AC circuits in series and parallel configurations.	K4
C113.5	Construct the two port networks and to verify its properties.	K2

Course Code & Title: C114 & EC8252 - Electronic Devices		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Understand the fundamental concepts of semiconductor diode and its operation.	K2
C114.2	Elaborate the construction and operation of transistors with its equivalent circuits.	K2
C114.3	Describe the construction and operation of FET and its characteristics.	K2
C114.4	Understand the principle of operation and characteristics of special semiconductor devices.	K2
C114.5	Discuss the operation of various semiconductor photo devices and power electronic devices.	K2

Course Code & Title: C115 & EC8261 - Circuits and Devices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Demonstrate VI characteristics of basic electronic devices.	K2
C115.2	Apply network theorems for electrical circuits.	K3
C115.3	Demonstrate the transient analysis and resonance of the RLC circuits.	K2

Course Code & Title: C116 & GE8261 - Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Fabricate carpentry joints.	K6
C116.2	Use Welding equipment's to join the structures.	K3
C116.3	Perform sheet metal works.	K6
C116.4	Perform basic fitting operations and plumbing.	K3
C116.5	Carry out basic home electrical works and appliances.	K3

SEMESTER 3

Course Code & Title: C201 & MA8352 - Linear Algebra and Partial Differential Equations

	CO Statements	Knowledge Level
The students should be able to		
C201.1	Analyze the fundamental concepts of advanced algebra and their role in modern Mathematics and applied contexts.	K3
C201.2	Apply the accurate and efficient use of advanced algebraic techniques in engineering field.	K4
C201.3	Solve non - trivial problems related to the concepts and by proving simple theorems.	K3
C201.4	Apply the engineering knowledge to manage the projects in transforms and partial differential equations to formulate and solve some of the physical engineering problems.	K6
C201.5	Identify and analyze the partial differential equations using Fourier series analysis in engineering applications.	K3

Course Code & Title: C202 & EC8393 - Fundamentals of Data Structures in C

	CO Statements	Knowledge Level
The students should be able to		
C202.1	Understand the fundamentals of basic C programming.	K2
C202.2	Create an application program using functions, pointers, structures and unions.	K3
C202.3	Implement linear data structures such as arrays, stacks, queues and linked list operations using C.	K3
C202.4	Implement non-linear data structures Trees and Graphs for an application.	K4
C202.5	Apply various sorting algorithms for an application using C program.	K4

Course Code & Title: C203 & EC8351 - Electronic Circuits- I		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Understand the fundamental concepts of biasing of BJT.	K2
C203.2	Design the single stage and multistage BJT amplifiers.	K2
C203.3	Analyze the FET and MOSFET small signal amplifiers.	K4
C203.4	Analyze the frequency response characteristics of FET and MOSFET small signal amplifiers.	K4
C203.5	Illustrate different types of rectifiers and power supplies.	K3

Course Code & Title: C204 & EC8352 - Signals and Systems		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Analyze the properties of signals and systems.	K4
C204.2	Apply Fourier Series and Fourier transform in continuous time signals.	K3
C204.3	Examine linear time invariant continuous time systems in the time domain and frequency domain.	K4
C204.4	Apply Z transform and discrete time Fourier transform in discrete time signals.	K3
C204.5	Analyze LTI DT systems in the time domain and frequency domain.	K4

Course Code & Title: C205 & EC8392- Digital Electronics		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Understand and apply the Boolean laws and formulate the different minimization techniques using Boolean functions.	K2
C205.2	Implement the various combinational circuits using logic gates.	K3
C205.3	Analyze and design the various synchronous sequential circuits using logic gates.	K4
C205.4	Analyze the asynchronous sequential circuits for stability and hazards.	K4
C205.5	Apply suitable memory devices and digital integrated circuits for real time applications.	K3

Course Code & Title: C206 & EC8391 - Control System Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Identify the various control system components and their representations.	K2
C206.2	Attain the time response and steady state error of control systems.	K3
C206.3	Analyze the stability of the system from its frequency response plots.	K4
C206.4	Apply the concepts of Routh Hurwitz, Root Locus and Nyquist stability criteria to analyze the stability of the system.	K4
C206.5	Analyze the system stability with state space models using state variables.	K4

Course Code & Title: C207 & EC8381- Fundamentals of Data Structures in C Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C207.1	Write basic C programs using looping, data manipulations, arrays and strings.	K2
C207.2	Develop a C program using functions with argument passing.	K3
C207.3	Create an application using linear and nonlinear data structures.	K4
C207.4	Implement various sorting algorithms using C program.	K4
C207.5	Create an application using search algorithms and hashing function.	K4

Course Code & Title: C208 & EC8361 - Analog and Digital Circuits Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C208.1	Analyze the rectifiers, filters and regulated power supplies.	K4
C208.2	Demonstrate the working of BJT and JFET amplifiers and to obtain its frequency response.	K2
C208.3	Design a Cascode and Cascade amplifiers.	K3
C208.4	Design a Combinational and Sequential Circuit using Logic Gates & Flip-flop.	K3
C208.5	Simulate the electronic circuits like amplifiers and rectifiers using PSPICE Model.	K3

Course Code & Title: C209 & HS8381 - Interpersonal Skills/Listening & Speaking

	CO Statements	Knowledge Level
The students should be able to		
C209.1	Listen and react to English in an appropriate manner.	K2
C209.2	Get themselves actively involved in group discussion activities.	K3
C209.3	Feel comfortable in making oral presentations.	K2
C209.4	React well in both formal and informal contexts in professional situations.	K4
C209.5	Persuade their audience by making appropriate expressions.	K5

SEMESTER 4

Course Code & Title: C210 & MA8451- Probability and Random Processes

	CO Statements	Knowledge Level
The students should be able to		
C210.1	Understand the basic notion of the concepts of probability and have knowledge of standard distributions which can apply to real life phenomenon.	K2
C210.2	Apply the Engineering knowledge of one- and two-dimensional random variables.	K3
C210.3	Identify and apply the concept of random processes in engineering field.	K3
C210.4	Interpret and apply the concept of correlation and spectral densities to manage the projects.	K3
C210.5	Analyze various distribution functions and to attain the knowledge to handle the response of random inputs to linear time invariant systems.	K5

Course Code & Title: C211 & EC8452- Electronic Circuits -II

	CO Statements	Knowledge Level
The students should be able to		
C211.1	Construct the various feedback amplifiers using BJT.	K3
C211.2	Design low frequency and high frequency oscillators using BJT.	K3
C211.3	Analyze the performance of different types of tuned amplifiers using BJT.	K4
C211.4	Design wave shaping circuits and multivibrators using BJT.	K3
C211.5	Describe power amplifiers and DC-DC converters.	K2

Course Code & Title: C212 & EC8491 Communication Theory

	CO Statements	Knowledge Level
The students should be able to		
C212.1	Understand the implementation of AM in communication systems.	K2
C212.2	Design angle modulated communication systems.	K4
C212.3	Apply the concepts of Random Process to design communication systems.	K3
C212.4	Analyze the noise performance of AM and FM systems.	K4
C212.5	Apply the concepts of sampling and quantization in communication.	K3

Course Code & Title: C213 & EC8451 Electromagnetic Fields

	CO Statements	Knowledge Level
The students should be able to		
C213.1	Apply the basic concepts of vector algebra that related to electromagnetic model in different co-ordinate systems.	K3
C213.2	Understand the applications of electric field, potential and energy density.	K2
C213.3	Apply the magnetic field, potential, energy density forces, torques for their applications.	K3
C213.4	Categorize the relation between electric and magnetic fields using Maxwell's equations.	K4
C213.5	Understand the various wave propagation techniques in lossless and in lossy media.	K2

Course Code & Title: C214 & EC8453 Linear Integrated Circuits

	CO Statements	Knowledge Level
The students should be able to		
C214.1	Understand the construction and working of op-amp and also its AC and DC characteristics.	K2
C214.2	Design the circuits using op-amp for linear and nonlinear applications.	K3
C214.3	Apply the concepts of analog multiplier and PLL for various applications.	K3
C214.4	Interpret the principle of conversion of ADC and DAC using op-amps.	K2
C214.5	Design various waveform generators and other circuits using different ICs.	K3

Course Code & Title: C215 & GE8291 Environmental Science and Engineering

	CO Statements	Knowledge Level
The students should be able to		
C215.1	Apply the finding and implementing scientific, technological, economic and political solutions to environmental problems with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.	K3
C215.2	Understand the impact of the professional engineering solutions in societal and environmental contexts for the importance of public participation in conservation of natural resources.	K2
C215.3	Discuss the types of natural energy sources and analyze the need for alternative fuels to solve current social problems by using engineering techniques.	K2
C215.4	Transforming the concepts from unsustainable to sustainable development and urban problems related to energy, water conservation, rain water harvesting.	K2
C215.5	Apply the basics of information technology in environment and human health function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.	K3

Course Code & Title: C216 & EC8461 Circuits Design and Simulation Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C216.1	Analyze the characteristics of various types of feedback amplifiers.	K4
C216.2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using BJT.	K3
C216.3	Simulate oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using SPICE tool.	K3

Course Code & Title: C217& EC8462 Linear Integrated Circuit Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C217.1	Design oscillators and amplifiers using operational amplifiers.	K3
C217.2	Design filters using op-amp and perform experiments to obtain frequency response.	K3
C217.3	Analyze the working of PLL and use PLL as frequency multiplier.	K4
C217.4	Design DC power supply using ICs.	K3
C217.5	Analyze the performance of oscillators and multivibrators using SPICE.	K4

SEMESTER 5

Course Code & Title: C301 & EC8501 Digital Communication

	CO Statements	Knowledge Level
The students should be able to		
C301.1	Compute the information capacity using Huffman and Shannon-Fano encoding methods.	K3
C301.2	Understand the implementation of DPCM, DM, ADPCM and ADM techniques.	K2
C301.3	Apply the base band transmission and reception techniques in digital communication systems.	K3
C301.4	Analyze the noise performance of various digital modulation techniques.	K4
C301.5	Compute error control coding techniques in digital communication system.	K3

Course Code & Title: C302 & EC8553 Discrete-Time Signal Processing

	CO Statements	Knowledge Level
The students should be able to		
C302.1	Understand the fundamental concepts of DFT for the analysis of discrete time signals.	K2
C302.2	Implement the digital Infinite Impulse Response filters and formulate various realizations.	K3
C302.3	Develop the linear phase Finite Impulse Response filters using windowing and frequency sampling techniques.	K4
C302.4	Examine the finite word length effects in digital signal processing.	K2
C302.5	Understand the architecture, addressing modes and instruction sets of Digital Signal Processors.	K2

Course Code & Title: C303 & EC8552 Computer Architecture and Organization

	CO Statements	Knowledge Level
The students should be able to		
C303.1	Understand the basic organization of modern computer systems.	K2
C303.2	Implement fixed-and floating-point arithmetic operations in computer architecture.	K3
C303.3	Design pipelined control units for implementing parallel processing.	K2
C303.4	Analyze the performance of memory systems and I/O devices.	K4
C303.5	Understand the parallel processing and advanced computer architectures.	K2

Course Code & Title: C304 & EC8551 Communication Networks		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	Understand the basic building block of networks and formulate the different error detection and correction techniques.	K2
C304.2	Relate various media access and internetworking protocols.	K2
C304.3	Apply various routing protocols and algorithms for a given network along with IP addresses.	K3
C304.4	Demonstrate the flow of information in transport layer.	K2
C304.5	Study the various application layer paradigms and the basics of cryptography and network security.	K2

Course Code & Title: C305 & GE8077 Total Quality Management		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Outline the dimensions and barriers regarding with quality.	K2
C305.2	Illustrate the TQM principles	K4
C305.3	Demonstrate tools utilization for quality improvement.	K6
C305.4	Explain the various types of techniques are used to measure quality.	K2
C305.5	Apply various quality systems and auditing on implementation of TQM.	K3

Course Code & Title: C306 & OMD551 Basics of Biomedical Instrumentation

	CO Statements	Knowledge Level
The students should be able to		
C306.1	Understand the bio potential generation, propagation and types of electrodes.	K2
C306.2	Apply the different electrode placement techniques for various physiological recording.	K3
C306.3	Interpret non-electrical parameters measurement techniques.	K3
C306.4	Apply biochemical measurement techniques for real time systems.	K3
C306.5	Design bio amplifier for various physiological recording.	K4

Course Code & Title: C307 & EC8562 Digital Signal Processing Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C307.1	Demonstrate convolution and correlation using MATLAB.	K3
C307.2	Design and implementation of FIR and IIR Filters using MATLAB.	K4
C307.3	Design and implementation of FIR and IIR Filters using digital signal processor.	K4

Course Code & Title: C308 & EC8561 Communication Systems Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C308.1	Analyse the effects of sampling and TDM.	K4
C308.2	Demonstrate the various analog and digital modulation and demodulation techniques.	K3
C308.3	Apply various channel coding schemes and demonstrate their capabilities towards the improvement of the noise performance of communication system.	K3
C308.4	Simulate digital modulation schemes using MATLAB.	K3
C308.5	Simulate error control coding schemes using MATLAB.	K3

Course Code & Title: C309 & EC8563 Communication Networks Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C309.1	Demonstrate communication between two desktop computers.	K2
C309.2	Implement various networking protocols and establish connection between computers.	K3
C309.3	Construct a network using sockets and exchange information.	K3
C309.4	Implement various routing protocols and maintain a secure data transfer.	K3
C309.5	Simulate various types of topologies and understand the differences between them.	K3

SEMESTER 6

Course Code & Title: C310 & EC8691 Microprocessors and Microcontrollers

	CO Statements	Knowledge Level
The students should be able to		
C310.1	Understand the fundamental concepts of 8086 microprocessor architecture, addressing modes and instruction set.	K2
C310.2	Understand the design aspects of I/O and memory interfacing circuits.	K2
C310.3	Develop assembly language program to interface 8086 microprocessors with supporting chips for different applications.	K4
C310.4	Understand the fundamental concepts of 8051 microcontroller architecture, addressing modes and instruction set.	K2
C310.5	Develop assembly language program to interface 8051 microcontrollers with supporting chips for different applications.	K4

Course Code & Title: C311 & EC8095 VLSI Design

	CO Statements	Knowledge Level
The students should be able to		
C311.1	Understand the concepts of digital building blocks using MOS transistor.	K2
C311.2	Design various combinational MOS logic circuits like CPL, DPL.	K3
C311.3	Construct sequential circuits and timing systems.	K2
C311.4	Design arithmetic building blocks and memory subsystem.	K3
C311.5	Implement FPGA design flow and testing.	K3

Course Code & Title: C312 & EC8652 Wireless Communication		
	CO Statements	Knowledge Level
The students should be able to		
C312.1	Characterize a wireless channel and evolve the system design specifications.	K2
C312.2	Illustrate the multiple access techniques and channel assignment used in cellular architecture.	K2
C312.3	Apply the various digital signaling techniques for the wireless channels and systems.	K3
C312.4	Identify multipath mitigation techniques for the wireless channel and system under consideration.	K2
C312.5	Understand the concept of Multiple Antenna techniques with transmitter and receiver diversity.	K2

Course Code & Title: C313 & MG8591 Principles of Management		
	CO Statements	Knowledge Level
The students should be able to		
C313.1	Discuss the evolution of management, functions and roles of managers.	K2
C313.2	Explain the different types of planning, process and tools used for planning.	K2
C313.3	Elaborate different organization structures and functions of Human Resources manager.	K2
C313.4	Illustrate the different theories of motivation and leadership.	K2
C313.5	Describe the control techniques and the role of technology in management.	K2

Course Code & Title: C314 & EC8651 Transmission Lines and RF Systems		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Understand the parameters of basic transmission lines.	K2
C314.2	Understand the parameters of high frequency transmission lines.	K2
C314.3	Analyze impedance matching by stubs using smith charts.	K4
C314.4	Derive the field equations for TE and TM waves.	K3
C314.5	Illustrate RF active components, gain and stability considerations.	K3

Course Code & Title: C315 & EC8004 Wireless Networks		
	CO Statements	Knowledge Level
The students should be able to		
C315.1	Illustrate the latest 3G/4G networks and its architecture.	K3
C315.2	Examine the suitable network depending on the availability and requirement.	K4
C315.3	Categorize and implement wireless network environment for any application using latest wireless protocols and standards.	K4
C315.4	Implement different type of applications for smart phones and mobile devices with latest network strategies.	K3
C315.5	Apply multiple antenna techniques for capacity/ performance gains and explore other research areas in 5G.	K3

Course Code & Title: C316 & EC8681 Microprocessors and Microcontrollers Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C316.1	Develop assembly language programs for fixed point arithmetic circuits.	K3
C316.2	Demonstrate the interfacing circuits for different I/Os.	K3
C316.3	Develop the assembly language program for generating waveforms such as square wave and triangular wave using microprocessors.	K3
C316.4	Develop assembly language program for arithmetic and logical operations using 8051 microcontrollers.	K3
C316.5	Demonstrate the performance in simulator and emulator.	K2

Course Code & Title: C317 & EC8661 VLSI Design Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C317.1	Develop the HDL code for basic combinational digital integrated circuits.	K4
C317.2	Develop the HDL code for basic sequential digital integrated circuits.	K4
C317.3	Implement the logic modules in FPGA boards.	K3
C317.4	Synthesize place and route the digital IPs.	K4
C317.5	Design, simulate and extract the layouts of Analog IC Blocks using EDA tools.	K4

Course Code & Title: C318 & EC8611 Technical Seminar		
	CO Statements	Knowledge Level
The students should be able to		
C318.1	Identify and formulate the problem.	K3
C318.2	Make effective literature survey for the identified problem.	K3
C318.3	Infer promising new directions of various cutting-edge technologies.	K4
C318.4	Inspect skills in preparing detailed report describing the project.	K3
C318.5	Communicate effectively by making an oral presentation before an evaluation committee.	K5

Course Code & Title: C319 & HS8581 Professional Communication		
	CO Statements	Knowledge Level
The students should be able to		
C319.1	Enhance the employability and career skills in engineering domain.	K3
C319.2	Improve professional communication.	K4
C319.3	Build confidence in employability skills.	K4
C319.4	Face interviews with necessary skills.	K5
C319.5	Acquire required skills to excel in their career.	K3

SEMESTER 7

Course Code & Title: C401 & EC8701 Antennas and Microwave Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C401.1	Understand the basic principles of antenna and microwave system design.	K2
C401.2	Apply the knowledge of radiation mechanism to design various antennas.	K3
C401.3	Apply the knowledge of radiation principles of antenna to construct arrays.	K3
C401.4	Understand the fundamentals of active and passive microwave devices.	K2
C401.5	Design a microwave system for a given specifications.	K3

Course Code & Title: C402 & EC8751 Optical Communication		
	CO Statements	Knowledge Level
The students should be able to		
C402.1	Understand and apply the basic elements of optical fibers, different operating modes and configurations.	K3
C402.2	Analyze the transmission characteristics associated with dispersion and polarization techniques.	K4
C402.3	Identify the characteristics of various fiber optical sources and detectors and apply for suitable applications.	K3
C402.4	Understand the fiber optic receiver systems, measurements and coupling techniques.	K2
C402.5	Understand the optical communication systems and its networks.	K2

Course Code & Title: C403 & EC8791 Embedded and Real Time Systems

	CO Statements	Knowledge Level
The students should be able to		
C403.1	Outline the concepts of embedded systems.	K3
C403.2	Analyze the ARM architecture and instruction set to understand ARM based MCU with peripherals.	K4
C403.3	Apply the models of programs in embedded programming to analyze the program level performance analysis.	K3
C403.4	Analyze the task assignment and scheduling in the real time system.	K4
C403.5	Enhance the model for real time applications using embedded system concepts.	K2

Course Code & Title: C404 & EC8702 Ad hoc and Wireless Sensor Networks

	CO Statements	Knowledge Level
The students should be able to		
C404.1	Understand the basics of Adhoc networks and Wireless Sensor Networks.	K2
C404.2	Apply the knowledge to identify the suitable routing algorithm based on the network and user requirement.	K3
C404.3	Apply the knowledge to identify appropriate physical and MAC layer protocols.	K3
C404.4	Understand the transport layer and security issues possible in Adhoc and Sensor networks.	K2
C404.5	Recognize the OS used in Wireless Sensor Networks and build basic modules.	K2

Course Code & Title: C405 & OME754 Industrial Safety

	CO Statements	Knowledge Level
The students should be able to		
C405.1	Discuss various types of industrial hazards.	K2
C405.2	Explain how to prevent chemical, environmental and mechanical fire hazard through analysis.	K2
C405.3	Summarise the proper safety techniques in engineering and management.	K2
C405.4	Demonstrate personal protective equipments to overcome disasters.	K2
C405.5	Illustrate the skill to understand safety system.	K2

Course Code & Title: C406 & EC8711 Embedded Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C406.1	Develop programs in ARM for specific applications.	K3
C406.2	Interface memory, A/D and D/A converters with ARM systems.	K4
C406.3	Analyze the performance of the interrupt.	K4
C406.4	Develop program for interfacing keyboard, display, motor and sensor.	K3
C406.5	Formulate the mini project using embedded system.	K5

Course Code & Title: C407 & EC8761 Advanced Communication Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C407.1	Determine the performance of simple analog and digital optical link to analyze its frequency response.	K4
C407.2	Experiment with optical fiber to measure the losses and to analyze the mode characteristics.	K4
C407.3	Model the wireless channel for the study of characteristics and performance of wireless communication system.	K3
C407.4	Determine the characteristics of active microwave devices.	K2
C407.5	Determine the characteristics of passive microwave devices.	K2

SEMESTER 8

Course Code & Title: C408 & EC8076 Professional Ethics in Engineering

	CO Statements	Knowledge Level
The students should be able to		
C408.1	Describe the importance of human values from perspective of engineers.	K1
C408.2	Explain different theories on moral development.	K2
C408.3	Discuss the codes of ethics for engineers and roles of engineers as Experimenters.	K2
C408.4	Describe about safety, risk and to recognize the different responsibilities and rights of engineers.	K2
C408.5	Interpret the different roles of engineers with regards to present global scenario.	K4

Course Code & Title: C409 & EC8094 Satellite Communication

	CO Statements	Knowledge Level
The students should be able to		
C409.1	Understand the basics of satellite orbits.	K2
C409.2	Distinguish the satellite segment and earth segment.	K2
C409.3	Analyze the satellite link design.	K3
C409.4	Understand the multiple access techniques and coding methods used in satellite networks.	K2
C409.5	Understand the development of satellites for various applications.	K2

Course Code & Title: C410 & EC8811 Project Work

	CO Statements	Knowledge Level
The students should be able to		
C410.1	Conduct a literature survey in the selected domain to identify requirements for the real-world problems and propose a methodology.	K2
C410.2	Model the problem at hand and experiment with Hardware/Software skill sets to suit the requirements.	K3
C410.3	Build and demonstrate the project effectively as a team with the attitudes of professional engineers.	K4
C410.4	Evaluate the challenges and risks involved in the execution of the project and take appropriate actions to circumvent them.	K5
C410.5	Communicate the results of an engineering project by means of an oral presentation, written reports and practical demonstration of the project outcomes.	K6

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code & Title:

As per Anna University Regulation 2021, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	HS3152	PROFESSIONAL ENGLISH - I
2	C102	MA3151	MATRICES AND CALCULUS
3	C103	PH3151	ENGINEERING PHYSICS
4	C104	CY3151	ENGINEERING CHEMISTRY
5	C105	GE3151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6	C106	GE3171	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
7	C107	BS3171	PHYSICS AND CHEMISTRY LABORATORY
8	C108	GE3172	ENGLISH LABORATORY
SEMESTER - II			
9	C109	HS3252	PROFESSIONAL ENGLISH -II
10	C110	MA3251	STATISTICS AND NUMERICAL METHODS
11	C111	PH3254	PHYSICS FOR ELECTRONICS ENGINEERING
12	C112	BE3254	ELECTRICAL AND INSTRUMENTATION ENGINEERING
13	C113	GE3251	ENGINEERING GRAPHICS
14	C114	EC3251	CIRCUIT ANALYSIS
15	C115	GE3271	ENGINEERING PRACTICES LABORATORY
16	C116	EC3271	CIRCUIT ANALYSIS LABORATORY
17	C117	GE3272	COMMUNICATION LABORATORY
SEMESTER - III			
18	C201	MA3355	RANDOM PROCESSES AND LINEAR ALGEBRA
19	C202	CS3353	C PROGRAMMING AND DATA STRUCTURES
20	C203	EC3354	SIGNALS AND SYSTEMS
21	C204	EC3353	ELECTRONIC DEVICES AND CIRCUITS
22	C205	EC3351	CONTROL SYSTEMS

23	C206	EC3352	DIGITAL SYSTEMS DESIGN
24	C207	EC3361	ELECTRONIC DEVICES AND CIRCUITS LABORATORY
25	C208	CS3362	C PROGRAMMING AND DATA STRUCTURES LABORATORY
26	C209	GE3361	PROFESSIONAL DEVELOPMENT
SEMESTER - IV			
27	C210	EC3452	ELECTROMAGNETIC FIELDS
28	C211	EC3401	NETWORKS AND SECURITY
29	C212	EC3451	LINEAR INTEGRATED CIRCUITS
30	C213	EC3492	DIGITAL SIGNAL PROCESSING
31	C214	EC3491	COMMUNICATION SYSTEMS
32	C215	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
33	C216	EC3461	COMMUNICATION SYSTEMS LABORATORY
34	C217	EC3462	LINEAR INTEGRATED CIRCUITS LABORATORY
SEMESTER - V			
35	C301	EC3501	WIRELESS COMMUNICATION
36	C302	EC3551	TRANSMISSION LINES AND RF SYSTEM
37	C303	EC3552	VLSI AND CHIP DESIGN
38	C304	CEC331	4G/5G COMMUNICATION NETWORK
39	C305	CEC336	AVIONICS
40	C306	CEC352	SATELLITE COMMUNICATION
41	C307	MX3081	INTRODUCTION TO GENDER AND WOMEN STUDIES
42	C308	MX3084	DISASTER RISK REDUCTION AND MANAGEMENT
43	C309	EC3561	VLSI LABORATORY
SEMESTER - VI			
44	C310	ET3491	EMBEDDED SYSTEM AND IOT DESIGN
45	C311	CS3491	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
46	C312	CEC334	ANALOG IC DESIGN
47	C313	CEC342	MIXED SIGNAL IC DESIGN TESTING
48	C314	CEC345	OPTICAL COMMUNICATION
49	C315	OEE351	RENEWABLE ENERGY SOURCES
50	C316	MX3089	INDUSTRIAL SAFETY

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & HS3152 - Professional English - I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Use appropriate words in a professional context.	K3
C101.2	Describe the basic grammatical structures and use them in right context.	K2
C101.3	Read and infer the denotative and connotative meanings of technical texts.	K1
C101.4	Visualize definitions, descriptions, narrations and essays on various topics.	K1

Course Code & Title: C102 & MA3151 - Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Apply differential calculus tools in solving various application problems.	K3
C102.3	Analyze differential calculus ideas on several variable functions.	K4
C102.4	Examine different methods of integration in solving practical problems.	K4
C102.5	Focus multiple integral ideas in solving areas, volumes and other practical problems.	K4

Course Code & Title: C103 & PH3151 - Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Illustrate the importance of mechanics.	K2
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K3
C103.4	Generalize the importance of quantum physics.	K2
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K2

Course Code & Title: C104 & CY3151 - Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K4
C104.2	Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K1
C104.3	Apply the knowledge of phase rule and composites for material selection requirements.	K3
C104.4	Select suitable fuels for engineering processes and applications.	K2
C104.5	Recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K1

Course Code & Title: C105 & GE3151- Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Express algorithmic solutions to simple computational problems.	K2
C105.2	Compute and execute simple Python programs.	K3
C105.3	Implement simple Python programs using conditionals and loops for solving problems.	K3
C105.4	Determine compound data using Python lists, tuples, dictionaries etc.	K3
C105.5	Read and write data from/to files in Python programs.	K1

Course Code & Title: C106 & GE3171- Problem Solving and Python Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Simplify algorithmic solutions to simple computational problems.	K4
C106.2	Model and execute simple Python programs.	K4
C106.3	Implement programs in Python using conditionals and loops for solving problems.	K3
C106.4	Generate functions to decompose a Python program.	K6
C106.5	Utilize Python packages for developing real-world software applications.	K3

Course Code & Title: C107 & BS3171 - Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Outline the functioning of various physics laboratory equipment.	K4
C107.2	Use graphical models to analyze laboratory data.	K3
C107.3	Examine mathematical models as a medium for quantitative reasoning and describing physical reality.	K4
C107.4	Model , process and analyze scientific information.	K4
C107.5	Solve problems individually and collaboratively.	K6

Course Code & Title: C108 & GE3172 - English Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Prepare and comprehend general as well as complex academic information.	K3
C108.2	Carry out different points of view in a discussion.	K3
C108.3	Express fluently and accurately in formal and informal communicative contexts.	K2
C108.4	Focus on products and processes and explain their uses and purposes clearly and accurately.	K4
C108.5	Demonstrate their opinions effectively in both formal and informal discussions.	K3

SEMESTER 2

Course Code & Title: C109 & HS3252 - Professional English -II		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	Compare and contrast products and ideas in technical texts.	K4
C109.2	Identify and report cause and effects in events, industrial processes through technical texts.	K1
C109.3	Analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	Express their ideas and opinions in a planned and logical manner.	K2
C109.5	Construct effective resumes in the context of job search.	K3

Course Code & Title: C110 & MA3251 - Statistics and Numerical Methods		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C110.2	Use the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C110.3	Comprehend the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K2
C110.4	Compute various techniques and methods for solving first and second order ordinary differential equations.	K3
C110.5	Examine partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3

Course Code & Title: C111 & PH3254 - Physics for Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Know basics of crystallography and its importance for varied materials properties.	K1
C111.2	Illustrate the electrical and magnetic properties of materials and their applications.	K2
C111.3	Interpret clearly of semiconductor physics and functioning of semiconductor devices.	K2
C111.4	Detect the optical properties of materials and working principles of various optical devices.	K4
C111.5	Paraphrase the importance of nanotechnology and nano devices..	K2

Course Code & Title: C112 & BE3254 - Electrical and Instrumentation Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Illustrate the working principle of electrical machines.	K2
C112.2	Analyze the output characterizes of electrical machines.	K4
C112.3	Determine the appropriate electrical machines for various applications.	K2
C112.4	Classify the types and operating principles of measuring instruments.	K2
C112.5	Comprehend the basic power system structure and protection schemes.	K3

Course Code & Title: C113 & GE3251 - Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Construct the conic curves, involutes and cycloid.	K2
C113.2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.	K3
C113.3	Sketch the projections of simple solids like prisms, pyramids, cylinder and cone and freehand sketch of given figures.	K3
C113.4	Practice the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its development of surfaces.	K3
C113.5	Sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.	K3

Course Code & Title: C114 & EC3251 - Circuit Analysis		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits.	K3
C114.2	Examine suitable network theorems and analyze AC and DC circuits.	K3
C114.3	Analyze steady state response of any R, L and C circuits.	K4
C114.4	Determine the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits.	K3
C114.5	Relate the coupled circuits and network topologies	K4

Course Code & Title: C116 & GE3271 – Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Design RL and RC circuits.	K3
C115.2	Apply network theorems for electrical circuits.	K3
C115.3	Demonstrate the transient analysis and resonance of the RLC circuits.	K2

Course Code & Title: C115 & EC3271 - Circuit Analysis Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Design RL and RC circuits.	K3
C116.2	Apply network theorems for electrical circuits.	K3
C116.3	Demonstrate the transient analysis and resonance of the RLC circuits.	K2

Course Code & Title: C116 & GE3272 - Communication Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Prepare effectively in group discussions held in formal/semi formal contexts.	K3
C117.2	Analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C117.3	Write emails, letters and effective job applications.	K6
C117.4	Make critical reports to convey data and information with clarity and precision.	K6
C117.5	Examine appropriate instructions and recommendations for safe execution of tasks.	K3

SEMESTER3

Course Code & Title: C201 & MA3355 - Random Processes and Linear Algebra		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.	K2
C201.2	Demonstrate accurate and efficient use of advanced algebraic techniques.	K3
C201.3	Apply the concept of random processes in engineering disciplines.	K3
C201.4	Examine the fundamental concepts of probability with a thorough knowledge of standard distributions that can describe certain real-life phenomenon.	K3
C201.5	Use the basic concepts of one and two dimensional random variables and apply them to model engineering problems.	K3

Course Code & Title: C202 & CS3353 - C Programming and Data Structures		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Model Develop C programs for any real world/technical application.	K4
C202.2	Apply advanced features of C in solving problems.	K3
C202.3	Implement functions for linear and non-linear data structure operations.	K3
C202.4	Use appropriate linear/non-linear data structure operations for solving a given problem.	K3
C202.5	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.	K3

Course Code & Title: C203 & EC3354 - Signals and Systems		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Analyze the properties of signals and systems.	K4
C203.2	Apply Fourier Series and Fourier transform in CT signals.	K3
C203.3	Examine LTI CT systems in the time domain and frequency domain.	K4
C203.4	Apply Z transform and DTFT in DT signals.	K3
C203.5	Analyze LTI DT systems in the time domain and frequency domain.	K4

Course Code & Title: C204 & EC3353 - Electronic Devices and Circuits		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Explain the structure and working operation of basic electronic devices.	K2
C204.2	Examine and analyze amplifiers.	K3
C204.3	Analyze frequency response of BJT and MOSFET amplifiers.	K4
C204.4	Implement feedback amplifiers and oscillator principles.	K3
C204.5	Describe power amplifiers and supply circuits.	K2

Course Code & Title: C205 & EC3351- Control Systems		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Identify and apply the various control system components and their representations.	K3
C205.2	Attain the time response and steady state error of control systems.	K3
C205.3	Analyze the stability of the system from its frequency response plots.	K4
C205.4	Apply the concepts of Routh Hurwitz, Root locus and Nyquist stability criterions to analyze the stability of the systems.	K4
C205.5	Analyze the system stability with state space models using state variables.	K4

Course Code & Title: C206 & EC3352 - Digital Systems Design		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Simplification of logical expression using K-map and using Boolean algebra.	K3
C206.2	Design various combinational digital circuits using logic gates.	K3
C206.3	Design and analyze synchronous sequential circuits.	K4
C206.4	Implement and design asynchronous sequential circuits.	K3
C206.5	Examine programmable devices using logic gates.	K3

Course Code & Title: C207 & EC3361- Electronic Devices and Circuits Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C207.1	Examine the characteristics of PN Junction diode and Zener diode.	K3
C207.2	Demonstrate the operation of rectifiers and filters.	K2
C207.3	Examine the transistor characteristics of BJT.	K3
C207.4	Analyze the frequency response and transistor characteristics of MOSFET.	K4
C207.5	Measure and analyze various parameters of amplifiers.	K4

Course Code & Title: C208 & CS3362 - C Programming and Data Structures Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C208.1	Use different constructs of C and develop applications.	K3
C208.2	Write functions to implement linear and non-linear data structure operations.	K6
C208.3	Use the appropriate linear / non-linear data structure operations for a given problem.	K3
C208.4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.	K3
C208.5	Implement Sorting and searching algorithms for a given application.	K3

Course Code & Title: C209 & GE3361 - Professional Development

	CO Statements	Knowledge Level
The students should be able to		
C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements.	K3
C209.2	Analyze themselves actively involved in group discussion activities. 2:Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding.	K4
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K3

SEMESTER 4

Course Code & Title: C210 & EC3452 - Electromagnetic Fields

	CO Statements	Knowledge Level
The students should be able to		
C210.1	Relate the fundamentals of vector, coordinate system to electromagnetic concepts.	K4
C210.2	Analyze the characteristics of Electrostatic field.	K4
C210.3	Interpret the concepts of Electric field in material space and solve the boundary conditions.	K2
C210.4	Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.	K2
C210.5	Determine the significance of time varying fields.	K2

Course Code & Title: C211 & EC3401 - Networks and Security

	CO Statements	Knowledge Level
The students should be able to		
C211.1	Analyze the network models, layers and functions.	K4
C211.2	Identify and classify the routing protocols.	K1
C211.3	Analyze the functions of the transport and application layer.	K4
C211.4	Understand and choose the network security mechanism.	K2
C211.5	Discuss the hardware security attacks and countermeasures.	K2

Course Code & Title: C212 & EC3451 - Linear Integrated Circuits		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	Understand the construction and working of Op-amp and also its AC and DC characteristics.	K2
C212.2	Design the circuits using op amp for linear and nonlinear applications.	K3
C212.3	Apply the concepts of analog multiplier and PLL for various applications.	K3
C212.4	Interpret the principle of conversion of ADC and DAC using op-amps.	K2
C212.5	Design various waveform generators and other circuits using different ICs.	K3

Course Code & Title: C213 & EC3492 - Digital Signal Processing		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Understand the fundamental concepts of DFT for the analysis of discrete time signals.	K3
C213.2	Implement the digital Infinite Impulse response Filters and formulate various realizations.	K3
C213.3	Describe the linear phase Finite Impulse Response filters using windowing and frequency sampling techniques.	K3
C213.4	Examine the finite word length effects in digital signal processing.	K3
C213.5	Apply the concepts of architecture, addressing modes and instruction sets of Digital Signal Processors.	K3

Course Code & Title: C214 & EC3491 - Communication Systems		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	Understand the basic properties of signal & systems and the Amplitude and Angle modulation.	K3
C214.2	Understand the basics in probability that are relevant in applications such as random signals, Sampling, Signal reconstruction in communication engineering.	K3
C214.3	Apply the different digital techniques, coding schemes to encode and decode the signals without error.	K4
C214.4	Analyze the digital modulation schemes to find the PSD, BER, and IQ representation.	K4
C214.5	Analyze the various demodulation techniques.	K4

Course Code & Title: C215 & GE3451 - Environmental Sciences and Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	Recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K1
C215.2	Identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K1
C215.3	Identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K1
C215.4	Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K1
C215.5	Demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3

Course Code & Title: C216 & EC3461 - Communication Systems Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Design AM, FM & Digital Modulators for specific applications.	K4
C216.2	Compute the sampling frequency for digital modulation.	K4
C216.3	Simulate & validate the various functional modules of Communication System.	K3
C216.4	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.	K2
C216.5	Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of Communication System.	K3

Course Code & Title: C217 & EC3462 - Linear Integrated Circuit Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C217.1	Analyze various types of feedback amplifiers.	K4
C217.2	Design and analyze amplifiers, oscillators, D-A converters and wave-shaping circuits using op-amp.	K4
C217.3	Design and analyze filters using op-amp and performs an experiment on frequency response.	K4
C217.4	Analyze the working of PLL and use PLL as frequency multiplier.	K4
C217.5	Design and simulate oscillators, tuned amplifiers, wave-shaping circuits and multivibrators and power amplifiers using SPICE Tool.	K4

SEMESTER 5

Course Code & Title: C301 & EC3501 - Wireless Communication

	CO Statements	Knowledge Level
The students should be able to		
C301.1	Understand the concept and design of a cellular system.	K2
C301.2	Understand mobile radio propagation and various digital modulation techniques.	K2
C301.3	Understand the concepts of multiple access techniques and wireless networks.	K2
C301.4	Characterize a wireless channel and evolve the system design specifications.	K2
C301.5	Design a cellular system based on resource availability and traffic demands.	K3

Course Code & Title: C302 & EC3551 - Transmission lines and RF Systems

	CO Statements	Knowledge Level
The students should be able to		
C302.1	Analyze the characteristics of transmission lines and its losses.	K3
C302.2	Calculate the standing wave ratio and input impedance in high frequency transmission lines.	K3
C302.3	Analyze impedance matching by stubs using Smith Charts.	K4
C302.4	Analyze the characteristics of TE and TM waves.	K3
C302.5	Design a RF transceiver system for wireless communication.	K3

Course Code & Title: C303 & EC3552 - VLSI and Chip Design		
	CO Statements	Knowledge Level
The students should be able to		
C303.1	Distinguish in-depth knowledge of MOS technology.	K4
C303.2	Compute combinational logic circuits and design principles.	K3
C303.3	Design sequential logic circuits and clocking strategies.	K4
C303.4	Outline memory architecture and building blocks.	K2
C303.5	Implement the ASIC design process and testing.	K2

Course Code & Title: C304 & CEC331 - 4G/5G Communication Networks		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	Generate 5G- compliant waveforms and protocols.	K5
C304.2	Design the modeling of 5G Synchronization signal blocks and bursts.	K5
C304.3	Apply the Channel modeling in 5G networks.	K3
C304.4	Perform the Multiband OFDM demodulation and 5G NR Downlink analysis.	K5
C304.5	Analyse the perfect channel estimation.	K4
C304.6	Develop the 5G New Radio Polar coding and LPDC coding.	K5

Course Code & Title: C305 & CEC336 - Avionics Systems		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Explain the different of avionics systems and its need for civil and military aircrafts considering the reliability and safety aspects.	K2
C305.2	Select a suitable architecture and data bus based on the requirements.	K3
C305.3	Compare the different display technologies used in cockpit.	K3
C305.4	Explain the principles of flight control systems and the importance of FMS.	K2
C305.5	Explain the communication and navigation techniques used in aircrafts.	K2

Course Code & Title: C306 & CEC352 - Satellite communication		
	CO Statements	Knowledge Level
The students should be able to		
C306.1	Understand the basics of satellite orbits.	K2
C306.2	Distinguish the satellite segment and earth segment.	K4
C306.3	Analyze the satellite link design.	K4
C306.4	Understand the multiple access techniques and coding methods used in satellite networks.	K2
C306.5	Understand the development of satellites for various applications.	K2

Course Code & Title: C307 & MX3081 - Introduction to Women and Gender Studies		
	CO Statements	Knowledge Level
The students should be able to		
C307.1	Understand the concept of gender, sex and social construction.	K2
C307.2	Explain about feminist theory.	K2
C307.3	Understand the concept of rise of feminism.	K2
C307.4	Understand about linguistic forms and gender.	K2
C307.5	Understand the concept of gender and its representation.	K2

Course Code & Title: C308 & MX3084 - Disaster and Risk Reduction Management		
	CO Statements	Knowledge Level
The students should be able to		
C308.1	Impart knowledge on the concepts of disaster, vulnerability and disaster risk reduction.	K5
C308.2	Enhance understanding on hazards, vulnerability and disaster risk assessment prevention and risk reduction.	K5
C308.3	Develop disaster response skills by adopting relevant tools and technology.	K5
C308.4	Enhance awareness of institutional processes for disaster response in the country.	K5
C308.5	Develop rudimentary ability to respond to their surroundings with potential.	K5

Course Code & Title: C309 & EC3561 - VLSI Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C309.1	Write HDL code for basic as well as advanced digital integrated circuit.	K3
C309.2	Import the logic modules into FPGA Boards.	K3
C309.3	Synthesize Place and Route the digital IPs.	K4
C309.4	Design , Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA.	K4
C309.5	Test and Verification of IC design.	K5

SEMESTER 6

Course Code & Title: C310 & ET3491 - Embedded Systems & IoT Design		
	CO Statements	Knowledge Level
The students should be able to		
C310.1	Explain the architecture and features of 8051.	K2
C310.2	Design a model of an embedded system.	K2
C310.3	List the concepts of real time operating systems.	K1
C310.4	Illustrate the architecture and protocols of IoT.	K2
C310.5	Design an IoT based system for any application.	K2

Course Code & Title: C311 & CS3491 - Artificial Intelligence & Machine Learning		
	CO Statements	Knowledge Level
The students should be able to		
C311.1	Understand the basics of intelligent agents and use appropriate search algorithms to solve the AI based problem.	K2
C311.2	Learn the theoretical knowledge about principles of logic-based representation and techniques for reasoning under uncertainty.	K1
C311.3	Understand the basics of machine learning and ability to understand the Supervised Learning models.	K2
C311.4	Understand the ensemble models and unsupervised learning models.	K2
C311.5	Describe the basic knowledge of deep learning neural networks and Demonstrate the various models to solve the real time complex problems.	K3

Course Code & Title: C312 & CEC334 - Analog IC Design		
	CO Statements	Knowledge Level
The students should be able to		
C312.1	Construct the amplifiers to meet user specifications.	K3
C312.2	Analyze the frequency and noise performance of amplifiers.	K4
C312.3	Construct the feedback amplifiers and one stage op amps.	K3
C312.4	Analyze the stability of op amp.	K4
C312.5	Interpret the testing experience of logic circuits.	K2

Course Code & Title: C313 & CEC342 - Mixed Signal IC Design Testing		
	CO Statements	Knowledge Level
The students should be able to		
C313.1	Learn the fundamentals of mixed signal circuits.	K3
C313.2	Define the various measurement terminologies.	K3
C313.3	Acquire knowledge of analog to digital converters.	K3
C313.4	Learn testing of analog to digital converters.	K3
C313.5	Comprehend the attributes of a clock signal.	K2

Course Code & Title: C314 & CEC345 - Optical Communication & Networks		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Realize basic elements in optical fibers, different modes and configurations.	K2
C314.2	Describe the transmission characteristics associated with dispersion and polarization techniques.	K2
C314.3	Determine optical sources and detectors with their use in optical communication system.	K3
C314.4	Construct fiber optic receiver systems, measurements and techniques.	K3
C314.5	Construct optical communication systems and its networks.	K3

Course Code & Title: C315 & OEE351 - Renewable Energy System		
	CO Statements	Knowledge Level
The students should be able to		
C315.1	Attained knowledge about various renewable energy technologies.	K2
C315.2	Ability to understand and design a PV system.	K3
C315.3	Understand the concept of various wind energy system.	K3
C315.4	Gained knowledge about various possible hybrid energy systems.	K4
C315.5	Attain knowledge about various application of renewable energy technologies.	K2

Course Code & Title: C316 & MX3089 - Industrial Safety		
	CO Statements	Knowledge Level
The students should be able to		
C316.1	Understand the basic concept of safety.	K2
C316.2	Obtain knowledge of statutory regulations and standards.	K2
C316.3	Know about the safety activities of the working place.	K2
C316.4	Analyze on the impact of occupational exposures and their remedies.	K4
C316.5	Obtain knowledge of risk assessment techniques.	K2

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code & Title:

As per Autonomous Regulation 2023, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (Autonomous)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	23HS101	PROFESSIONAL ENGLISH - I
2	C102	23MA101	MATRICES AND CALCULUS
3	C103	23PH102	PHYSICS FOR ELECTRONICS ENGINEERING
4	C104	23CY101	ENGINEERING CHEMISTRY
5	C105	23GE101	PROBLEM SOLVING AND C PROGRAMMING
6	C106	23GE103	தமிழர் மரபு /HERITAGE OF TAMILS
7	C107	23BS112	PHYSICS AND CHEMISTRY LABORATORY FOR ELECTRONICS ENGINEERING
8	C108	23GE112	ENGLISH LABORATORY -I
SEMESTER - II			
9	C109	23HS201	PROFESSIONAL ENGLISH – II
10	C110	23MA203	PARTIAL DIFFERENTIAL EQUATIONS AND TRANSFORMS
11	C111	23BE204	ELECTRONIC DEVICES
12	C112	23CS201	PYTHON PROGRAMMING
13	C113	23EC201	CIRCUITS ANALYSIS
14	C114	23GE901	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
15	C115	23GE201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology
16	C116	23BE213	ELECTRONIC DEVICES LABORATORY
17	C117	23CS211	PYTHON PROGRAMMING LABORATORY
18	C118	23GE212	ENGLISH LABORATORY –II

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & 23HS101 Professional English - I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	To use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	To gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	To read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	To write definitions, descriptions, narrations and essays on various topics.	K6
C101.5	To express their opinions effectively in both oral and written medium of communication.	K6

Course Code & Title: C102 & 23MA101 Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Able to use differential calculus ideas on several variable functions.	K3
C102.3	Apply integral calculus and multiple integral tools in solving various application problems.	K3
C102.4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	K2
C102.5	Apply various techniques in solving ordinary differential equations.	K3

Course Code & Title: C103 & 23PH102 Physics for Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	K3
C103.2	Apply quantum theory's sophisticated physics notions to the matter's characterization.	K3
C103.3	Know the fundamentals of crystal formations and growth methods.	K2
C103.4	To understand about the creation of energy band structures, free electron theory, and quantum theory.	K2
C103.5	To gain knowledge about semiconductor and magnetic materials, as well as the applications for them.	K2

Course Code & Title: C104 & 23CY101 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Summarize the water related problems in boilers and their treatment techniques.	K1
C104.2	Discuss the applications of nano materials in medicine, agriculture, energy, electronics and catalysis.	K2
C104.3	Discuss the types, properties and applications of polymers and composites.	K3
C104.4	Summarize the fuels used for engineering processes and applications of fuels.	K2
C104.5	Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.	K3

Course Code & Title: C105 & 23GE101 Problem Solving and C Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Understand the basic concepts of C programming tokens, control statements Input/ Output statements and Preprocessor directives	K3
C105.2	Develop C Programs using basic programming constructs for solving simple problems	K3
C105.3	Develop C programs for solving computational problems by using arrays and strings	K3
C105.4	Develop simple real-time applications in C using functions, arrays, and strings	K3
C105.5	Develop applications for real time problems in C using pointers and structures	K3

Course Code & Title: C107 & 23BS112 Physics and Chemistry Laboratory for Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Apprehend the concepts of interference, diffraction of light and recognize the resonance concept of waves.	K2
C107.2	Apply the principles of operations of semiconductor using simple circuits and interaction of electromagnetic waves and crystalline solids.	K3
C107.3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
C107.4	Experiment the relationship between the light and matter & properties of liquids.	K4
C107.5	Estimate the velocity of sound and compressibility of liquid.	K2
C107.1	Analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C107.2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	K3
C107.3	Analyze and determine the composition of alloys.	K4

C107.4	Learn simple method of synthesis of nanoparticles	K2
C107.5	Quantitatively analyze the impurities in solution by electro analytical methods.	K4

Course Code & Title: C108 & 23GE112 English Laboratory -I		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	To listen to and comprehend general as well as complex academic information.	K2
C108.2	To listen to and understand different points of view in a discussion.	K2
C108.3	To speak fluently and accurately in formal and informal communicative contexts.	K3
C108.4	To describe products and processes and explain their uses and purposes clearly and accurately.	K6
C108.5	To express their opinions effectively in both formal and informal discussions.	K6

SEMESTER 2

Course Code & Title: C109 & 23HS201 Professional English – II

	CO Statements	Knowledge Level
The students should be able to		
C109.1	To compare and contrast products and ideas in technical texts and write analytical essays.	K2
C109.2	To identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C109.3	To analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	To present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C109.5	To draft effective resumes in the context of job application.	K6

Course Code & Title: C110 & 23MA203 Partial Differential Equations And Transforms

	CO Statements	Knowledge Level
The students should be able to		
C110.1	To apply Partial Differential Equation in real time Engineering problems.	K3
C110.2	To understand general periodic functions and apply in problems of Fourier series, which are sums of sines and cosines.	K2
C110.3	To use the Fourier transform as the tool to connect the time domain and frequency domain in signal processing.	K3
C110.4	To apply Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	K3
C110.5	To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z - Transform techniques for discrete time systems.	K2

Course Code & Title: C111 & 23BE204 Electronic Devices		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Design simple rectifiers and voltage regulators using diodes	K3
C111.2	Apply suitable biasing conditions to study the input and output characteristics of BJT	K3
C111.3	Explore the characteristics and operation of JFET and MOSFET	K2
C111.4	Compare the characteristics of special Semiconductor diodes	K2
C111.5	Articulate the applications of Power and Display devices	K2

Course Code & Title: C112 & 23CS201 Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Develop simple python programs for applying the concepts of data types, expressions, and python statements	K3
C112.2	Develop Python programs for solving real-time computational problems by using conditionals, looping, functions, and strings.	K3
C112.3	Understand the concepts of compound data using Python lists, tuples, and dictionaries	K2
C112.4	Develop python programs for solving computational problems by using modules, files, and python packages	K3
C112.5	Develop python programs for solving computational problems by using Exceptions and Libraries	K3

Course Code & Title: C113 & 23EC201 Circuits Analysis		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Apply the basic concepts of Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits	K3
C113.2	Apply suitable network theorems to analyze electric circuits	K3
C113.3	Analyze series, parallel resonance and coupled circuits	K4
C113.4	Analyze the transient response for any RC, RL and RLC circuits	K4
C113.5	Analyze the two port network parameters and properties	K4

Course Code & Title: C114 & 23GE901 Environmental Sciences and Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Recognize and understand the functions of environment, ecosystems and biodiversity and their conservation	K1
C114.2	Identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
C114.3	Identify the causes, effects of natural disasters and contribute to the preventive measures in the society.	K3
C114.4	Identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K2
C114.5	Demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3

Course Code & Title: C116 & 23BE213 Electronic Devices Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C116.1	Analyze the characteristics of basic electronic devices	K4
C116.2	Analyze the characteristics of power electronic devices	K4
C116.3	Analyze the characteristics of electronic devices using simulation software	K4

Course Code & Title: C117 & 23CS211 Python Programming Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C117.1	Develop simple python programs for applying the concepts of data types, expressions, and python statements	K6
C117.2	Develop Python programs using conditionals, looping, functions, and strings for solving real-time computational problems.	K6
C117.3	Understand the concepts of compound data using Python lists, tuples, and dictionaries	K2
C117.4	Develop python programs for solving problems by using modules, files, and python packages	K6
C117.5	Utilize Python packages for developing real-world software applications	K6

Course Code & Title: C118 & 23GE212 English Laboratory –II

	CO Statements	Knowledge Level
The students should be able to		
C118.1	Speak effectively in group discussions held in a formal/semiformal contexts.	K6
C118.2	Discuss , analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C118.3	Make effective presentations in an attractive way using appropriate vocabulary.	K3
C118.4	Attend job interviews and be successful in them.	K6
C118.5	Develop adequate Soft Skills required for the workplace.	K3

DEPARTMENT OF MECHANICAL ENGINEERING

Course Code & Title:

As per Anna University Regulation 2017, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S/N	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER – I			
1.	C101	HS8151	COMMUNICATIVE ENGLISH
2.	C102	MA8151	ENGINEERING MATHEMATICS–I
3.	C103	PH8151	ENGINEERING PHYSICS
4.	C104	CY8151	ENGINEERING CHEMISTRY
5.	C105	GE8151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6.	C106	GE8152	ENGINEERING GRAPHICS
7.	C107	GE8161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8.	C108	BS8161	PHYSICS AND CHEMISTRY LABORATORY
SEMESTER – II			
9.	C109	HS8251	TECHNICAL ENGLISH
10.	C110	MA8251	ENGINEERING MATHEMATICS–II
11.	C111	PH8251	MATERIALS SCIENCE
12.	C112	BE8253	BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING
13.	C113	GE8291	ENVIRONMENTAL SCIENCE AND ENGINEERING
14.	C114	GE8292	ENGINEERING MECHANICS
15.	C115	GE8261	ENGINEERING PRACTICES LABORATORY
16.	C116	BE8261	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY
SEMESTER – III			
17.	C201	MA8353	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS
18.	C202	ME8391	ENGINEERING THERMODYNAMICS
19.	C203	CE8394	FLUID MECHANICS AND MACHINERY
20.	C204	ME8351	MANUFACTURING TECHNOLOGY – I
21.	C205	EE8353	ELECTRICAL DRIVES AND CONTROLS
22.	C206	ME8361	MANUFACTURING TECHNOLOGY LABORATORY - I
23.	C207	ME8381	COMPUTER AIDED MACHINE DRAWING
24.	C208	EE8361	ELECTRICAL ENGINEERING LABORATORY
25.	C209	HS8381	INTERPERSONAL SKILLS / LISTENING & SPEAKING
SEMESTER – IV			
26.	C210	MA8452	STATISTICS AND NUMERICAL METHODS
27.	C211	ME8492	KINEMATICS OF MACHINERY
28.	C212	ME8451	MANUFACTURING TECHNOLOGY – II
29.	C213	ME8491	ENGINEERING METALLURGY
30.	C214	CE8395	STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS

31.	C215	ME8493	THERMAL ENGINEERING- I
32.	C216	ME8462	MANUFACTURING TECHNOLOGY LABORATORY – II
33.	C217	CE8381	STRENGTH OF MATERIALS AND FLUID MECHANICS AND MACHINERY LABORATORY
34.	C218	HS8461	ADVANCED READING AND WRITING
SEMESTER – V			
35.	C301	ME8595	THERMAL ENGINEERING- II
36.	C302	ME8593	DESIGN OF MACHINE ELEMENTS
37.	C303	ME8501	METROLOGY AND MEASUREMENTS
38.	C304	ME8594	DYNAMICS OF MACHINES
	C305	OAT551	AUTOMOTIVE SYSTEMS
39.	C306	ME8511	KINEMATICS AND DYNAMICS LABORATORY
40.	C307	ME8512	THERMAL ENGINEERING LABORATORY
41.	C308	ME8513	METROLOGY AND MEASUREMENTS LABORATORY
SEMESTER – VI			
42.	C309	ME8651	DESIGN OF TRANSMISSION SYSTEMS
43.	C310	ME8691	COMPUTER AIDED DESIGN AND MANUFACTURING
44.	C311	ME8693	HEAT AND MASS TRANSFER
45.	C312	ME8692	FINITE ELEMENT ANALYSIS
46.	C313	ME8694	HYDRAULICS AND PNEUMATICS
47.	C314	ME8681	CAD / CAM LABORATORY
48.	C315	ME8682	DESIGN AND FABRICATION PROJECT
49.	C316	HS8581	PROFESSIONAL COMMUNICATION
SEMESTER – VII			
50.	C401	ME8792	POWER PLANT ENGINEERING
51.	C402	ME8793	PROCESS PLANNING AND COST ESTIMATION
52.	C403	ME8791	MECHATRONICS
53.	C404	ME8073	UNCONVENTIONAL MACHINING PROCESS
54.	C405	ME8097	NON DESTRUCTIVE TESTING
55.	C406	ME8711	SIMULATION AND ANALYSIS LABORATORY
56.	C407	ME8781	MECHATRONICS LABORATORY
57.	C408	ME8712	TECHNICAL SEMINAR
SEMESTER – VIII			
58.	C419	MG8591	PRINCIPLES OF MANAGEMENT
59.	C410	IE8693	PRODUCTION PLANNING AND CONTROL
60.	C411	ME8811	PROJECT WORK

Course Outcomes with K – Level Mapping for all Courses

SEMESTER 1

Course Code & Name: C101 & HS8151 - Communicative English		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Enhance their reading and technical writing skills in the first year itself.	K2
C101.2	Read comfortably and understand articles in science and engineering journals and articles in dailies.	K2
C101.3	Get themselves involved in an active manner during informal conversations, state opinions and express willingness.	K3
C101.4	Communicate effectively in short conversations and talks uttered in English.	K4
C101.5	Draft essays related to their courses and write personal letters and emails in comfortable manner for lifelong learning.	K4

Course Code & Name: C102 & MA8151 - Engineering Mathematics - I		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Analyze and apply the Engineering knowledge in differentiation to solve maxima and minima problems.	K4
C102.2	Solve the problems of integrals using different methods of calculus.	K5
C102.3	Design and develop the problems of integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K6
C102.4	Analyze the problems of integrals by using various methods of integration, such as substitution, partial fractions, and integration by parts.	K4
C102.5	Apply various tools in solving the differential equations to recognize the need for life-long learning.	K3

Course Code & Name: C103 & PH8151 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Analyze the problems in columns and beams and gain the engineering knowledge in properties of matter to formulate.	K4
C103.2	Explain the fundamental concepts and applications of waves, lasers, and fiber optics to give theoretical approaches to design modern devices.	K2
C103.3	Interpret the knowledge in thermal properties of materials and can determine expansion joints and heat exchangers in devices.	K3
C103.4	Discuss the fundamental concepts of quantum theory and how modern electron microscope techniques use it to make predictions in the field of physics.	K2
C103.5	Describe the behavior of solids, describe the fundamentals of crystals, their structures, and the various crystal development processes.	K2

Course Code & Name: C104 & CY8151 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Apply the water treatment techniques water in the industries and domestic water using the latest techniques by using engineering knowledge.	K3
C104.2	Select the adsorption methods used in the field of water and air pollution purification to assess societal, health, safety, and cultural issues in the environmental.	K2
C104.3	Explain the significance of alloying and the behavior of one component and two component systems using phase diagram and apply appropriate techniques in the field of metallurgy.	K2
C104.4	Discuss the types of fuels, calorific value calculations, and analyze the need for alternative fuels to solve current social problems by using engineering techniques.	K4
C104.5	Review the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells with appropriate consideration for the societal and environmental considerations	K2

Course Code & Name: C105 & GE8151 Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Express the concepts of computational thinking and algorithmic problem-solving techniques.	K2
C105.2	Develop simple python programs for applying the concepts of data types, expressions, and python statements.	K3
C105.3	Develop Python programs for solving real-time computational problems by using conditionals, looping, functions, and strings.	K3
C105.4	Explain the concepts of compound data using Python lists, tuples, and dictionaries.	K2
C105.5	Develop python programs for solving computational problems by using modules, files, and python packages.	K3

Course Code and Name: C106 & GE8152 Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Sketch the conic sections, special curves, and draw orthographic views from pictorial views and models.	K4
C106.2	Apply the principles of orthographic projections of points in all quadrants, lines, and planes in first quadrant.	K3
C106.3	Sketch the projections of simple solids like prisms, pyramids, cylinder, and cone and obtain the traces of plane figures.	K4
C106.4	Practice the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its lateral surfaces.	K3
C106.5	Sketch the perspective projection of simple solids, truncated prisms, pyramids, cone, and cylinders and sketch the isometric projection of simple machine parts.	K4

Course Code and Name: C107 & GE8161 Problem Solving and Python Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Develop simple python programs for applying the concepts of data types, expressions, and python statements.	K3
C107.2	Develop Python programs using conditionals, looping, functions, and strings for solving real-time computational problems.	K3
C107.3	Explain the concepts of compound data using Python lists, tuples, and dictionaries.	K2
C107.4	Develop python programs for solving problems by using modules, files, and python packages.	K3
C107.5	Utilize Python packages for developing real-world software applications.	K6

Course Code and Name: C108 & BS8161 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Manipulate the fundamental concepts like torque, elasticity and bending moment of beams for various engineering applications by the determination of rigidity modulus of the wire and young's modulus of the material of the beam by non-uniform bending.	K3
C108.2	Practice the fundamentals of thermal properties of material of the bad conductor by Lee's disc method.	K3
C108.3	Apply the basic knowledge and estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer.	K2
C108.4	Dramatize the strength of an acid using pH meter and conductometer for applications in the field of engineering.	K3
C108.5	Experimenting the estimation of total, permanent and temporary hardness of water for our environment.	K3

SEMESTER 2

Course Code and Name: C109 & HS8251 Technical English		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	Read and write their technical and area-specific texts in an effortless manner.	K3
C109.2	Listen comfortably and respond confidently to lectures and talks pertaining to their domain skills.	K2
C109.3	Speak in an appropriate manner in both formal and informal situations for lifelong learning.	K3
C109.4	Create CVs and draft Job applications in confident manner.	K6
C109.5	Communicate confidently by using all the four skills with their peers and in real life situations.	K4

Course Code and Name: C110 & MA8251 Engineering Mathematics -II		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	Analyze the different types of matrices for solving practical problems.	K4
C110.2	Apply Gradient, divergence and curl of a vector point function and related identities in engineering field.	K3
C110.3	Acquire the knowledge to solve the engineering problems in analytic functions.	K2
C110.4	Analyze and apply the different methods to solve complex integration problems.	K4
C110.5	Create and manage the projects after applying and analyzing the fundamentals of Laplace transforms.	K6

Course Code and Name: C111 & PH8251 Materials Science		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Inferring the fundamental knowledge in phase diagrams and explains its application in the field of materials science and engineering.	K2
C111.2	Interpret the fundamentals of the Fe-Fe ₃ C phase diagram, diverse microstructures, and alloys for engineering designs.	K3
C111.3	Describe the fundamental mechanical properties of materials and their methods of measurement.	K2
C111.4	Interpret the properties of magnetic and dielectric materials, manipulate them, and then analyze them for the purposes for which they are used in modern devices.	K3
C111.5	Comprehend the basics of ceramics, composites, and nanomaterials to design modern devices.	K2

Course Code and Name: C112 & BE8253 Basic Electrical, Electronics and Measurement Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Explain the operation of three phase electrical circuits and power systems.	K2
C112.2	Apply their knowledge of AC circuits by interpreting waveforms, calculating RMS values.	K3
C112.3	Recall and comprehend the principles of operation and characteristics of DC machines and transformers.	K2
C112.4	Explain the principles and characteristics of electronic devices and circuits.	K2
C112.5	Explain the concepts of measurements and instruments for real time applications.	K2

Course Code and Name: C113 & GE8291 Environmental Science and Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Apply the finding and implementing scientific, technological, economic, and political solutions to environmental problems with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	K3
C113.2	Comment the impact of the professional engineering solutions in societal and environmental contexts for the importance of public participation in conservation of natural resources.	K2
C113.3	Discuss the types of natural energy sources and analyze the need for alternative fuels to solve current social problems by using engineering techniques.	K2
C113.4	Describe the concepts from unsustainable to sustainable development and urban problems related to energy, water conservation, rain water harvesting.	K2
C113.5	Apply the basics of information technology in environment and human health function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	K3

Course Code and Name: C114 & GE8292 Engineering Mechanics		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Illustrate the vector and scalar representation of forces and moments.	K3
C114.2	Analyse the rigid body in equilibrium.	K4
C114.3	Evaluate the properties of surfaces and solids.	K5
C114.4	Calculate dynamic forces exerted in rigid body.	K3
C114.5	Determine the friction and the effects by the laws of friction.	K3

Course Code and Name: C115 & GE8261 Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Fabricate carpentry joints.	K6
C115.2	Use Welding equipment's to join the structures.	K3
C115.3	Perform sheet metal works.	K6
C115.4	Perform basic fitting operations and plumbing.	K3
C115.5	Carry out basic home electrical works and appliances.	K3

Course Code and Name: C116 & BE8261 Basic Electrical, Electronics and Instrumentation Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Comprehend the electrical circuit and their working principles.	K2
C116.2	Identify the electrical components of a machines and their applications.	K2
C116.3	Illustrate the characteristics of various electronic devices.	K2
C116.4	Explore the basics concepts in design of digital circuits.	K2
C116.5	Explain the fundamentals of communication systems.	K2

SEMESTER 3

Course Code and Name: C201 & MA8353 Transforms and Partial Differential Equations		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Solve the given standard partial differential equations.	K3
C201.2	Identify and analyze the differential equations using Fourier series analysis in engineering applications.	K4
C201.3	Apply modern techniques of Fourier series to solve one- and two-dimensional heat flow problems and one-dimensional wave equations	K3
C201.4	Apply the engineering knowledge to manage the projects in transforms and partial differential equations to formulate and solve some of the physical engineering.	K3
C201.5	Use the effective modern mathematical tools to solve the partial differential equations by using Z transform techniques for discrete time systems.	K3

Course Code and Name: C202 & ME8391 Engineering Thermodynamics		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Apply the first law of thermodynamics to calculate the property changes in closed and open engineering systems.	K3
C202.2	Apply the second law of thermodynamics to calculate entropy and availability in open and closed systems.	K3
C202.3	Use the property tables to identify the correct properties of pure substances and apply Rankine cycle to steam power plant.	K3
C202.4	Derive thermodynamic relations of ideal and real gases.	K3
C202.5	Calculate the properties of gas mixtures and moist air and its use in psychometric processes.	K3

Course Code and Name: C203 & CE8394 Fluid Mechanics and Machinery		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Apply mathematical knowledge to predict the properties of fluids and flow characteristics.	K3
C203.2	Analyze and calculate major and minor losses associated with pipe flow in piping networks.	K4
C203.3	Develop dimensional parameters and use the dynamic similitude.	K3
C203.4	Analyse the performance of pumps and design the centrifugal and reciprocating pumps.	K4
C203.5	Analyse the performance of turbines and design the various types of turbines.	K4

Course Code and Name: C204 & ME8351 Manufacturing Technology - I		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Describe special casting processes and sand testing methods.	K2
C204.2	Differentiate the various welding process and its application.	K2
C204.3	Classify the hot working and cold working operation and its rolling defect.	K2
C204.4	Explain sheet metal characteristics and various special forming processes.	K2
C204.5	Compare thermoplastic and thermosetting plastic and its manufacturing methods.	K2

Course Code and Name: C205 & EE8353 Electrical Drives and Control		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Illustrate heating and cooling curves with factors influencing the choice of electrical drives	K2
C205.2	Explain different types of electrical machines and their performances.	K2
C205.3	Employ various starting methods in electrical motors.	K2
C205.4	Apply various methods adopted in conventional and solid state speed control of DC drives.	K2
C205.5	Use various methods adopted in conventional and solid state speed control of AC drives.	K4

Course Code and Name: C206 & ME8361 Manufacturing Technology Laboratory – 1		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Demonstrate the safety precautions exercised in the mechanical workshop.	K3
C206.2	Make the work piece as per given shape and size using lathe, shaper, planner.	K6
C206.3	Apply the knowledge to join two metals using arc welding.	K3
C206.4	Apply the knowledge of sheet metal fabrication tools and make simple tray and funnel.	K3
C206.5	Identify the different moulding tools, patterns and prepare sand moulds.	K2

Course Code and Name: C207 & ME8381 Computer Aided Machine Drawing		
	CO Statements	Knowledge Level
The students should be able to		
C207.1	Apply the drawing standards, Fits and Tolerances.	K3
C207.2	Re-create part drawings, sectional views, and assembly drawings as per standards.	K3
C207.3	Apply Indian Standards on drawing practices and standard components to create or modify technical drawings in accordance with established guidelines.	K3
C207.4	Apply knowledge to create sketch drawings of machine components manually.	K3
C207.5	Construct drawings using standard CAD packages.	K3

Course Code and Name: C208 & EE8361 Electrical Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C208.1	Determine the load characteristics of various DC motors and Generators.	K3
C208.2	Draw the equivalent circuit of transformer.	K2
C208.3	Predetermine the voltage regulation of an alternator.	K3
C208.4	Sketch the characteristics of three phase synchronous and induction motors.	K2
C208.5	Differentiate various types of D.C. and A.C. motor starters.	K4

Course Code and Name: C209 & HS8381 Interpersonal Skills / Listening & Speaking		
	CO Statements	Knowledge Level
The students should be able to		
C209.1	Listen and react to English in an appropriate manner.	K2
C209.2	Get themselves actively involved in Group Discussion activities.	K3
C209.3	Demonstrate confidence in delivering oral presentations.	K3
C209.4	React well in both formal and informal contexts in professional situations.	K4
C209.5	Persuade their audience by making appropriate expressions.	K5

SEMESTER 4

Course Code and Name: C210 & MA8452 Statistics and Numerical Methods		
	CO Statements	Knowledge Level
The students should be able to		
C210.1	Apply the concept of testing of hypothesis for small and large samples to manage projects.	K3
C210.2	Analyze the basic concepts of classifications of design of experiments to real life problems.	K4
C201.3	Analyze the basic concepts and techniques of solving algebraic and transcendental equations.	K4
C201.4	Apply the numerical techniques of interpolation and error approximations in various intervals in real life situations.	K3
C210.5	Apply the engineering knowledge to solve the differentiation and integration problems.	K3

Course Code and Name: C211 & ME8492 Kinematics of Machinery		
	CO Statements	Knowledge Level
The students should be able to		
C211.1	Explain the principles of kinematic pairs, chains, and their classification, DOF, inversions, and basics of mechanisms.	K2
C211.2	Analyze the planar mechanisms for position, velocity, and acceleration.	K3
C211.3	Design and synthesize the cam mechanism for specified kinematic conditions.	K3
C211.4	Explain the basic concepts of toothed gearing and kinematics of gear trains.	K3
C211.5	Solve the Problems related with friction and its applications in machine elements like belt and rope drives brakes and clutches.	K3

Course Code and Name: C212 & ME8451 Manufacturing Technology - II		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	Apply milling machine operations to accurately produce complex contours, spur and helical gears.	K3
C212.2	Demonstrate the gear making proficiency in milling, hobbing and gear shaping machine tools.	K3
C212.3	Apply surface grinding techniques for achieving flat, cylindrical smooth surfaces and tool angles using grinding machines.	K3
C212.4	Execute experiments to measure cutting forces in milling and turning processes.	K3
C212.5	Develop CNC part programs using appropriate codes and commands.	K6

Course Code and Name: C213 & ME8491 Engineering Metallurgy		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.	K2
C213.2	Discuss isothermal transformation, continuous cooling diagrams and different heat treatment processes.	K3
C213.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals.	K2
C213.4	Summarize the properties and applications of non-metallic materials.	K2
C213.5	Compute the testing of mechanical properties.	K2

Course Code and Name: C214 & CE8395 Strength of Materials for Mechanical Engineers		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	Describe the mechanical behavior of materials under stress with axial load, thermal load and compute the principal stress and principal strain by Mohr's circle.	K3
C214.2	Calculate the shear force and bending moment for the different types of beams with various types of loading condition.	K3
C214.3	Use the concept of deflection of beams by various methods.	K3
C214.4	Explain the concept of torsional behavior of materials with various configuration and also combine the deflection and torsional behavior of helical springs, carriage springs.	K3
C214.5	Apply the biaxial state of stress concept on thin and thick cylinders.	K3

Course Code and Name: C215 & ME8493 Thermal Engineering - I		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	Apply thermodynamic concepts for analysis of different air standard cycles and compare their performance.	K4
C215.2	Discuss different types of air compressors and solve problems related to their efficiencies.	K2
C215.3	Explain the working of IC engines and combustion phenomenon and perform calculations on air-fuel mixture.	K3
C215.4	Compute the performance parameters of engines and explain the working of different types of fuel injection, ignition, and cooling systems.	K4
C215.5	Explain gas turbine cycle analysis and ways of improving its performance.	K4

Course Code and Name: C216 & ME8462 - Manufacturing Technology Laboratory -II		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Apply milling machine operations to accurately produce complex contours, spur, and helical gears.	K3
C216.2	Demonstrate the gear making proficiency in milling, hobbing and gear shaping machine tools.	K3
C216.3	Apply surface grinding techniques for achieving flat, cylindrical smooth surfaces and tool angles using grinding machines.	K3
C216.4	Execute experiments to measure cutting forces in milling and turning processes.	K3
C216.5	Develop CNC part programs using appropriate codes and commands.	K6

Course Code and Name: C217 & CE8381 Strength of Materials and Fluid Mechanics and Machinery Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C217.1	Determine the tensile, torsion and hardness properties of metals by testing.	K4
C217.2	Determine the stiffness properties of helical and carriage spring.	K4
C217.3	Apply the conservation laws to determine the coefficient of discharge of a venturimeter and finding the friction factor of given pipe.	K3
C217.4	Apply the fluid static and momentum principles to determine the metacentric height and forces due to impact of jet.	K3
C217.5	Determine the performance characteristics of turbine, rotodynamic pump and Positive displacement pump.	K4

Course Code and Name: C218 & HS8461 Advanced Reading and Writing		
	CO Statements	Knowledge Level
The students should be able to		
C218.1	Write technical articles in a confident manner.	K3
C218.2	Create their CV and write cover letter without anyone's help.	K6
C218.3	Read and express their views critically.	K2
C218.4	Exhibit their critical wisdom in varied professional situations.	K3
C218.5	Write confidently by acquiring competency in writing skills and use them in academic situations forever.	K5

SEMESTER 5

Course Code and Name: C301 & ME8595 Thermal Engineering II		
	CO Statements	Knowledge Level
The students should be able to		
C301.1	Apply the thermodynamic concepts for steam nozzles and solve problems.	K3
C301.2	Explain the functioning of different types of boilers, auxiliaries and calculate performance parameters	K3
C301.3	Explain the flow in steam turbines, draw velocity triangles and solve problems	K3
C301.4	Explain the working of heat pumps and heat exchangers and summarize the concept of cogeneration.	K5
C301.5	Describe the working of refrigeration and air conditioning systems and perform cooling load calculations.	K4

Course Code and Name: C302 & ME8593 Design of Machine Elements		
	CO Statements	Knowledge Level
The students should be able to		
C302.1	Apply the knowledge of mathematics fundamentals in the influence of steady and variable stresses in machine component design.	K3
C302.2	Design solutions for complex engineering problems to design to shafts, keys and couplings.	K4
C302.3	Identify and apply the concepts of design to temporary and permanent joints.	K1
C302.4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.	K3
C302.5	Apply the concepts of design to bearings.	K3

Course Code and Name: C303 & ME8501 Metrology and Measurements		
	CO Statements	Knowledge Level
The students should be able to		
C303.1	Describe the concepts of measurements to apply in various metrological instruments	K2
C303.2	Outline the principles of linear and angular measurement tools used for industrial applications	K3
C303.3	Explain the procedure for conducting computer aided inspection	K2
C303.4	Demonstrate the techniques of form measurement used for industrial components	K3
C303.5	Discuss various measuring techniques of mechanical properties in industrial applications	K2

Course Code and Name: C304 & ME8594 Dynamics of Machines		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	Discuss the forces required by various machine components to overcome inertia	K3
C304.2	Compute the unbalanced forces on reciprocating and rotating masses.	K3
C304.3	Distinguish the types of vibration and its effect on the system.	K3
C304.4	Associate the system response an exposure to various forced vibrations.	K3
C304.5	Explain the control mechanisms of governor and gyroscope with their applications.	K3

Course Code and Name: C305 & OAT551 - AUTOMOTIVE SYSTEMS		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	understand the construction and working principle of various parts of an automobile	K2
C305.2	illustrate the different vehicle frames and steering systems in automobile	K2
C305.3	Explain the different auxiliary and transmission system.	K2
C305.4	Discuss the suspension and brakes system	K2
C305.5	explain the alternative energy sources for automobiles	K2
Course Code and Name: C306 & ME8511 Kinematics and Dynamics Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C306.1	Investigate the gear parameters of various types of gears and gear trains, and measure their characteristics.	K4
C306.2	Compute the gyroscopic couple in gyroscope and centrifugal force in various governors.	K3
C306.3	Determine mass moment of inertia of mechanical element, natural frequency and damping coefficient and transmissibility.	K4
C306.4	Discuss the kinematic working model of various mechanism and cam profile.	K2
C306.5	Compute the torsional frequency and critical speed of shafts.	K3

Course Code and Name: C307 & ME8512 Thermal Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C307.1	Determine the valve timing and port timing diagram of an IC engines.	K2
C307.2	Compute the property of fuels and lubricating oils using suitable tests.	K4
C307.3	Analyse the performance and energy balance test on engine, boiler, and turbine.	K4
C307.4	Examine the heat transfer coefficient in modes of natural and forced convection.	K4
C307.5	Demonstrate Effectiveness and COP of various refrigeration and air conditioning systems.	K3

Course Code and Name: C308 & ME8513 Metrology and Measurement Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C308.1	Measure the gear tooth dimensions, angle using sine bar, straightness and flatness, thread parameters, temperature using thermocouple, force, displacement, torque, and vibration.	K4
C308.2	Calibrate the Vernier, micrometer and slip gauges and setting up the comparator for the inspection.	K4
C308.3	Measure the components precisely using non-contact (optical) measurement system.	K4
C308.4	Demonstrate the functions of surface roughness tester for measuring complex profiles.	K3
C308.5	Explain the machine tool metrology equipments with its measuring technique like straightness using auto collimator, precision level using spindle tests.	K4

SEMESTER 6

Course Code and Name: C309 & ME8651 Design of Transmission Systems		
	CO Statements	Knowledge Level
The students should be able to		
C309.1	Apply the knowledge of fundamentals and concepts of design to belts, chains and rope drives.	K3
C309.2	Apply the concepts of design to spur, helical gears.	K4
C309.3	Apply the concepts of design to worm and bevel gears	K4
C309.4	Apply the concepts of design to gear boxes.	K4
C309.5	Apply the concepts of design to cams, brakes, and clutches.	K3

Course Code and Name: C310 & ME8691 Computer Aided Design and Manufacturing		
	CO Statements	Knowledge Level
The students should be able to		
C310.1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics	K2
C310.2	Design representation the fundamentals of parametric curves, surfaces, and Solids	K2
C310.3	Summarize the different types of Standard systems used in CAD	K2
C310.4	Associate the concepts of NC& CNC programming to develop part programme for Lathe & Milling Machines	K2
C310.5	Summarize the different types of techniques used in Cellular Manufacturing and FMS.	K2

Course Code and Name: C311 & ME8693 Heat and Mass Transfer		
	CO Statements	Knowledge Level
The students should be able to		
C311.1	Apply heat conduction equations to solve real life problems in steady state and transient conditions.	K3
C311.2	Apply free and forced convective heat transfer correlations to solve problems in internal and external flows through/over various surface configurations	K3
C311.3	Explain the phenomena of boiling and condensation and design different types of heat exchanger.	K3
C311.4	Explain basic laws for radiation and apply to radiative heat transfer between different types of surfaces to solve numerical problems	K3
C311.5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications	K3

Course Code and Name: C312 & ME8692 Finite Element Analysis		
	CO Statements	Knowledge Level
The students should be able to		
C312.1	Summarize the basics of finite element formulation.	K2
C312.2	Apply finite element formulations to solve one dimensional Problem.	K3
C312.3	Apply finite element formulations to solve two dimensional scalar Problems	K3
C312.4	Apply finite element method to solve two-dimensional Vector problems.	K4
C312.5	Apply finite element method to solve problems on iso parametric element and dynamic Problems.	K2

Course Code and Name: C313 & ME8694 Hydraulics and Pneumatics		
	CO Statements	Knowledge Level
The students should be able to		
C313.1	Explain the Fluid power and operation of different types of pumps.	K2
C313.2	Summarize the features and functions of Hydraulic motors, actuators, and Flow control valves.	K2
C313.3	Discuss the different types of Hydraulic circuits and systems.	K2
C313.4	Explain the working of different pneumatic circuits and systems.	K4
C313.5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.	K3

Course Code and Name: C314 & ME8681 CAD/CAM Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Design different parts of mechanical equipment's.	K4
C314.2	Apply skills in various designing and manufacturing industries.	K3
C314.3	Create 2D and 3D models using modeling software's.	K6
C314.4	Make appropriate selection of CAD functionality to use as tools in the design process.	K4
C314.5	Demonstrate manual part programming with G and M codes using CAM.	K2

Course Code and Name: C315 & ME8682 Design and Fabrication Project		
	CO Statements	Knowledge Level
The students should be able to		
C315.1	Remember the basic principles of mechanical engineering in design of component	K1
C315.2	Describe the manufacturing process for fabrication of designed component.	K2
C315.3	Apply the ethical principles in drafting of project report.	K3
C315.4	Analyze the functionality of the fabricated component.	K4
C315.5	Evaluate the communication of individual and team on technical information.	K5

Course Code and Name: C316 & HS8581 Professional Communication		
	CO Statements	Knowledge Level
The students should be able to		
C316.1	Talk in English in real life situations.	K3
C316.2	Make effective presentations.	K3
C316.3	Participate in GD and contribute ideas with ease.	K3
C316.4	Master soft skills required for the work place.	K3
C316.5	Write letters and technical writing.	K3

SEMESTER 7

Course Code and Name: C401 & ME8792 Power Plant Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C401.1	Discuss the layout, construction and working of the components inside a thermal power plant.	K2
C401.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.	K2
C401.3	Discuss the layout, construction and working of the components inside nuclear power plants.	K2
C401.4	Summarize the working and construction of the components inside Renewable energy power plants.	K2
C401.5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.	K2

Course Code and Name: C402 & ME8793 Process Planning and Cost Estimation		
	CO Statements	Knowledge Level
The students should be able to		
C402.1	Enumerate the activities involved in the Production Planning and Control function.	K2
C402.2	Explain the significance and applications of work study techniques.	K2
C402.3	Describe the process planning activities with reference to production control.	K2
C402.4	Discuss the concepts of production scheduling.	K2
C402.5	Explain different types of costs in inventory system.	K2

Course Code and Name: C403 & ME8791 Mechatronics		
	CO Statements	Knowledge Level
The students should be able to		
C403.1	Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical and Computer Systems for the Control of Mechanical, Electronics Systems and sensor technology.	K3
C403.2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing modes of Microprocessor and Microcontroller.	K2
C403.3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device interfacing.	K3
C403.4	Explain the architecture, programming, and application of programmable logic controllers to problems and challenges in the areas of mechatronics engineering.	K3
C403.5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies.	K3

Course Code and Name: C404 & ME8073 Unconventional Machining Processes		
	CO Statements	Knowledge Level
The students should be able to		
C404.1	Explain the need for unconventional machining processes and its classification.	K2
C404.2	Compare various thermal energy and electrical energy based unconventional machining processes.	K2
C404.3	Summarize various chemical and electro-chemical energy based unconventional machining processes.	K3
C404.4	Explain various nano abrasives based unconventional machining processes.	K3
C404.5	Distinguish various recent trends based unconventional machining processes.	K3

Course Code and Name: C405.1 & ME8097 Non Destructive Testing and Evaluation		
	CO Statements	Knowledge Level
The students should be able to		
C405.1	Explain the fundamental concepts of NDT	K2
C405.2	Discuss the different methods of NDE	K2
C405.3	Explain the concept of Thermography and Eddy current testing	K2
C405.4	Explain the concept of Ultrasonic Testing and Acoustic Emission	K2
C405.5	Explain the concept of Radiography	K2

Course Code and Name: C406 & ME8711 Simulation and Analysis Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C406.1	Analyze the forces and stress in trusses, cables, beams, plates, axis-symmetric components with different boundary conditions.	K4
C406.2	Compute the temperature distribution in plates and cylindrical shells.	K3
C406.3	Perform the vibration, modal and harmonic analysis of simple system.	K3
C406.4	Comprehend the basic functions and interface of MATLAB.	K2
C406.5	Synthesis and simulation of mechanism using MATLAB software.	K4

Course Code and Name: C407 & ME8781 Mechatronics Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C407.1	Write and execute the assembly language programming in microprocessor 8085.	K3
C407.2	Demonstrate the interface between microprocessor and external devices.	K3
C407.3	Design , model, analysis of mechatronics system with various pneumatic, hydraulic electrical and PLC system.	K3
C407.4	Explain the application of image processing.	K2
C407.5	Understand the functions of transducers.	K2

Course Code and Name: C408 & ME8712 Technical Seminar

	CO Statements	Knowledge Level
The students should be able to		
C408.1	Recollect the knowledge acquired during the earlier semesters.	K2
C408.2	Apply fundamental principle of mechanical engineering concepts to solve real life problems.	K3
C408.3	Present technical topics and discuss about them.	K2
C408.4	Analyze and interpret experimental data with relevance.	K2
C408.5	Simplify the decision-making skills.	K2

SEMESTER 8

Course Code and Name: C409 & MG8591 Principles of Management		
	CO Statements	Knowledge Level
The students should be able to		
C409.1	Explain the purpose of management, roles and skills of Manager in local and global organization.	K2
C409.2	Describe the purpose of planning, decision making and their processes.	K2
C409.3	Demonstrate the various organizational structures and staff selection procedure.	K2
C409.4	Classify the motivational theories and communication process	K2
C409.5	Describe the scope of control and role of computer, IT in management control.	K2

Course Code and Name: C410 & IE8693 Production Planning and Control		
	CO Statements	Knowledge Level
The students should be able to		
C410.1	Enumerate the activities involved in the production planning and control function.	K2
C410.2	Explain the significance and applications of work study techniques.	K2
C410.3	Describe the process planning activities with reference to production control.	K2
C410.4	Discuss the concepts of production scheduling.	K2
C410.5	Explain different types of costs in inventory system.	K2

Course Code and Name: C411 & ME8811 Project Work		
	CO Statements	Knowledge Level
The students should be able to		
C411.1	Formulate a real-world problem, identify the requirement and develop the design solutions.	K3
C411.2	Identify technical ideas, strategies, and methodologies.	K3
C411.3	Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.	K3
C411.4	Test and validate through conformance of the developed prototype and analysis the cost effectiveness.	K4
C411.5	Prepare technical report and oral presentations	K3

DEPARTMENT OF MECHANICAL ENGINEERING

Course Code & Title:

As per Anna University Regulation 2021, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S/N.	COURSE CODE	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER – I			
1.	C101	HS3152	PROFESSIONAL ENGLISH - I
2.	C102	MA3151	MATRICES AND CALCULUS
3.	C103	PH3151	ENGINEERING PHYSICS
4.	C104	CY3151	ENGINEERING CHEMISTRY
5.	C105	GE3151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6.	C106	GE3171	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
7.	C107	BS3171	PHYSICS AND CHEMISTRY LABORATORY
8.	C108	GE3172	ENGLISH LABORATORY
SEMESTER – II			
9.	C109	HS3252	PROFESSIONAL ENGLISH - II
10.	C110	MA3251	STATISTICS AND NUMERICAL METHODS
11.	C111	PH3251	MATERIALS SCIENCE
12.	C112	BE3251	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
13.	C113	GE3251	ENGINEERING GRAPHICS
14.	C114	GE3271	ENGINEERING PRACTICES LABORATORY
15.	C115	BE3271	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY
16.	C116	GE3272	COMMUNICATION LABORATORY
SEMESTER – III			
17.	C201	MA3351	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS
18.	C202	ME3351	ENGINEERING MECHANICS
19.	C203	ME3391	ENGINEERING THERMODYNAMICS
20.	C204	CE3391	FLUID MECHANICS AND MACHINERY
21.	C205	ME3392	ENGINEERING MATERIALS AND METALLURGY

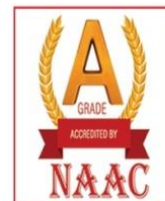
22.	C206	ME3393	MANUFACTURING PROCESSES
23.	C207	ME3381	COMPUTER AIDED MACHINE DRAWING
24.	C208	ME3382	MANUFACTURING TECHNOLOGY LABORATORY
25.	C209	GE3361	PROFESSIONAL DEVELOPMENT
SEMESTER – IV			
26.	C210	ME3491	THEORY OF MACHINES
27.	C211	ME3451	THERMAL ENGINEERING
28.	C212	ME3492	HYDRAULICS AND PNEUMATICS
29.	C213	ME3493	MANUFACTURING TECHNOLOGY
30.	C214	CE3491	STRENGTH OF MATERIALS
31.	C215	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
32.	C216	CE3481	STRENGTH OF MATERIALS AND FLUID MACHINERY LABORATORY
33.	C217	ME3461	THERMAL ENGINEERING LABORATORY
SEMESTER – V			
34.	C301	ME3591	DESIGN OF MACHINE ELEMENTS
35.	C302	ME3592	METROLOGY AND MEASUREMENTS
36.	C303	MR3691	ROBOTICS
37.	C304	CME380	AUTOMOBILE ENGINEERING
38.	C305	CME384	POWER PLANT ENGINEERING
39.	C306	ME3581	METROLOGY AND DYNAMICS LABORATORY
SEMESTER – VI			
40.	C307	ME3691	HEAT AND MASS TRANSFER
41.	C308	CME387	NON-TRADITIONAL MACHINING PROCESSES
42.	C309	CME340	CAD/CAM
43.	C310	CME397	SURFACE ENGINEERING
44.	C311	CME366	EQUIPMENT FOR POLLUTION CONTROL
45.	C312	OCS352	IOT CONCEPTS AND APPLICATIONS
46.	C313	ME3681	CAD / CAM LABORATORY
47.	C314	ME3682	HEAT TRANSFER LABORATORY
SEMESTER – VII			
48.	C401	ME3791	MECHATRONICS AND IOT
49.	C402	ME3792	COMPUTER INTEGRATED MANUFACTURING
50.	C403	GE3791	HUMAN VALUES AND ETHICS
51.	C404	GE3792	INDUSTRIAL MANAGEMENT
52.	C405	OCS353	DATA SCIENCE FUNDAMENTALS
53.	C406	OML351	INTRODUCTION TO NON-DESTRUCTIVE



NPR

COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)



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			TESTING
54.	C407	ME3781	MECHATRONICS AND IOT LABORATORY
55.	C408	ME3711	SUMMER INTERNSHIP
SEMESTER – VIII			
56.	C409	ME3811	PROJECT WORK / INTERNSHIP

Course Outcomes

Course Outcomes with K – Level Mapping for all Courses

SEMESTER 1

Course Code & Name: C101 & HS3152 Professional English - I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Use appropriate words in a professional context	K3
C101.2	Gain understanding of basic grammatical structures and use them in right context.	K2
C101.3	Read and infer the denotative and connotative meanings of technical texts.	K2
C101.4	Read and interpret information presented in tables, charts and other graphic forms.	K2
C101.5	Write definitions, descriptions, narrations and essays on various topics.	K3

Course Code & Name: C102 & MA3151 Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Apply differential calculus tools in solving various application problems.	K3
C102.3	Use differential calculus ideas on several variable functions.	K3
C102.4	Apply different methods of integration in solving practical problems.	K3
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3

Course Code &Name: C103 & PH3151 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Understand the importance of mechanics.	K2
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics, lasers.	K2
C103.4	Understand the importance of quantum physics.	K2
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K3

Course Code &Name: C104 & CY3151 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K2
C104.2	Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K3
C104.3	Apply the knowledge of phase rule and composites for material selection requirements.	K3
C104.4	Recommend suitable fuels for engineering processes and applications.	K2
C104.5	Recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K3

Course Code & Name: C105 & GE3151 Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K3
C105.2	Develop and execute simple Python programs.	K3
C105.3	Write simple Python programs using conditionals and looping for solving problems.	K2
C105.4	Decompose a Python program into functions.	K4
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.	K2
C105.6	Read and write data from/to files in Python programs.	K2

Course Code and Name: C106 & GE3171 Problem Solving and Python Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Develop algorithmic solutions to simple computational problems	K6
C106.2	Develop and execute simple Python programs.	K3
C106.3	Implement programs in Python using conditionals and loops for solving problems.	K3
C106.4	Deploy functions to decompose a Python program.	K2
C106.5	Process compound data using Python data structures.	K2
C106.6	Utilize Python packages in developing software applications.	K6

Course Code and Name: C107 & BS3171 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Discuss the functioning of various physics laboratory equipment.	K2
C107.2	Use graphical models to analyze laboratory data.	K3
C107.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K3
C107.4	Access , process and analyze scientific information.	K4
C107.5	Solve problems individually and collaboratively.	K3

Course Code and Name: C107 & BS3171 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C107.2	Determine the amount of metal ions through volumetric and spectroscopic techniques	K3
C107.3	Analyse and determine the composition of alloys.	K4
C107.4	Learn simple method of synthesis of nanoparticles.	K2
C107.5	Analyse quantitatively the impurities in solution by electroanalytical techniques.	K4

Course Code and Name: C108 & GE3172 English Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Listen to and comprehend general as well as complex academic information.	K2
C108.2	Listen to and understand different points of view in a discussion.	K2
C108.3	Speak fluently and accurately in formal and informal communicative contexts.	K3
C108.4	Describe products and processes and explain their uses and purposes clearly and accurately.	K2
C108.5	Express their opinions effectively in both formal and informal discussions.	K2

SEMESTER 2

Course Code and Name: C109 & HS3252 Professional English -II

	CO Statements	Knowledge Level
The students should be able to		
C109.1	Compare and contrast products and ideas in technical texts.	K4
C109.2	Identify and report cause and effects in events, industrial processes through technical texts.	K2
C109.3	Analyse problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	Present their ideas and opinions in a planned and logical manner.	K3
C109.5	Draft effective resumes in the context of job search.	K4

Course Code and Name: C110 & MA3251 Statistics and Numerical Methods

	CO Statements	Knowledge Level
The students should be able to		
C110.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C110.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C110.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K2
C110.4	Discuss various techniques and methods for solving first and second order ordinary differential equations.	K2
C110.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3

Course Code and Name: C111 & PH3251 Materials Science		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Know basics of crystallography and its importance for varied materials properties.	K2
C111.2	Gain knowledge on the electrical and magnetic properties of materials and their applications.	K2
C111.3	Comment clearly of semiconductor physics and functioning of semiconductor devices.	K2
C111.4	Discuss the optical properties of materials and working principles of various optical devices.	K2
C111.5	Appreciate the importance of functional nanoelectronic devices.	K3

Course Code and Name: C112 & BE3251 Basic Electrical and Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Compute the electric circuit parameters for simple problems.	K3
C112.2	Explain the working principle and applications of electrical machines.	K2
C112.3	Analyze the characteristics of analog electronic devices.	K4
C112.4	Explain the basic concepts of digital electronics.	K2
C112.5	Explain the operating principles of measuring instruments.	K2

Course Code and Name: C113 & GE3251 Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Construct the conic curves, involutes and cycloid.	K2
C113.2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.	K3
C113.3	Sketch the projections of simple solids like prisms, pyramids, cylinder and cone and freehand sketch of given figures.	K3
C113.4	Practice the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its development of surfaces	K3
C113.5	Sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.	K3

Course Code and Name: C114 & GE3271 Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Apply the knowledge of pipeline planning, plumbing fitting installation, wood sawing, planning, and joint making and execute common household plumbing and woodworking tasks.	K3
C114.2	Execute wiring of various electrical joints in common household electrical wire work.	K3
C114.3	Apply the knowledge of arc welding, machining, mechanical assembly, and sheet metal work, and create various functional household appliances	K3
C114.4	Apply the procedures for soldering and testing simple electronic circuits, as well as assembling and testing basic electronic components.	K3

Course Code and Name: C115 & BE3271 Basic Electrical and Electronics Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Use experimental methods to verify the Ohm's and Kirchhoff's laws.	K2
C115.2	Analyze experimentally the load characteristics of electrical machines.	K2
C115.3	Analyze the characteristics of basic electronics devices.	K2
C115.4	Use DSO to measure the various parameters.	K2
C115.5	Design, build, and test electronic circuits, including half-wave and full-wave rectifiers for power supply applications, as well as binary adder and subtractor circuits for digital arithmetic.	K4

Course Code and Name: C117 & GE3272 Communication Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Speak effectively in group discussions held in a formal/semi formal contexts.	K2
C116.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions.	K2
C116.3	Write emails, letters and effective job applications.	K2
C116.4	Write critical reports to convey data and information with clarity and precision.	K2
C116.5	Give appropriate instructions and recommendations for safe execution of tasks.	K3

SEMESTER 3

Course Code and Name: C201 & MA3351 Transforms and Partial Differential Equations		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Express how to solve the given standard partial differential equations.	K3
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	K3
C201.3	Appreciate the physical significance of Fourier series techniques in solving one- and two-dimensional heat flow problems and one-dimensional wave equations.	K2
C201.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	K3
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems	K2

Course Code and Name: C202 & ME3351 – Engineering Mechanics		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Illustrate the vector and scalar representation of forces and moments.	K2
C202.2	Analyse the rigid body in equilibrium.	K4
C202.3	Evaluate the properties of distributed forces.	K4
C202.4	Determine the friction and the effects by the laws of friction.	K3
C202.5	Calculate dynamic forces exerted in rigid body.	K4

Course Code and Name: C203 & ME3391 Engineering Thermodynamics		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Apply the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems.	K3
C203.2	Apply the second law of thermodynamics in analysing the performance of thermal devices through energy and entropy calculations.	K3
C203.3	Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart	K3
C203.4	Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations.	K3
C203.5	Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.	K3

Course Code and Name: C204 & CE3391 Fluid Mechanics and Machinery		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Discuss the properties and behaviour in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics	K2
C204.2	Estimate losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. Also, to understand the concept of boundary layer and its thickness on the flat solid surface.	K4
C204.3	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies.	K4
C204.4	Explain the working principles of various turbines and design the various types of turbines.	K2
C204.5	Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps.	K2

Course Code and Name: C205 & ME3392 Engineering Materials and Metallurgy		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.	K2
C205.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.	K2
C205.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals.	K2
C205.4	Summarize the properties and applications of non-metallic materials.	K2
C205.5	Explain the testing of mechanical properties.	K2

Course Code and Name: C206 & ME3393 Manufacturing Processes		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Explain the principle of different metal casting processes.	K2
C206.2	Describe the various metal joining processes.	K2
C206.3	Illustrate the different bulk deformation processes.	K2
C206.4	Apply the various sheet metal forming process.	K3
C206.5	Apply suitable molding technique for manufacturing of plastic components.	K3

Course Code and Name: C207 & ME3381 Computer Aided Machine Drawing

	CO Statements	Knowledge Level
The students should be able to		
C207.1	Apply standard drawing practices, including fits and tolerances, to ensure the accuracy and precision of technical drawings.	K3
C207.2	Model orthogonal views of machine components.	K3
C207.3	Prepare standard drawing layout for modeled parts, assemblies with BoM.	K3

Course Code and Name: C208 & ME3382 Manufacturing Technology Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C208.1	Demonstrate the safety precautions exercised in the mechanical workshop and join two metals using GMAW.	K3
C208.2	Make the green sand mould cavity.	K6
C208.3	Make the work piece as per given shape and size using machining process such as rolling, drawing, turning, shaping, drilling and milling.	K6
C208.4	Make the gears using gear making machines and perform grinding operation in different grinding machines	K6
C208.5	Calculate the cutting forces using dynamometer on machine tools.	K3

Course Code and Name: C209 & GE3361 Professional Development		
	CO Statements	Knowledge Level
The students should be able to		
C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements	K3
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding	K3
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K3

SEMESTER 4

Course Code and Name: C210 & ME3491 Theory of Machines		
	CO Statements	Knowledge Level
The students should be able to		
C210.1	Discuss the basics of mechanism.	K3
C210.2	Solve problems on gears and gear trains.	K4
C201.3	Examine friction in machine elements.	K4
C201.4	Calculate static and dynamic forces of mechanisms.	K4
C210.5	Calculate the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of free vibration, forced vibration and damping coefficient.	K4

Course Code and Name: C211 & ME3451 Thermal Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C211.1	Apply thermodynamic concepts to different air standard cycles and solve problems.	K2
C211.2	Solve problems in steam nozzle and calculate critical pressure ratio.	K3
C211.3	Explain the flow in stream turbines, draw velocity diagrams, flow in Gas turbines, and solve problems.	K3
C211.4	Explain the functioning and features of IC engine, components, and auxiliaries.	K3
C211.5	Calculate the various performance parameters of IC engines.	K3

Course Code and Name: C212 & ME3492 Hydraulics and Pneumatics		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	Apply the working principles of fluid power systems and hydraulic pumps.	K3
C212.2	Apply the working principles of hydraulic actuators and control components.	K3
C212.3	Design and develop hydraulic circuits and systems.	K4
C212.4	Apply the working principles of pneumatic circuits and power system and its components.	K3
C212.5	Identify various troubles shooting methods in fluid power systems.	K3

Course Code and Name: C213 & ME3493 Manufacturing Technology		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Apply the mechanism of metal removal process and to identify the factors involved in improving machinability.	K3
C213.2	Describe the constructional and operational features of centre lathe and other special purpose lathes.	K2
C213.3	Describe the constructional and operational features of reciprocating machine tools.	K2
C213.4	Apply the constructional features and working principles of CNC machine tools.	K3
C213.5	Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component.	K3

Course Code and Name: C214 & CE3491 Strength of Materials		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	Explain the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.	K2
C214.2	Discuss the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.	K2
C214.3	Apply basic equation of torsion in designing of shafts and helical springs	K3
C214.4	Calculate slope and deflection in beams using different methods.	K4
C214.5	Analyze thin and thick shells for applied pressures.	K4

Course Code and Name: C215 & GE3451 Environmental Sciences and Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	Recognize and understand the functions of environment, ecosystems, and biodiversity and their conservation.	K2
C215.2	Identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
C215.3	Identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K3
C215.4	Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K2
C215.5	Demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3

Course Code and Name: C216 & CE3491 Strength of Materials and Fluid Machinery Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Determine the tensile, torsion and hardness properties of metals by testing.	K3
C216.2	Determine the stiffness properties of helical and carriage spring.	K3
C216.3	Apply the conservation laws to determine the coefficient of discharge of a venturimeter and finding the friction factor of given pipe.	K3
C216.4	Apply the fluid static and momentum principles to determine the metacentric height and forces due to impact of jet.	K3
C216.5	Determine the performance characteristics of turbine, rotodynamic pump and positive displacement pump.	K3

Course Code and Name: C217 & ME3461 Thermal Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C217.1	Evaluate performance characteristics of IC engines	K5
C217.2	Examine the viscous property of given lubricants.	K4
C217.3	Test to evaluate Performance and Energy Balance on a Steam Generator.	K4

SEMESTER 5

Course Code and Name: C301 & ME3591 Design of Machine Elements		
	CO Statements	Knowledge Level
The students should be able to		
C301.1	Explain the design machine members subjected to static and variable loads.	K2
C301.2	Apply the concepts design to shafts, key and couplings.	K3
C301.3	Apply the concepts of design to bolted, Knuckle, Cotter, riveted and welded joints.	K3
C301.4	Apply the concept of design helical, leaf springs, flywheels, connecting rods and crank shafts.	K3
C301.5	Apply the concepts of design and select sliding and rolling contact bearings, seals and gaskets.	K3

Course Code and Name: C302 & ME3592 Metrology and Measurements		
	CO Statements	Knowledge Level
The students should be able to		
C302.1	Discuss the concepts of measurements to apply in various metrological instruments.	K2
C302.2	Apply the principle and applications of linear and angular measuring instruments, assembly, and transmission elements.	K3
C302.3	Apply the tolerance symbols and tolerance analysis for industrial applications.	K3
C302.4	Apply the principles and methods of form and surface metrology.	K3
C302.5	Apply the advances in measurements for quality control in manufacturing Industries.	K3

Course Code and Name: C303 & MR3691 Robotics

	CO Statements	Knowledge Level
The students should be able to		
C303.1	Apply the basic concepts and terminologies of robots.	K3
C303.2	Acquire the procedures for Forward and Inverse Kinematics, Dynamics for Various Robots.	K2
C303.3	Derive the Forward and Inverse Kinematics, Dynamics for Various Robots.	K3
C303.4	Explore the various programming techniques in industrial applications.	K2
C303.5	Analyze the use of various types of robots in different applications.	K4

Course Code and Name: C304 & CME380 Automobile Engineering

	CO Statements	Knowledge Level
The students should be able to		
C304.1	Discuss the forces required by various machine components to overcome inertia	K3
C304.2	Compute the unbalanced forces on reciprocating and rotating masses.	K3
C304.3	Distinguish the types of vibration and its effect on the system.	K3
C304.4	Associate the system response an exposure to various forced vibrations.	K3
C304.5	Explain the control mechanisms of governor and gyroscope with their applications.	K3

Course Code and Name: C305 & CME384 Power Plant Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Explain the layout, construction and working of the components inside a thermal power plant.	K2
C305.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.	K2
C305.3	Explain the layout, construction and working of the components inside nuclear power plants.	K2
C305.4	Explain the layout, construction and working of the components inside Renewable energy power plants.	K2
C305.5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.	K2

Course Code and Name: C306 & ME3581 Metrology and Dynamics Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C306.1	Perform calibration and measurements of linear/angular parameters, form parameters using linear/angular measuring instruments and roundness tester.	K5
C306.2	Measure the gear tooth parameters, screw thread parameters, surface finish parameters, prismatic component dimensions using appropriate measuring instruments	K5
C306.3	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.	K2
C306.4	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, balancing mass of rotating and reciprocating masses, and transmissibility ratio.	K3
C306.5	Determine the natural frequency and damping coefficient, critical speeds of shafts.	K3

SEMESTER 6

Course Code and Name: C307 & ME3691 Heat and Mass Transfer		
	CO Statements	Knowledge Level
The students should be able to		
C307.1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems.	K3
C307.2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems.	K3
C307.3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems.	K2
C307.4	Explain basic laws for radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems.	K2
C307.5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications.	K3

Course Code and Name: C308 & CME387 Non-traditional Machining Processes		
	CO Statements	Knowledge Level
The students should be able to		
C308.1	Formulate different types of non-traditional machining processes and evaluate mechanical energy based non-traditional machining processes.	K5
C308.2	Illustrate chemical and electro chemical energy based processes.	K2
C308.3	Evaluate thermo-electric energy based processes	K4
C308.4	Interpret Nano finishing processes	K2
C308.5	Analyse hybrid non-traditional machining processes and differentiate non-traditional machining processes	K4

Course Code and Name: C309 & CME340 CAD/CAM		
	CO Statements	Knowledge Level
The students should be able to		
C309.1	Discuss the basics of the design and concepts.	K2
C309.2	Develop the two dimensional drafting and projection views.	K6
C309.3	Discuss the three dimensional modeling, parametric and Non-parametric modeling.	K2
C309.4	Discuss the assembly modeling and top down, bottom-up approaches.	K2
C309.5	Use the computer aided machining and writing part programming.	K3

Course Code and Name: C310 & CME397 Surface Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C310.1	Describe the fundamentals of surface features and different types of friction associated with metals and non-metals.	K2
C310.2	Analyze the different types of wear mechanism and its standard measurement.	K4
C310.3	Analyze the different types of corrosion and its preventive measures.	K4
C310.4	Analyze the different types of surface properties and surface modification techniques.	K4
C310.5	Analyze the various types of materials used in the friction and wear applications.	K4

Course Code and Name: C311 & CME366 Equipment for Pollution Control		
	CO Statements	Knowledge Level
The students should be able to		
C311.1	Explain the different types of pollution, their sources and effects.	K2
C311.2	Discuss the pollution control regulations and standards.	K2
C311.3	Design equipment for pollution control.	K5
C311.4	Discuss different methods of pollution control from various sources in air, water and soil.	K2
C311.5	Discuss the Conduct performance assessment of pollution control equipment.	K2

Course Code and Name: C312 & OCS352 IoT Concepts and Applications		
	CO Statements	Knowledge Level
The students should be able to		
C312.1	Explain the concept of IoT.	K2
C312.2	Explain the communication models and various protocols for IoT.	K2
C312.3	Design portable IoT using Arduino/Raspberry Pi /open platform.	K5
C312.4	Apply data analytics and use cloud offerings related to IoT.	K3
C312.5	Analyze applications of IoT in real time scenario.	K4

Course Code and Name: C313 & ME3681 CAD/CAM Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C313.1	Test the practical experience in 2D drafting and 3D modelling using software.	K4
C313.2	Translate 3-Dimensional geometric model of parts, sub-assemblies, assemblies and exporting it to drawing	K2
C313.3	Develop program using G & M Code, simulate the part program and generated CL data using CAM software.	K6

Course Code and Name: C314 & ME3682 Heat Transfer Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C314.1	Predict the thermal conductivity of solids and liquids.	K4
C314.2	Estimate the heat transfer coefficient values of various fluids.	K5
C314.3	Test the performance of tubes in tube heat exchangers.	K4

DEPARTMENT OF MECHANICAL ENGINEERING

As per Autonomous Regulation 2023, the lists of courses are given in the Table.

List of Courses

S/ N	COURSE CODE (NBA)	COURSE CODE (Autonomous)	TITLE OF THE COURSE
SEMESTER – I			
1.	C101	23HS101	PROFESSIONAL ENGLISH-I
2.	C102	23MA101	MATRICES AND CALCULUS
3.	C103	23PH101	ENGINEERING PHYSICS
4.	C104	23CY101	ENGINEERING CHEMISTRY
5.	C105	23GE102	PROBLEM SOLVING AND PYTHON PROGRAMMING
7.	C106	23GE111	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8.	C107	23BS111	PHYSICS AND CHEMISTRY LABORATORY
9.	C108	23GE112	ENGLISH LABORATORY - I
SEMESTER – II			
10.	C109	23HS201	PROFESSIONAL ENGLISH-II
11.	C110	23MA201	STATISTICS AND NUMERICAL METHODS
12.	C111	23PH204	MATERIALS SCIENCE AND TECHNOLOGY
13.	C112	23BE201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
14.	C113	23ME201	ENGINEERING MECHANICS
15.	C114	23GE202	ENGINEERING GRAPHICS
17.	C115	23GE211	ENGINEERING PRACTICES LABORATORY
18.	C116	23BE212	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY
19.	C117	23GE212	ENGLISH LABORATORY - II

Course Outcomes with K–Level Mapping for all Courses (Regulation 2023)

SEMESTER1

Course Code & Name: C101 & 23HS101 Professional English-I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	Gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	Read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	Write definitions, descriptions, narrations and essays on various topics.	K6
C101.5	Express their opinions effectively in both oral and written medium of communication.	K6

Course Code & Name: C102 & 23MA101 Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Able to use differential calculus ideas on several variable functions.	K3
C102.3	Apply integral calculus and multiple integral tools in solving various application problems.	K3
C102.4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	K2
C102.5	Apply various techniques in solving ordinary differential equations.	K3

Course Code & Name: C103 & 23PH101 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Infer the characteristics of laser for various Engineering applications and expand the understanding of optical fibers use in communications.	K2
C103.4	Apply quantum theory's sophisticated physics notions to the matter's characterization.	K3
C103.5	Know the fundamentals of crystal formations and growth methods.	K3

Course Code & Name: C104 & 23CY101 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Summarize the water related problems in boilers and their treatment techniques.	K1
C104.2	Discuss the applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.	K2
C104.3	Discuss the types, properties and applications of polymers and composites.	K3
C104.4	Summarize the fuels used for engineering processes and applications of fuels.	K2
C104.5	Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.	K3

Course Code & Name: C105 & 23GE102 Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Understand the concepts of computational thinking and algorithmic problem-solving techniques.	K2
C105.2	Develop simple python programs for applying the concepts of datatypes, expressions, and python statements.	K3
C105.3	Develop Python programs for solving real-time computational problems by using conditionals, looping, functions, and strings.	K3
C105.4	Understand the concepts of compound data using Python lists, tuples, and dictionaries.	K2
C105.5	Develop python programs for solving computational problems by using modules, files, and python packages.	K3

Course Code and Name: C106 & 23GE111 Problem Solving and Python Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Develop simple python programs for applying the concepts of datatypes, expressions, and python statements.	K3
C106.2	Develop Python programs using conditionals, looping, functions, and strings for solving real-time computational problems.	K3
C106.3	Understand the concepts of compound data using Python lists, tuples, and dictionaries.	K2
C106.4	Develop python programs for solving problems by using modules, files, and python packages.	K3
C106.5	Utilize Python packages for developing real-world software applications.	K3

Course Code and Name: C107 & 23BS111 Physics and Chemistry Laboratory		
	(PHYSICS) CO Statements	Knowledge Level
The students should be able to		
C107.1	Apprehend the concepts of interference, diffraction of light and recognize the resonance concept of waves.	K2
C107.2	Apply the principles of operations of optical fibers, semiconductor using simple circuits and interaction of electromagnetic waves and crystalline solids.	K3
C107.3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
C107.4	Experiment the relationship between the light and matter & properties of liquids.	K4
C107.5	Estimate the thermal properties and thermal behavior of the material.	K2

Course Code and Name: C107 & 23BS111 Physics and Chemistry Laboratory		
	(CHEMISTRY) CO Statements	Knowledge Level
The students should be able to		
C107.1	Analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C107.2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	K3
C107.3	Analyse and determine the composition of alloys.	K4
C107.4	Learn simple method of synthesis of nanoparticles	K2
C107.5	Quantitatively analyse the impurities in solution by electroanalytical methods.	K4

Course Code and Name: C108 & 23GE112 English Laboratory - I

	CO Statements	Knowledge Level
The students should be able to		
C108.1	Listen to and comprehend general as well as complex academic information.	K2
C108.2	Listen to and understand different points of view in a discussion.	K2
C108.3	speak fluently and accurately in formal and informal communicative contexts.	K3
C108.4	Describe products and processes and explain their uses and purposes clearly and accurately.	K6
C108.5	Express their opinions effectively in both formal and informal discussions.	K6

SEMESTER2

Course Code and Name: C109 & 23HS201 Professional English-II

	CO Statements	Knowledge Level
The students should be able to		
C109.1	Compare and contrast products and ideas in technical texts and write analytical essays.	K2
C109.2	Identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C109.3	Analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	Present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C109.5	Draft effective resumes in the context of job application.	K6

Course Code and Name: C110 & 23MA201 Statistics and Numerical Methods

	CO Statements	Knowledge Level
The students should be able to		
C110.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C110.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C110.3	Apply the basic concepts and Techniques of solving algebraic and transcendental equations.	K3
C110.4	Understand the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K2
C110.5	Solve the ordinary differential equations with initial conditions by using certain techniques with engineering applications.	K4

Course Code and Name: C111 & 23PH204 Materials Science and Technology		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Inferring the fundamental knowledge in phase diagrams and explain its application in the field of materials science and engineering.	K2
C111.2	Interpret the fundamentals of the Fe-Fe ₃ C phase diagram, diverse microstructures, and alloys for engineering designs.	K2
C111.3	Understand the fundamental mechanical properties of materials and their methods of measurement.	K2
C111.4	Gain knowledge on dielectric, super conducting and their properties.	K2
C111.5	Apply the suitable nanomaterials and shape memory alloys for specific engineering applications.	K3

Course Code and Name: C112 & 23BE201 Basic Electrical and Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Compute the electric circuit parameters for simple problems	K3
C112.2	Examine the working principle and applications of electrical machines	K2
C112.3	Illustrate the characteristics of analog electronic devices	K2
C112.4	Examine the basic concepts of digital electronics	K4
C112.5	Apply the concepts of principles of measuring instruments for real time applications	K2

Course Code and Name: C113 & 23ME201 Engineering Mechanics		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Identify various force system in a plane.	K2
C113.2	Solve equilibrium of rigid bodies in two dimensions.	K3
C113.3	Calculate the centroid, areas and mass moment of inertia for surface and solids.	K3
C113.4	Apply the concept of dynamics for particle motions.	K3
C113.5	Determine the friction of elements and dynamics of rigid bodies.	K3

Course Code and Name: C114 & 23GE202 Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Construct the conic curves, involutes and cycloid.	K3
C114.2	Solve practical problems involving projection of lines, points and plane surfaces	K3
C114.3	Draw orthographic projection of solids and freehand sketch of simple objects.	K3
C114.4	Draw the sectioning and development of simple solids.	K3
C114.5	Draw isometric and perspective projections of simple solids.	K3

Course Code and Name: C115 & 23GE211 Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K3
C115.2	Wire various electrical joints in common household electrical wire work.	K3
C115.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K3
C115.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K4

Course Code and Name: C116 & 23BE212 Basic Electrical and Electronics Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Perform the Verification of Ohm's and Kirchhoff's Laws for DC circuits.	K3
C116.2	Analyze experimentally the load characteristics of electrical machines	K4
C116.3	Analyze the characteristics of basic electronic devices	K4
C116.4	Demonstrate use of DSO to measure the various parameters	K3

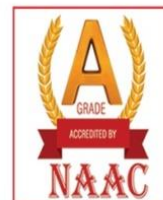


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COLLEGE OF ENGINEERING & TECHNOLOGY

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Course Code and Name: C117 & 23GE212 & English Laboratory - II		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Speak effectively in group discussions held in a-formal/ semi formal contexts.	K6
C117.2	Discuss , analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C117.3	Make effective presentations in an attractive way using appropriate vocabulary.	K3
C117.4	Attend job interviews and be successful in them.	K6
C117.5	Develop adequate Soft Skills required for the workplace.	K3

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Course Code & Title:

As per Anna University Regulation 2021, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S/N	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	HS3152	PROFESSIONAL ENGLISH - I
2	C102	MA3151	MATRICES AND CALCULUS
3	C103	PH3151	ENGINEERING PHYSICS
4	C104	CY3151	ENGINEERING CHEMISTRY
5	C105	GE3151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6	C106	GE3152	HERITAGE OF TAMILS
7	C107	GE3171	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8	C108	BS3171	PHYSICS AND CHEMISTRY LABORATORY
9	C109	GE3172	ENGLISH LABORATORY
SEMESTER - II			
10	C110	HS3252	PROFESSIONAL ENGLISH - II
11	C111	MA3251	STATISTICS AND NUMERICAL METHODS
12	C112	PH3256	PHYSICS FOR INFORMATION SCIENCE

13	C113	BE3251	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
14	C114	GE3251	ENGINEERING GRAPHICS
7	C115	AD3251	DATA STRUCTURES DESIGN
8	C116	GE3252	TAMILS AND TECHNOLOGY
9	C117	GE3271	ENGINEERING PRACTICES LABORATORY
	C118	AD3271	DATA STRUCTURES DESIGN LABORATORY
	C119	GE3272	COMMUNICATION LABORATORY / FOREIGN LANGUAGE
SEMESTER - III			
1	C201	MA3354	DISCRETE MATHEMATICS
2	C202	CS3351	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION
3	C203	AD3391	DATABASE DESIGN AND MANAGEMENT
4	C204	AD3351	DESIGN AND ANALYSIS OF ALGORITHMS
5	C205	AD3301	DATA EXPLORATION AND VIRTUALIZATION
6	C206	AL3391	ARTIFICIAL INTELLIGENCE
7	C207	AD3381	DATABASE DESIGN AND MANAGEMENT LABORATORY
8	C208	AD3311	ARTIFICIAL INTELLIGENCE LABORATORY
9	C209	GE3361	PROFESSIONAL DEVELOPMENTS
SEMESTER - IV			

10	C210	MA3391	PROBABILITY AND STATISTICS
11	C211	AL3452	OPERATING SYSTEMS
12	C212	AL3451	MACHINE LEARNING
13	C213	AD3491	FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS
14	C2	CS3591	COMPUTER NETWORKS
15	C2	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
16	C2	AD3411	DATA SCIENCE AND ANALYTICS LABORATORY
17	C2	AD3461	MACHINE LEARNING LABORATORY

Course Outcomes with K – Level mapping for all courses

Course Code & Title: C101 & 23HS101 Professional English –I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	To use appropriate words in a professional context	K3
C101.2	To gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	To read and infer the denotative and connotative meanings of technical texts	K3
C101.4	To write definitions, descriptions, narrations and essays on various topics	K6

Course Code & Title: C102 & MA3151 MATRICES AND CALCULUS		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Apply differential calculus tools in solving various application problems.	K3
C102.3	Able to use differential calculus ideas on several variable functions.	K3
C102.4	Apply different methods of integration in solving practical problems.	K2
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3

Course Code & Title: C103 & PH3151 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Understand the importance of mechanics	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K2
C103.4	Understand the importance of quantum physics.	K3
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K2
Course Code & Title: C104 & CY3151 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K1
C104.2	To identify and apply basic concepts of nano science and nanotechnology in designing the synthesis of nano materials for engineering and technology applications.	K2
C104.3	To apply the knowledge of phase rule and composites for material selection requirements.	K3
C104.4	To recommend suitable fuels for engineering processes and applications	K2
C104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K3

Course Code & Title: C105 & GE3151 PROBLEM SOLVING AND PYTHON PROGRAMMING		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K2
C105.2	Develop and execute simple Python programs.	K3
C105.3	Write simple Python programs using conditionals and loops for solving problems.	K3
C105.4	Decompose a Python program into functions.	K3
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.	K3
C105.6	Read and write data from/to files in Python programs.	K3
Course Code & Title: C107 & GE3171 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Develop algorithmic solutions to simple computational problems	K2
C107.2	Develop and execute simple Python programs.	K3
C107.3	Implement programs in Python using conditionals and loops for solving problems.	K3
C107.4	Deploy functions to decompose a Python program.	K4
C107.5	Process compound data using Python data structures.	K2
C107.6	Utilize Python packages in developing software applications.	K2

Course Code & Title: C108&BS3171PHYSICS AND CHEMISTRY LABORATORY		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Understand the functioning of various physics laboratory equipment.	K2
C108.2	Use graphical models to analyze laboratory data.	K2
C108.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality	K3
C108.4	Access, process and analyze scientific information.	K6
C108.5	Solve problems individually and collaboratively.	K6

Course Code & Title: C109 &GE3172 English Laboratory -I		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	To listen to and comprehend general as well as complex academic information	K2
C109.2	To listen to and understand different points of view in a discussion	K2
C109.3	To speak fluently and accurately in formal and informal communicative contexts	K3
C109.4	To describe products and processes and explain their uses and purposes clearly and accurately	K6
C109.5	To express their opinions effectively in both formal and informal discussions	K6

SEMESTER 2

Course Code & Title: C110 & HS3252 Professional English –II		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	To compare and contrast products and ideas in technical texts.	K2
C110.2	To identify and report cause and effects in events, industrial processes through technical texts	K6
C110.3	To analyses problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C110.4	To present their ideas and opinions in a planned and logical manner	K6
C110.5	To draft effective resumes in the context of job search.	K6

Course Code & Title: C111 & MA3251 – STATISTICS AND NUMERICAL METHODS

	CO Statements	Knowledge Level
The students should be able to		
C111.1	Apply the concept of testing of hypothesis for small and large samples in real life problems	K2
C111.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C111.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K2
C111.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
C111.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3

Course Code & Title: C112 & PH3256- PHYSICS FOR INFORMATION SCIENCE

	CO Statements	Knowledge Level
The students should be able to		
C112.1	gain knowledge on classical and quantum electron theories, and energy band structures	K2
C112.2	acquire knowledge on basics of semiconductor physics and its applications in various devices	K3
C112.3	get knowledge on magnetic properties of materials and their applications in data storage,	K3
C112.4	have the necessary understanding on the functioning of optical materials for optoelectronics	K2
C112.5	understand the basics of quantum structures and their applications and basics of quantum computing	K2

Course Code & Title: C113 & BE3251-BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

	CO Statements	Knowledge Level
The students should be able to		
C113.1	Compute the electric circuit parameters for simple problems	K3
C113.2	Explain the working principle and applications of electrical machines	K2
C113.3	Analyze the characteristics of analog electronic devices	K2
C113.4	Explain the basic concepts of digital electronics	K4
C113.5	Explain the operating principles of measuring instruments	K2

Course Code & Title: C114 & GE3251-ENGINEERING GRAPHICS

	CO Statements	Knowledge Level
The students should be able to		
C114.1	Use BIS conventions and specifications for engineering drawing.	K1
C114.2	Construct the conic curves, involutes and cycloid.	K2
C114.3	Solve practical problems involving projection of lines.	K3
C114.4	Draw the orthographic, isometric and perspective projections of simple solids	K2
C114.5	Draw the development of simple solids.	K3

Course Code & Title: C115 &AD3251 DATA STRUCTURES DESIGN		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Explain abstract data types	K2
C115.2	Design , implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications	K3
C115.3	Design , implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting	K3
C115.4	Model problems as graph problems and implement efficient graph algorithms to solve them	K3

Course Code & Title: C117&GE3271ENGINEERING PRACTICESLABORATORY		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K3
C117.2	Wire various electrical joints in common household electrical wire work.	K3
C117.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K3
C117.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K4

Course Code & Title: C118 & AD3271 DATA STRUCTURES DESIGN LABORATORY

	CO Statements	Knowledge Level
The students should be able to		
C118.1	implement ADTs as Python classes	K2
C118.2	design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications	K3
C118.3	design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting	K3
C118.4	model problems as graph problems and implement efficient graph algorithms to solve them	K3

Course Code & Title: C118 & GE3272 COMMUNICATION LABORATORY

	CO Statements	Knowledge Level
The students should be able to		
C119.1	Speak effectively in group discussions held in a formal/semi formal contexts.	K6
C119.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions	K4
C119.3	Write emails, letters and effective job applications.	K3
C119.4	Write critical reports to convey data and information with clarity and precision	K6
C119.5	Give appropriate instructions and recommendations for safe execution of tasks	K3

SEMESTER 3

Course Code & Title: MA3354 Discrete Mathematics		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Have knowledge of the concepts needed to test the logic of a program	K2
C201.2	Have an understanding in identifying structures on many levels	K2
C201.3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	K3
C201.4	Be aware of the counting principles.	K3
C201.5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	K2

Course Code & Title: CS3351 - Digital Principles And Computer Organization		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Design various combinational digital circuits using logic gates	K4
C202.2	Design sequential circuits and analyze the design procedures	K4
C202.3	State the fundamentals of computer systems and analyze the execution of an instruction	K3
C202.4	Analyze different types of control design and identify hazards	K4
C202.5	Identify the characteristics of various memory systems and I/O communication	K3

Course Code & Title: AD3391 - Database Design and Management		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Understand the database development life cycle and apply conceptual modeling	K2
C203.2	Apply SQL and programming in SQL to create, manipulate and query the database	K3
C203.3	Apply the conceptual-to-relational mapping and normalization to design relational database	K3
C203.4	Determine the serializability of any non-serial schedule using concurrency techniques	K4
C203.5	Apply the data model and querying in Object-relational and No-SQL databases.	K3

Course Code & Title: AD3351 - Design and Analysis of Algorithms

	CO Statements	Knowledge Level
The students should be able to		
C204.1	Analyze the efficiency of recursive and non-recursive algorithms mathematically	K4
C204.2	Analyze the efficiency of brute force, divide and conquer, decrease and conquer, transform and conquer algorithmic techniques	K4
C204.3	Implement and analyze the problems using dynamic programming and greedy algorithmic techniques	K4
C204.4	Solve the problems using iterative improvement techniques for optimization.	K3
C204.5	Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques.	K3

Course Code & Title: AD3301- Data Exploration and Visualization

	CO Statements	Knowledge Level
The students should be able to		
C205.1	Understand the fundamentals of exploratory data analysis.	K2
C205.2	Implement the data visualization using Matplotlib.	K3
C205.3	Perform univariate data exploration and analysis.	K3
C205.4	Apply bivariate data exploration and analysis.	K3
C205.5	Use Data exploration and visualization techniques for multivariate and time series data	K3

Course Code & Title: AI3391 - Artificial Intelligence		
	CO Statements	Knowledge Level
The students Will be able to		
C206.1	Explain intelligent agent frameworks	K2
C206.2	Apply problem solving techniques	K3
C206.3	Apply game playing and CSP techniques	K3
C206.4	Perform logical reasoning	K4
C206.5	Perform probabilistic reasoning under uncertainty	K4

Course Code & Title: AD3381 - Database Design and Management Laboratory		
	CO Statements	Knowledge Level
The students Will be able to		
C207.1	Understand the database development life cycle	K2
C207.2	Design relational database using conceptual-to-relational mapping, Normalization	K3
C207.3	Apply SQL for creation, manipulation and retrieval of data	K3
C207.4	Develop a database applications for real-time problems	K3
C207.5	Design and query object-relational databases	K3

Course Code & Title: AD3311 - Artificial Intelligence Laboratory		
	CO Statements	Knowledge Level
The students will be able to		
C208.1	Design and implement search strategies	K3
C208.2	Implement game playing and CSP techniques	K3
C208.3	Develop logical reasoning systems	K3
C208.4	Develop probabilistic reasoning systems	K3
Course Code & Title: GE3361 - Professional Development		
	CO Statements	Knowledge Level
The students Will be able to		
C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements	K3
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding	K3
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K3

SEMESTER 4 (Reg 2021 Anna university)

Course Code & Title: MA3391 Probability and Statistics

	CO Statements	Knowledge Level
The students Will be able to		
C210.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon	K2
C210.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.	K2
C210.3	Apply the concept of testing of hypothesis for small and large samples in real life problem	K3
C210.4	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.	K3
C210.5	Have the notion of sampling distributions and statistical techniques used in engineering and management problems	K2

Course Code & Title: AL3452-Operating Systems

	CO Statements	Knowledge Level
The students Will be able to		
C211.1	Analyze various scheduling algorithms and process synchronization.	K4
C211.2	Explain deadlock, prevention and avoidance algorithms.	K2
C211.3	Compare and contrast various memory management schemes.	K4
C211.4	Explain the functionality of file systems I/O systems, and Virtualization	K2
C211.5	Compare IOS and Android Operating Systems.	K4

Course Code & Title: AL3451- Machine Learning		
	CO Statements	Knowledge Level
The students Will be able to		
C212.1	Explain the basic concepts of machine learning.	K2
C212.2	Construct supervised learning models.	K3
C212.3	Construct unsupervised learning algorithms.	K3
C212.4	Evaluate and compare different models	K5

Course Code & Title: AD3491- Fundamentals of Data Science and Analytics		
	CO Statements	Knowledge Level
The students Will be able to		
C213.1	Explain the data analytics pipeline	K2
C213.2	Describe and visualize data	K2
C213.3	Perform statistical inferences from data	K3
C213.4	Analyze the variance in the data	K4
C213.5	Build models for predictive analytics	K6

Course Code & Title: CS3591& Computer Networks		
	CO Statements	Knowledge Level
The students Will be able to		
C214.1	Explain the basic layers and its functions in computer networks.75	K2
C214.2	Understand the basics of how data flows from one node to another.	K2
C214.3	Analyze routing algorithms.	K4
C214.4	Describe protocols for various functions in the network.	K2
C214.5	Analyze the working of various application layer protocol	K4

Course Code & Title: GE3451 & Environmental Sciences and Sustainability		
	CO Statements	Knowledge Level
The students Will be able to		
C215.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation	K2
C215.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society	K3
C215.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K3
C215.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development	K3
C215.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3

Course Code & Title: AD3411 & Data Science and Analytics Laboratory		
	CO Statements	Knowledge Level
The students Will be able to		
C216.1	Write python programs to handle data using Numpy and Pandas	K3
C216.2	Perform descriptive analytics	K3
C216.3	Perform data exploration using Matplotlib	K3
C216.4	Perform inferential data analytics	K3
C216.5	Build models of predictive analytics	K6

Course Code & Title: AD3461 & Machine Learning Laboratory		
	CO Statements	Knowledge Level
The students Will be able to		
C217.1	Apply suitable algorithms for selecting the appropriate features for analysis.	K3
C217.2	Implement supervised machine learning algorithms on standard datasets and evaluate the performance.	K3
C217.3	Apply unsupervised machine learning algorithms on standard datasets and evaluate the performance	K3
C217.4	Build the graph based learning models for standard data sets	K3
C217.5	Assess and compare the performance of different ML algorithms and select the suitable one based on the application.	K5

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Course Code & Title:

As per Autonomous Regulation 2023, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (Autonomous)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	23HS101	PROFESSIONAL ENGLISH - I
2	C102	23MA101	MATRICES AND CALCULUS
3	C103	23PH101	ENGINEERING PHYSICS
4	C104	23CY101	ENGINEERING CHEMISTRY
5	C105	23GE101	PROBLEM SOLVING AND PYTHON PROGRAMMING
6	C106	23GE103	தமிழர்மரபு /HERITAGE OF TAMILS
7	C107	23GE111	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8	C108	23BS112	PHYSICS AND CHEMISTRY LABORATORY
9	C109	23GE112	ENGLISH LABORATORY -I
SEMESTER - II			
10	C110	23HS201	PROFESSIONAL ENGLISH – II
11	C111	23MA201	STATISTICS AND NUMERICAL METHODS
12	C112	23PH203	PHYSICS FOR INFORMATION SCIENCE
13	C113	23BE201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
14	C114	23CS901	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION
15	C115	23AD201	DATA STRUCTURES DESIGN
16	C116	23GE201	தமிழரும்தொழில்நுட்பமும் / TAMILS AND TECHNOLOGY
17	C117	23GE211	ENGINEERING PRACTICES LABORATORY

18	C118	23AD211	DATA STRUCTURES DESIGN LABORATORY
19	C119	23GE212	ENGLISH LABORATORY

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & 23 HS101 Professional English - I

	CO Statements	Knowledge Level
The students should be able to		
C101.1	To use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	To gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	To read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	To write definitions, descriptions, narrations and essays on various topics.	K6
C101.5	To express their opinions effectively in both oral and written medium of communication.	K6

Course Code & Title: C102 & 23MA101 Matrices and Calculus

	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Able to use differential calculus ideas on several variable functions.	K3
C102.3	Apply integral calculus and multiple integral tools in solving various application problems.	K3
C102.4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	K2
C102.5	Apply various techniques in solving ordinary differential equations.	K3

Course Code & Title: C103 & 23PH101 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Infer the characteristics of laser for various Engineering applications and expand the understanding of optical fibers use in communications.	K2
C103.4	Apply quantum theory's sophisticated physics notions to the matter characterization.	K3
C103.5	Know the fundamentals of crystal formations and growth methods.	K2

Course Code & Title: C104 & 23CY101 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Summarize the water related problems in boilers and their treatment techniques.	K1
C104.2	Discuss the applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.	K2
C104.3	Discuss the types, properties and applications of polymers and composites.	K3
C104.4	Summarize the fuels used for engineering processes and applications of fuels.	K2
C104.5	Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.	K3

Course Code & Title: C105 & 23GE101 Problem Solving and Python Programming

	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K2
C105.2	Develop simple applications using basic constructs.	K2
C105.3	Write programs using arrays and strings.	K3
C105.4	Design and implement applications using functions, pointers and structures	K6
C105.5	Design applications using sequential and random access file processing.	K6

Course Code & Title: C108 & 23BS112 Physics and Chemistry Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C108.1	Apprehend the concepts of interference, diffraction of light and recognize the resonance concept of waves.	K2
C108.2	Apply the principles of operations of optical fibers, semiconductor using simple circuits and interaction of electromagnetic waves and crystalline solids.	K3
C108.3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
C108.4	Experiment the relationship between the light and matter & properties of liquids.	K4
C108.5	Estimate the velocity of sound and compressibility of liquid.	K2
C108.1	Analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C108.2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	K3
C108.3	Analyze and determine the composition of alloys.	K4
C108.4	Learn simple method of synthesis of nanoparticles	K2
C108.5	Quantitatively analyze the impurities in solution by electro analytical methods.	K4

Course Code & Title: C109 & 23GE112 English Laboratory -I

	CO Statements	Knowledge Level
The students should be able to		
C109.1	To listen to and comprehend general as well as complex academic information.	K2
C109.2	To listen to and understand different points of view in a discussion.	K2
C109.3	To speak fluently and accurately in formal and informal communicative contexts.	K3
C109.4	To describe products and processes and explain their uses and purposes clearly and accurately.	K6
C109.5	To express their opinions effectively in both formal and informal discussions.	K6

SEMESTER 2

Course Code & Title: C110 & 23HS201 Professional English – II

	CO Statements	Knowledge Level
The students should be able to		
C110.1	To compare and contrast products and ideas in technical texts and write analytical essays.	K2
C110.2	To identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C110.3	To analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C110.4	To present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C110.5	To draft effective resumes in the context of job application.	K6

Course Code & Title: C111 & 23MA201 - Statistics And Numerical Methods

	CO Statements	Knowledge Level
The students should be able to		
C111.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C111.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C111.3	Understand the basic concepts and Techniques of solving algebraic and transcendental equations	K3
C111.4	Understand the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. .	K2
C111.5	Solve the ordinary differential equations with initial conditions by using certain techniques with engineering applications. .	K4

Course Code & Title: C112 & 23PH203-Physics For Information Science		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	To recognize the fundamental ideas behind different free-electron theories and establish the solids' electrical characteristics	K2
C112.2	To evaluate the functions of semiconductors and their uses	K3
C112.3	To employing quantum principles to examine the mechanisms at work in magnetic materials.	K3
C112.4	To understand about the uses of superconducting and Optical properties of materials.	K2
C112.5	To show the fundamentals of how micro- and nano-electronic equipment functions	K2

Course Code & Title: C113 & 23BE201-Basic Electrical And Electronics Engineering

	CO Statements	Knowledge Level
The students should be able to		
C113.1	Compute the electric circuit parameters for simple problems	K3
C113.2	Examine the working principle and applications of electrical machines	K2
C113.3	Illustrate the characteristics of analog electronic devices	K2
C113.4	Examine the basic concepts of digital electronics	K4
C113.5	Apply the concepts of principles of measuring instruments for real time applications	K2

Course Code & Title: C114 & 23CS901-Digital Principles And Computer Organization

	CO Statements	Knowledge Level
The students should be able to		
C114.1	Design various combinational digital circuits using logic gates	K3
C114.2	Describe the operation and construction of various flip flops.	K2
C114.3	Design sequential circuits and analyze the design procedures	K3
C114.4	State the fundamentals of computer systems and analyze the execution of an instruction.	K2
C114.5	Analyze different types of control design and identify hazards.	K4
C114.6	Identify the characteristics of various memory systems and I/O communication.	K2
C114.7	Design and implementation of combinational circuits.	K3
C114.8	Design and implementation of sequential circuits.	K3

Course Code & Title: C115 & 23AD201- Data Structures Design

	CO Statements	Knowledge Level
The students should be able to		
C115.1	Understanding of Abstract Data Types (ADTs) and their practical implementations.	K2
C115.2	Apply the Design and Implementation of Lists, Stacks, and Queues to Address Real-World Challenges	K3
C115.3	Apply In-Depth Understanding of Sorting, Searching, and Hashing Algorithms for Effective Problem Solving	K3
C115.4	Apply Profound Understanding of Trees to Effectively Manage Hierarchical and Interconnected Data	K3
C115.5	Analyze , Synthesize, and Innovate with Graph Structures for Complex Interconnected Data and Network Solution	K4

Course Code & Title: C117 & 23GE211 - Engineering Practices Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C117.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work	K4
C117.2	Wire various electrical joints in common household electrical wire work.	K4
C117.3	Study and analyse the various electrical equipment's in common household applications	K4
C117.4	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipment's; Make a tray out of metal sheet using sheet metal work.	K4
C117.5	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K3

Course Code & Title: C118 & 23AD211 - Data Structures Design Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C118.1	Analyzing and Applying Fundamental Data Structures and Recursive Algorithms in Python	K3
C118.2	Design , implement, and analyses linear data structures, such as lists, queues, and stacks, according to the needs of different applications	K6
C118.3	Design , implement, and analyses efficient tree structures to meet requirements such as searching, indexing, and sorting	K6
C118.4	Analyzing Graph Representation Methods and Mastering Traversal Algorithms	K4
C118.5	Design , implement, and analyses single source shortest path algorithm and minimum spanning tree algorithms	K6

Course Code & Title: C118 & 23GE212 English Laboratory –II		
	CO Statements	Knowledge Level
The students should be able to		
C118.1	Speak effectively in group discussions held in a formal/semiformal contexts.	
C118.2	Discuss , analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	
C118.3	Make effective presentations in an attractive way using appropriate vocabulary.	
C118.4	Attend job interviews and be successful in them.	
C118.5	Develop adequate Soft Skills required for the workplace.	

DEPARTMENT OF INFORMATION TECHNOLOGY

Course Code & Title:

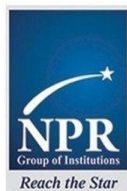
As per Anna University Regulation 2021, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S.NO.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	HS3152	PROFESSIONAL ENGLISH - I
2	C102	MA3151	MATRICES AND CALCULUS
3	C103	PH3151	ENGINEERING PHYSICS
4	C104	CY3151	ENGINEERING CHEMISTRY
5	C105	GE3151	PROBLEM SOLVING AND PYTHON PROGRAMMING
6	C106	GE3152	தமிழர்மரபு /HERITAGE OF TAMILS
7	C107	GE3171	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
8	C108	BS3171	PHYSICS AND CHEMISTRY LABORATORY
9	C109	GE3172	ENGLISH LABORATORY -I
SEMESTER - II			
10	C110	HS3252	PROFESSIONAL ENGLISH – II
11	C111	MA3251	STATISTICS AND NUMERICAL METHODS
12	C112	PH3256	PHYSICS FOR INFORMATION SCIENCE
13	C113	BE3251	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
14	C114	GE3251	ENGINEERING GRAPHICS
15	C115	CS3251	CS3251 PROGRAMMING IN C

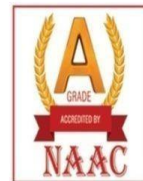
16	C116	GE3252	தமிழரும் தொழில்நுட்பமும் / TAMILS AND TECHNOLOGY
17	C117	GE3271	ENGINEERING PRACTICES LABORATORY
18	C118	CS3271	PROGRAMMING IN C LABORATORY
19	C119	GE3272	ENGLISH LABORATORY -II

SEMESTER - III			
20	C201	MA3354	DISCRETE MATHEMATICS
21	C202	CS3351	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION
22	C203	CS3352	FOUNDATIONS OF DATA SCIENCE
23	C204	CD3291	DATA STRUCTURES AND ALGORITHMS
24	C205	CS3391	OBJECT ORIENTED PROGRAMMING
25	C206	CD3281	DATA STRUCTURES AND ALGORITHMS LABORATORY
26	C207	CS3381	OBJECT ORIENTED PROGRAMMING LABORATORY
27	C208	CS3361	DATA SCIENCE LABORATORY
28	C209	GE3361	PROFESSIONAL DEVELOPMENT
SEMESTER - IV			
29	C210	CS3452	THEORY OF COMPUTATION
30	C211	CS3491	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
31	C212	CS3492	DATABASE MANAGEMENT SYSTEMS
32	C213	IT3401	WEB ESSENTIALS
33	C214	CS3451	INTRODUCTION TO OPERATING SYSTEMS



NPR

COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)



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34	C215	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
35	C216	CS3461	OPERATING SYSTEMS LABORATORY
36	C217	CS3481	DATABASE MANAGEMENT SYSTEMS LABORATORY

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & HS3152- Professional English - I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	To use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	To gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	To read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	To write definitions, descriptions, narrations and essays on various topics.	K6

Course Code & Title: C102 & MA3151-Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K2
C102.2	Apply differential calculus tools in solving various application problems.	K3
C102.3	Able to use differential calculus ideas on several variable functions.	K2
C102.4	Apply different methods of integration in solving practical problems.	K3
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems	K3

Course Code & Title: C103 & PH3151 –Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Understand the importance of mechanics.	K2
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K2
C103.4	Understand the importance of quantum physics.	K2
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy	K3

Course Code & Title: C104 & CY3151-Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K2
C104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K3
C104.3	To apply the knowledge of phase rule and composites for material selection requirements.	K3
C104.4	To recommend suitable fuels for engineering processes and applications	K5
C104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K3

Course Code & Title: C105 & GE3151-Problem Solving and Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K6
C105.2	Develop and execute simple Python programs.	K6
C105.3	Write simple Python programs using conditionals and loops for solving problems.	K3
C105.4	Decompose a Python program into functions.	K6
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.	K4
C105.6	Read and write data from/to files in Python programs.	K6

Course Code & Title: C107 & GE3171- Problem Solving And Python Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Develop algorithmic solutions to simple computational problems	K6
C107.2	Develop and execute simple Python programs.	K6
C107.3	Implement programs in Python using conditionals and loops for solving problems.	K6
C107.4	Deploy functions to decompose a Python program.	K6
C107.5	Process compound data using Python data structures.	K5
C107.6	Utilize Python packages in developing of software applications.	K3

Course Code & Title: C108 & BS3171-Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Understand the functioning of various physics laboratory equipment.	K2
C108.2	Use graphical models to analyze laboratory data.	K2
C108.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K2
C108.4	Access , process and analyze scientific information.	K3
C108.5	Solve problems individually and collaboratively.	K6

Course Code & Title: C109 & 23GE112 - English Laboratory -I		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	To listen to and comprehend general as well as complex academic information.	K2
C109.2	To listen to and understand different points of view in a discussion.	K2
C109.3	To speak fluently and accurately in formal and informal communicative contexts.	K3
C109.4	To describe products and processes and explain their uses and purposes clearly and accurately.	K6
C109.5	To express their opinions effectively in both formal and informal discussions.	K6

SEMESTER 2

Course Code & Title: C109 & HS325-Professional English - II

	CO Statements	Knowledge Level
The students should be able to		
C110.1	To compare and contrast products and ideas in technical texts and write analytical essays.	K2
C110.2	To identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C110.3	To analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C110.4	To present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C110.5	To draft effective resumes in the context of job application.	K6

Course Code & Title: C111&MA3251-Statistics And Numerical Methods

	CO Statements	Knowledge Level
The students should be able to		
C111.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C111.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C111.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K2
C111.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
C111.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K6

Course Code & Title: C112 &PH3256-Physics For Information Science

	CO Statements	Knowledge Level
The students should be able to		
C112.1	Gain knowledge on classical and quantum electron theories, and energy band structures	K2
C112.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices	K3
C112.3	Get knowledge on magnetic properties of materials and their applications in data storage,	K3
C112.4	Have the necessary understanding on the functioning of optical materials for optoelectronics	K2
C112.5	Understand the basics of quantum structures and their applications and basics of quantum computing	K2

Course Code & Title: C113&BE3251-Basic Electrical And Electronics Engineering

	CO Statements	Knowledge Level
The students should be able to		
C113.1	Compute the electric circuit parameters for simple problems	K3
C113.2	Explain the working principle and applications of electrical machines	K2
C113.3	Analyze the characteristics of analog electronic devices	K3
C113.4	Explain the basic concepts of digital electronics	K2
C113.5	Explain the concepts of principles of measuring instruments for real time applications	K2

Course Code & Title: C114&GE3251-Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Use BIS conventions and specifications for engineering drawing.	K2
C114.2	Construct the conic curves, involutes and cycloid.	K3
C114.3	Solve practical problems involving projection of lines.	K6
C114.4	Draw the orthographic, isometric and perspective projections of simple solids.	K6
C114.5	Draw the development of simple solids.	K6

Course Code & Title: C115&CS3251 - Programming in C		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Demonstrate knowledge on C Programming constructs	K2
C115.2	Develop simple applications in C using basic constructs	K6
C115.3	Design and implement applications using arrays and strings	K6
C115.4	Develop and implement modular applications in C using functions.	K6
C115.5	Develop applications in C using structures and pointers.	K6
C115.6	Design applications using sequential and random access file processing.	K6

Course Code & Title: C117 & GE3271 - Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work	K4
C117.2	Wire various electrical joints in common household electrical wire work.	K4
C117.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipment's; Make a tray out of metal sheet using sheet metal work.	K4
C117.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K3

Course Code & Title: C118 & CS3271-Programming in C Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C118.1	Demonstrate knowledge on C programming constructs.	K2
C118.2	Develop programs in C using basic constructs.	K6
C118.3	Develop programs in C using arrays.	K6
C118.4	Develop applications in C using strings, pointers, functions.	K6
C118.5	Develop applications in C using structures.	K6
C118.6	Develop applications in C using file processing.	K6

Course Code & Title: C118 & GE3272- English Laboratory –II

	CO Statements	Knowledge Level
The students should be able to		
C118.1	Speak effectively in group discussions held in formal / semiformal contexts.	K6
C118.2	Discuss , analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C118.3	Make effective presentations in an attractive way using appropriate vocabulary.	K3
C118.4	Attend job interviews and be successful in them.	K6
C118.5	Develop adequate Soft Skills required for the workplace.	K3

SEMESTER 3

Course Code & Title: C201 & MA3354 -Discrete Mathematics

	CO Statements	Knowledge Level
The students should be able to		
C201.1	Have knowledge of the concepts needed to test the logic of a program	K4
C201.2	Have an understanding in identifying structures on many levels	K2
C201.3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	K2
C201.4	Be aware of the counting principles	K3
C201.5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	K2

Course Code & Title: C202 & CS3351 - Digital Principles and Computer Organization		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Design various combinational digital circuits using logic gates	K6
C202.2	Design sequential circuits and analyze the design procedure	K6
C202.3	State the fundamentals of computer systems and analyze the execution of an instruction	K1
C202.4	Analyze different types of control design and identify hazards	K4
C202.5	Identify the characteristics of various memory systems and I/O communication	K1

Course Code & Title: C203 & CS3352- Foundations of Data Science		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Define the data science process	K1
C203.2	Understand different types of data description for data science process	K2
C203.3	Gain knowledge on relationships between data	K2
C203.4	Use the Python Libraries for Data Wrangling	K3
C203.5	Apply visualization Libraries in Python to interpret and explore data	K3

Course Code & Title: C204 &CD3291 -Data Structures and Algorithms		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Explain abstract data types	K2
C204.2	Design , implement, and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications	K4
C204.3	Design , implement, and analyze efficient tree structures to meet requirements such as searching, indexing, and sorting	K4
C204.4	Model problems as graph problems and implement efficient graph algorithms to solve them	K4

Course Code & Title: C205&CS3391 - Object Oriented Programming		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Apply the concepts of classes and objects to solve simple problems	K3
C205.2	Develop programs using inheritance, packages and interfaces	K3
C205.3	Make use of exception handling mechanisms and multithreaded model to solve real world problems	K3
C205.4	Build Java applications with I/O packages, string classes, Collections and generics concepts	K3
C205.5	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications	K3

Course Code & Title: C206&CD3281 -Data Structures and Algorithms Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Implement ADTs as Python classes	K3
C206.2	Design , implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications	K4
C206.3	Design , implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting	K4
C206.4	Model problems as graph problems and implement efficient graph algorithms to solve them	K4

Course Code & Title: C207&CS3381- Object Oriented Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C207.1	Design and develop java programs using object-oriented programming concepts	K6
C207.2	Develop simple applications using object-oriented concepts such as package, exceptions	K3
C207.3	Implement multithreading, and generics concepts	K3
C207.4	Create GUIs and event driven programming applications for real world problems	K6
C207.5	Implement and deploy web applications using Java	K3

Course Code & Title: C208&CS3361 - Data Science Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C208.1	Make use of the python libraries for data science	K3
C208.2	Make use of the basic Statistical and Probability measures for data science.	K3
C208.3	Perform descriptive analytics on the benchmark data sets.	K3
C208.4	Perform correlation and regression analytics on standard data sets	K3
C208.5	Present and interpret data using visualization packages in Python.	K3

Course Code & Title: C209 & GE3361 -Professional Development		
	CO Statements	Knowledge Level
The students should be able to		
C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements	K3
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding	K3
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K3

SEMESTER 4

Course Code & Title: C210 & CS3452 - Theory of Computation

	CO Statements	Knowledge Level
The students should be able to		
C210.1	Construct automata theory using Finite Automata	K6
C210.2	Write regular expressions for any pattern	K6
C210.3	Design context free grammar and Pushdown Automata	K6
C210.4	Design Turing machine for computational functions	K6
C210.5	Differentiate between decidable and undecidable problems	K4

Course Code & Title: C211 & CS3491 - Artificial Intelligence and Machine Learning

	CO Statements	Knowledge Level
The students should be able to		
C211.1	Use appropriate search algorithms for problem solving	K3
C211.2	Apply reasoning under uncertainty	K3
C211.3	Build supervised learning models	K6
C211.4	Build ensembling and unsupervised models	K6
C211.5	Build deep learning neural network models	K6

Course Code & Title: C212 & CS3492 - Database Management Systems		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	Construct SQL Queries using relational algebra	K3
C212.2	Design database using ER model and normalize the database	K6
C212.3	Construct queries to handle transaction processing and maintain consistency of the database	K3
C212.4	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database	K4
C212.5	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.	K5

Course Code & Title: C213 & IT3401 - Web Essentials		
	CO Statements	Knowledge Level
The students should be able to		
C213.1	Apply JavaScript, HTML and CSS effectively to create interactive and dynamic websites.	K3
C213.2	Create simple PHP scripts	K6
C213.3	Design and deploy simple web-applications.	K6
C213.4	Create simple database applications.	K6
C213.5	Handle multimedia components	K3

Course Code & Title: C214 & CS3451 - Introduction to Operating Systems		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	Analyze various scheduling algorithms and process synchronization.	K4
C214.2	Explain deadlock prevention and avoidance algorithms.	K2
C214.3	Compare and contrast various memory management schemes.	K4
C214.4	Explain the functionality of file systems, I/O systems, and Virtualization	K2
C214.5	Compare iOS and Android Operating Systems.	K4

Course Code & Title: C215 & GE3451 - Environmental Sciences and Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
C215.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K4
C215.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K3
C215.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K3
C215.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K2

Course Code & Title: C216&CS3461 - Operating Systems Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C216.1	Define and implement UNIX Commands.	K3
C216.2	Compare the performance of various CPU Scheduling Algorithms.	K4
C216.3	Compare and contrast various Memory Allocation Methods.	K4
C216.4	Define File Organization and File Allocation Strategies.	K2
C216.5	Implement various Disk Scheduling Algorithms.	K3

Course Code & Title: C217&CS3481 - Database Management Systems Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C217.1	Create databases with different types of key constraints.	K6
C217.2	Construct simple and complex SQL queries using DML and DCL commands.	K3
C217.3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.	K3
C217.4	Create an XML database and validate with meta-data (XML schema).	K6
C217.5	Create and manipulate data using NOSQL database.	K3

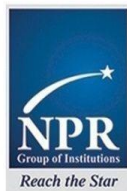
DEPARTMENT OF INFORMATION TECHNOLOGY

Course Code & Title:

As per Autonomous Regulation 2023, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

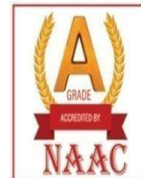
S.NO.	COURSE CODE (NBA)	COURSE CODE (Autonomous)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	23HS101	PROFESSIONAL ENGLISH - I
2	C102	23MA101	MATRICES AND CALCULUS
3	C103	23PH101	ENGINEERING PHYSICS
4	C104	23CY101	ENGINEERING CHEMISTRY
5	C105	23GE101	PROBLEM SOLVING AND C PROGRAMMING
6	C106	23GE103	தமிழர்மரபு / HERITAGE OF TAMILS
7	C107	23BS112	PHYSICS AND CHEMISTRY LABORATORY
8	C108	23GE112	ENGLISH LABORATORY -I
SEMESTER - II			
10	C109	23HS201	PROFESSIONAL ENGLISH – II
11	C110	23MA901	PROBABILITY AND STATISTICS
12	C111	23PH203	PHYSICS FOR INFORMATION SCIENCE
13	C112	23BE201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
14	C113	23GE901	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
15	C114	23CS201	PYTHON PROGRAMMING
16	C115	23GE201	தமிழரும் தொழில்நுட்பமும் / TAMILS AND TECHNOLOGY
17	C116	23GE211	ENGINEERING PRACTICES LABORATORY



NPR

COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

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18	C117	23CS211	PYTHON PROGRAMMING LABORATORY
19	C118	23GE212	ENGLISH LABORATORY II

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & 23HS101- Professional English - I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	To use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	To gain understanding of basic grammatic structures and use them in right context.	K2
C101.3	To read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	To write definitions, descriptions, narrations and essays on various topics.	K6
C101.5	To express their opinions effectively in both oral and written medium of communication.	K6

Course Code & Title: C102 & 23MA101-Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Able to use differential calculus ideas on several variable functions.	K3
C102.3	Apply integral calculus and multiple integral tools in solving various application problems.	K3
C102.4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	K2
C102.5	Apply various techniques in solving ordinary differential equations.	K3

Course Code & Title: C103 & 23PH101- Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Infer the characteristics of laser for various Engineering applications and expand the understanding of optical fibers use in communications.	K2
C103.4	Apply quantum theory's sophisticated physics notions to the matter characterization.	K3
C103.5	Know the fundamentals of crystal formations and growth methods.	K2

Course Code & Title: C104 & 23CY101- Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Summarize the water related problems in boilers and their treatment techniques.	K1
C104.2	Discuss the applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.	K2
C104.3	Discuss the types, properties and applications of polymers and composites.	K3
C104.4	Summarize the fuels used for engineering processes and applications of fuels.	K2
C104.5	Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.	K3

Course Code & Title: C105 & 23GE101-Problem Solving And C Programming		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Explain the basic concepts of Problem solving and C programming constructs	K2
C105.2	Construct and implement C programs for solving computational Problems using arrays and strings	K3
C105.3	Develop the simple real-time applications in C using functions and pointers	K6
C105.4	Develop the applications in C using structures	K6
C105.5	Develop the applications using file handling.	K6

Course Code & Title: C107 & 23BS112-Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Apprehend the concepts of interference, diffraction of light and recognize the resonance concept of waves.	K2
C107.2	Apply the principles of operations of optical fibers, semiconductor using simple circuits and interaction of electromagnetic waves and crystalline solids.	K3
C107.3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
C107.4	Experiment the relationship between the light and matter & properties of liquids.	K4
C107.5	Estimate the velocity of sound and compressibility of liquid.	K2
C107.1	Analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C107.2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	K3
C107.3	Analyze and determine the composition of alloys.	K4
C107.4	Learn simple method of synthesis of nanoparticles	K2
C107.5	Quantitatively analyze the impurities in solution by electro analytical methods.	K4

Course Code & Title: C108&23GE112 - English Laboratory -I		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	To listen to and comprehend general as well as complex academic information.	K2
C108.2	To listen to and understand different points of view in a discussion.	K2
C108.3	To speak fluently and accurately in formal and informal communicative contexts.	K3
C108.4	To describe products and processes and explain their uses and purposes clearly and accurately.	K6
C108.5	To express their opinions effectively in both formal and informal discussions.	K6

SEMESTER 2

Course Code & Title: C109&23HS201 - Professional English – II		
	CO Statements	Knowledge Level
The students should be able to		
C109.1	To compare and contrast products and ideas in technical texts and write analytical essays.	K2
C109.2	To identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C109.3	To analyze problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	To present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C109.5	To draft effective resumes in the context of job application.	K6

Course Code & Title: C110&23MA901 -Probability and Statistics		
	CO Statements	Knowledge Level
The students should be able to		
C110.1	To Understand the fundamental concepts of probability.	K2
C110.2	By applying the knowledge of one-dimensional random variables to standard distributions which can describe real life phenomenon.	K3
C110.3	Understand the basic concepts of two-dimensional random variables and apply in engineering applications.	K2
C110.4	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C110.5	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3

Course Code & Title: C111&23PH203-Physics For Information Science		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	To recognize the fundamental ideas behind different free-electron theories and establish the solids' electrical characteristics	K2
C111.2	To evaluate the functions of semiconductors and their uses	K3
C111.3	To employing quantum principles to examine the mechanisms at work in magnetic materials.	K3
C111.4	To understand about the uses of superconducting and Optical properties of materials.	K2
C111.5	To show the fundamentals of how micro- and nano-electronic equipment functions	K2

Course Code & Title: C112&23BE201-Basic Electrical And Electronics Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Compute the electric circuit parameters for simple problems	K3
C112.2	Examine the working principle and applications of electrical machines	K2
C112.3	Illustrate the characteristics of analog electronic devices	K2
C112.4	Examine the basic concepts of digital electronics	K4
C112.5	Apply the concepts of principles of measuring instruments for real time applications	K2

Course Code & Title: C113&23GE901- Environmental Sciences And Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation	K2
C113.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K3
C113.3	To identify the causes, effects of natural disasters and contribute to the preventive measures in the society.	K3
C113.4	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K3
C113.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K2

Course Code & Title: C114&23CS201 - Python Programming		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Explain the concepts of python data types, expressions and statements	K2
C114.2	Make use of Python programs for solving real-time computational Problems by using conditionals, looping, functions and strings	K3
C114.3	Explain the concepts of compound data using Python lists, tuples and dictionaries	K2
C114.4	Develop the python programs for solving computational Problems by using modules, files and python packages	K6
C114.5	Develop the python programs for solving computational Problems by using Exceptions and Libraries	K6

Course Code & Title: C117 &23GE211 - Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work	K4
C116.2	Wire various electrical joints in common household electrical wire work.	K4
C116.3	Study and analyse the various electrical equipment's in common household applications	K4
C116.4	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipment's; Make a tray out of metal sheet using sheet metal work.	K4
C116.5	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K3

Course Code & Title: C117&23CS211 - Python Programming Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C117.1	Develop simple python programs for applying the concepts of data types, expressions, and python statements	K6
C117.2	Develop Python programs using conditionals, looping, functions, and strings for solving real-time computational problems.	K6
C117.3	Understand the concepts of compound data using Python lists, tuples, and dictionaries	K2
C117.4	Develop python programs for solving problems by using modules, files, and python packages	K6
C117.5	Utilize Python packages for developing real-world software applications	K3

Course Code & Title: C118& 23GE212- English Laboratory –II		
	CO Statements	Knowledge Level
The students should be able to		
C118.1	Speak effectively in group discussions held in formal / semiformal contexts.	K6
C118.2	Discuss , analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C118.3	Make effective presentations in an attractive way using appropriate vocabulary.	K3
C118.4	Attend job interviews and be successful in them.	K6
C118.5	Develop adequate Soft Skills required for the workplace.	K3

ME VLSI

Course Code & Title:

As per Anna University Regulation 2021, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S/ N	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1.	C101	VL4153	GRAPH THEORY AND OPTIMIZATION TECHNIQUES
2.	C102	RM4151	MATRICES AND CALCULUS
3.	C103	VL4151	ANALOG IC DESIGN
4.	C104	VL4152	DIGITAL CMOS VLSI DESIGN
5.	C105	AP4152	ADVANCED DIGITAL SYSTEM DESIGN
6.	C106	AP4153	SEMICONDUCTOR DEVICES AND MODELING
7.	C107	VL4111	FPGA LABORATORY
8.	C108	VL4112	ANALOG IC DESIGN LABORATORY
SEMESTER - II			
9.	C109	VL4251	DESIGN FOR VERIFICATION USING UVM
10.	C110	VL4291	LOW POWER VLSI DESIGN
11.	C111	VL4292	RFIC DESIGN
12.	C112	VL4252	VLSI TESTING
13.	C113	VE4152	EMBEDDED SYSTEM DESIGN
14.	C114	VL4006	ADVANCED WIRELESS SENSOR NETWORKS
15.	C115	VL4211	VERIFICATION USING UVM LABORATORY
16.	C116	VL4212	TERM PAPER WRITING AND SEMINAR
SEMESTER - III			
17.	C201	VL4351	VLSI SIGNAL PROCESSING
18.	C202	VL4074	NANOTECHNOLOGY
19.	C203	VL4010	SYSTEM VERILOG
20.	C204	CX4016	ENVIRONMENTAL SUSTAINABILITY
21.	C205	VL4311	PROJECT WORK I
SEMESTER - IV			
22.	C206	VL4411	PROJECT WORK II

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & VL4153 - Graph Theory and Optimization Techniques		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Apply graph ideas is solving connectivity related problems.	K3
C101.2	Apply fundamental graph algorithms to solve certain optimization problems.	K3
C101.3	Formulate and construct mathematical models for linear programming problems and solve the transportation and assignment problems.	K6
C101.4	Model various real life situations as optimization problems and effect their solution through Non-linear programming.	K4
C101.5	Apply simulation modeling techniques to problems drawn from industry management and other engineering fields.	K3

Course Code & Title: C102 & RM4151 - Research Methodology and IPR		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Arrange the conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose	K1
C102.2	Gather information in a measured and systematic manner to ensure accuracy and facilitate data analysis.	K2
C102.3	Transform and model the collected data to discover useful information for decision- making.	K2
C102.4	Identify the awareness about the benefits of Intellectual property.	K1
C102.5	Review legal certainty while applying for Patent.	K2

Course Code & Title: C103 & VL4151 – Analog IC Design		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Design amplifiers to meet user specifications.	K3
C103.2	Design and analyze feedback amplifiers and one stage op amps.	K4
C103.3	Design and analyze feedback amplifiers and one stage op amps	K4
C103.4	Design and analyze two stage op amps.	K4
C103.5	Design and analyze current mirrors and current sources with MOS devices	K4

Course Code & Title: C104 & VL4152 – Digital CMOSVLSI Design		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Use mathematical methods and circuit analysis models in analysis of CMOS digital circuits.	K3
C104.2	Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K1
C104.3	Apply the knowledge of phase rule and composites for material selection requirements	K3
C104.4	Select suitable fuels for engineering processes and applications.	K2
C104.5	Recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K1

Course Code & Title: C105 & AP4152- Advanced Digital System Design		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Analyze and design synchronous sequential circuits.	K4
C105.2	Analyze hazards and design a synchronous sequential circuit.	K4
C105.3	Implement the testing procedure for combinational circuit and PLA	K3
C105.4	Sketch to design PLD and ROM.	K3
C105.5	Design and use programming tools for implementing digital circuits of industry standards.	K4

Course Code & Title: C106 & AP4153- Semiconductor Devices and Modeling		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Examine the properties of MOS capacitors.	K4
C106.2	Analyze the various characteristics of MOSFET devices	K4
C106.3	Describe the various CMOS design parameters and the impact on performance of the device	K3
C106.4	Discuss the device level characteristics of BJT transistors	K2
C106.5	Identify the suitable mathematical technique for simulation	K1

Course Code & Title: C107 & VL4111 - FPGA Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Understand and use the System Verilog RTL design and synthesis features.	K2
C107.2	Apply the System Verilog verification features and learn how to utilize these features for more effective and efficient verification	K3
C107.3	Implementation of higher level of abstraction to design and verification	K3
C107.4	Develop Verilog test environments of significant capability and complexity.	K6
C107.5	Integrate scoreboards, multichannel sequencers and Register Models.	K6

Course Code & Title: C108 & VL4112 - Analog IC Design Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Design digital and analog Circuit using CMOS given a design specification.	K6
C108.2	Design and carry out time domain and frequency domain simulations of simple analog building blocks, study the pole zero behaviors and compute the input/output impedances	K6
C108.3	Use EDA tools for Circuit Design	K3

SEMESTER 2

Course Code & Title: C109 & VL4251 – Design for Verification using UVM

	CO Statements	Knowledge Level
The students should be able to		
C109.1	Compare and contrast products and ideas in technical texts	K4
C109.2	Examine actual verification components.	K1
C109.3	Execute the register layer classes.	K3
C109.4	Model code test benches using UVM.	K4
C109.5	Compute advanced peripheral bus test benches.	K3

Course Code & Title: C110 & VL4291 - Low Power VLSI Design

	CO Statements	Knowledge Level
The students should be able to		
C110.1	Carry out to find the power dissipation of MOS circuits	K3
C110.2	Design and analyze various MOS logic circuits	K4
C110.3	Apply low power techniques for low power dissipation.	K3
C110.4	Determine to estimate the power dissipation of ICs	K3
C110.5	Model to develop algorithm to reduce power dissipation by software tools.	K4

Course Code & Title: C111 & VL4292 - RFICDESIGN		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	Illustrate the principles of operation of an RF receiver front end	K1
C111.2	Design and apply constraints for LNAs, Mixers and frequency synthesizers	K3
C111.3	Analyze and design mixers	K4
C111.4	Model different types of oscillators and perform noise analysis	K3
C111.5	Implement PLL and frequency synthesizer.	K3

Course Code & Title: C112 & VL4252 –VLSI Testing		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Interpret VLSI Testing Process	K2
C112.2	Compute Logic Simulation and Fault Simulation	K3
C112.3	Examine Test for Combinational and Sequential Circuits	K3
C112.4	Describe the Design for Testability	K2
C112.5	Prepare Fault Diagnosis	K3

Course Code & Title: C113 & VL4211- Verification using UVM Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Generalize the features and capabilities of the UVM class library for system Verilog	K2
C113.2	Examine multiple UVCs into a complete verification environment	K3
C113.3	Demonstrate and configure reusable, scalable, and robust UVM verification components (UVCs)	K3
C113.4	Model an UVM test bench structure using the UVM library base classes and the UVM factory	K4
C113.5	Implement a register model for your DUT and use the model for initialization and accessing DUT registers	K3

SEMESTER 3

Course Code & Title: C201 & VL4351 - VLSI Signal Processing		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Determine the parameters influencing the efficiency of DSP architectures and apply pipelining and parallel processing techniques to alter FIR structures for efficiency	K2
C201.2	Analyze and modify the design equations leading to efficient DSP architectures for transforms apply low power techniques for low power dissipation	K4
C201.3	Prepare to speed up convolution process and develop fast and area efficient IIR structures	K3
C201.4	Transform to develop fast and area efficient multiplier architectures	K2
C201.5	Manipulate to reduce multiplications and build fast hardware for synchronous digital systems	K3

Course Code & Title: C202 & VL4074 - NANO TECHNOLOGY		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Understand the bases for introduction to Nanotechnology	K2
C202.2	Understand the synthesis of Nanomaterials and their application and the impact of Nanomaterials on environment	K2
C202.3	Gather knowledge about various kind of Nano materials	K2
C202.4	Understand the Nanotechnology devices used and their structures	K2
C202.5	Understand and improve the application of Nanotechnology	K2

Course Code & Title: C203 & VL4010–System Verilog		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Use system verilog to create correct, efficient, and re-usable models for digital designs	K3
C203.2	Use system verilog to create test benches for digital designs	K3
C203.3	Understand and effectively exploit new constructs in System Verilog for verification	K2
C203.4	Understand the communication between modules	K3
C203.5	Examine a complete system model using Verilog	K3

Course Code & Title: C204 & CX4016 – Environmental Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Discuss the importance of environmental sustainability	K2
C204.2	Describe the concept of sustainable practices	K2
C204.3	Understand the functions of biodiversity and their conservation.	K2
C204.4	Identify the causes, effects of environmental pollution in the society.	K1
C204.5	Understand socio-economic issues pertaining to environment	K2

Course Code & Title: C205 & VL4311- Project Work I		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Conduct a literature survey in the selected domain to identify requirements for the real-world problems and propose a methodology.	K2
C205.2	Model the problem at hand and experiment with Hardware/Software skill sets to suit the requirements.	K3
C205.3	Build and demonstrate the project effectively as a team with the attitudes of professional engineers.	K4
C205.4	Evaluate the challenges and risks involved in the execution of the project and take appropriate actions to circumvent them.	K5
C205.5	Communicate the results of an engineering project by means of an oral presentation, written reports and practical demonstration of the project outcomes.	K6

SEMESTER4

Course Code & Title: C206 & VL4411- Project Work II		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Conduct a literature survey in the selected domain to identify requirements for the real-world problems and propose a methodology.	K2
C206.2	Model the problem at hand and experiment with Hardware/Software skill sets to suit the requirements.	K3
C206.3	Build and demonstrate the project effectively as a team with the attitudes of professional engineers.	K4
C206.4	Evaluate the challenges and risks involved in the execution of the project and take appropriate actions to circumvent them.	K5
C206.5	Communicate the results of an engineering project by means of an oral presentation, written reports and practical demonstration of the project outcomes.	K6

DEPARTMENT OF MANAGEMENT STUDIES

Course Code & Title:

As per Anna University Regulation 2021, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S/N	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	BA4101	STATISTICS FOR MANAGEMENT
2	C102	BA4102	MANAGEMENT CONCEPTS AND ORGANIZATIONAL BEHAVIOR
3	C103	BA4103	MANAGERIAL ECONOMICS
4	C104	BA4104	ACCOUNTING FOR DECISION MAKING
5	C105	BA4105	LEGAL ASPECTS OF BUSINESS
6	C106	BA4106	INFORMATION MANAGEMENT
7	C111	BA4111	INDIAN ETHOS (SEMINAR)
8	C112	BA4112	BUSINESS COMMUNICATION (LABORATORY)
SEMESTER - II			
9	C201	BA4201	QUANTITATIVE TECHNIQUES FOR DECISION MAKING
10	C202	BA4202	FINANCIAL MANAGEMENT
11	C203	BA4203	HUMAN RESOURCE MANAGEMENT
12	C204	BA4204	OPERATIONS MANAGEMENT
13	C205	BA4205	BUSINESS RESEARCH METHODS
14	C206	BA4206	BUSINESS ANALYTICS
15	C207	BA4207	MARKETING MANAGEMENT
16	C211	BA4211	BUSINESS ETHICS (SEMINAR)
17	C212	BA4212	DATA ANALYSIS AND BUSINESS MODELLING (LABORATORY)
SEMESTER - III			
18	C301	BA4301	STRATEGIC MANAGEMENT
19	C302	BA4302	INTERNATIONAL BUSINESS
20	C001	BA4001	SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT
21	C002	BA4002	FINANCIAL MARKETS
22	C003	BA4003	BANKING AND FINANCIAL SERVICES

23	C015	BA4015	STRATEGIC HUMAN RESOURCE MANAGEMENT
24	C016	BA4016	INDUSTRIAL RELATIONS AND LABOUR LEGISLATIONS
25	C017	BA4017	ORGANIZATIONAL, DESIGN, CHANGE AND DEVELOPMEN
26	C021	BA4021	SUPPLY CHAIN MANAGEMENT
27	C023	BA4023	MATERIALS MANAGEMENT
28	C026	BA4026	PROJECT MANAGEMENT
SEMESTER - IV			
29	C0411	BA4411	PROJECT WORK

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101 & BA4101 Statistics for Management		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	To facilitate objective solutions in business decision making.	K2
C101.2	To understand and solve business problems.	K6
C101.3	To apply statistical techniques to data sets, and correctly interpret the results.	K6
C101.4	To develop skill-set that is in demand in both the research and business environments.	K4
C101.5	To enable the students to apply the statistical techniques in a work setting.	K5

Course Code & Title: C102 & BA4102 Management Concepts and Organizational Behavior		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Understanding of various management concepts and skills required in the business world	K2
C102.2	In-depth knowledge of various functions of management in a real time management context	K2
C102.3	Understanding of the complexities associated with management of individual behavior in the organizations	K4
C102.4	Develop the skill set to have manage group behaviour in Organizations	K2
C102.5	Insights about the current trends in managing organizational behaviour	K3

Course Code & Title: C103 & BA4103 Managerial Economics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	To introduce the concepts of scarcity and efficiency;	K1
C103.2	To explain principles of microeconomics relevant to managing an organization	K4
C103.3	To describe principles of macroeconomics	K3
C103.4	To have the understanding of economic environment of business.	K3
C103.5	To study about the policies that regulate economic variables	K4

Course Code & Title: C104 & BA4104 Accounting for Decision Making		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	A thorough grounding of financial accounting concepts	K1
C104.2	Preparation of financial statement analysis	K4
C104.3	Understand the management and cost accounting techniques	K2
C104.4	Apply the management and cost accounting techniques for decision making	K4
C104.5	Assess the accountancy standards of practices in India	K2

Course Code & Title: C105 & BA4105 Legal Aspects of Business		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	Understand the fundamental legal principles in developing various contracts and commercial laws in the business world	K2
C105.2	Identify the common forms of business associations and elements of Corporate Governance	K3
C105.3	Develop insights regarding the laws related to industrial environment	K6
C105.4	Ability to understand the fundamentals of corporate tax and GST	K3
C105.5	Understand the role of consumer rights and cyber laws in the modern business environment	K4

Course Code & Title: C106 & BA4106 Information Management		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	Learn the basics of data and information system.	K4
C106.2	Understand the system development methodologies.	K3
C106.3	Understand database management system and its types.	K4
C106.4	Learn the various technologies in information system and its security.	K3
C106.5	Gains knowledge on effective applications of information systems in business.	K4

Course Code & Title: C111 & BA4111 Indian ethos (Seminar)		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	The learners are able to apply the basic concepts of Indian ethos and value systems at work.	K1
C111.2	The learners can handle issues of business ethics and offer solutions in ethical perspectives	K3
C111.3	The learners are professionally efficient and skillful in value systems and culture	K4
C111.4	The learners are capable in ethically manage business towards well-being of the society.	K4
C111.5	The learners can be socially effective in undertaking business responsibilities	K5

Course Code & Title: C112 & A4112 Business Communication (Laboratory)		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	Develop good managerial communication skills	K4
C112.2	Ability to excel in different forms of written communication required in a business context	K6
C112.3	Develop good presentation skills	K3
C112.4	In-depth understanding of interview skills	K6
C112.5	Ability to prepare Business reports	K3

SEMESTER 2

Course Code & Title: C201 & BA4201 Quantitative Techniques for Decision Making		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Linear programming in product mix decisions	K3
C201.2	Transportation and assignment in logistics and job allocation scenarios	K4
C201.3	Game theory and heuristics of decision making in real time decisions	K4
C201.4	Inventory management and replacement models in manufacturing context	K4
C201.5	Queuing and simulation in real time scenario optimization	K5

Course Code & Title: C202 & BA4202 Financial Management		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Identify the concepts of financial decision of an organization	K2
C202.2	Recognize the time value of money	K5
C202.3	Learn the capital budgeting and cost of capital techniques	K1
C202.4	Understand how to decide the decision of capital structure and distribution of dividend	K2
C202.5	Assess the short-term and long-term sources of finance	K2

Course Code & Title: BA4203 - Human Resource Management		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Students would have gained knowledge on the various aspects of HRM	K3
C203.2	Students will gain knowledge needed for success as a human resources professional.	K3
C203.3	Students will develop the skills needed for a successful HR manager	K6
C203.4	Students would be prepared to implement the concepts learned in the workplace.	K4
C203.5	Students would be aware of the emerging concepts in the field of HRM	K2

Course Code & Title: C204 & BA4204 Operations Management		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Understanding of the evolution of operations management practices and world class manufacturing processes	K1
C204.2	Knowledge about capacity planning, strategic sourcing and procurement in organizations	K4
C204.3	Enhances the understanding of product development and design process	K3
C204.4	Ability to forecast demand and overcome bottlenecks	K5
C204.5	Provides insight to Quality management tools and practices	K4

Course Code & Title: C205 & BA4205 Business Research Methods		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Students will understand and appreciate scientific inquiry	K1
C205.2	Students would know to write research proposals	K6
C205.3	The students would be able to undertake a systematic outlook towards business situations for the purpose of objective decision making and the method of conducting scientific inquiry to solve organizational problems	K3
C205.4	Students would be able to analyze data and find solutions to the problems.	K3
C205.5	Students could prepare research reports	K2

Course Code & Title: C206 & BA4206 Business Analytics		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Ability to understand the role of Business Analytics in decision making	K2
C206.2	Ability to identify the appropriate tool for the analytics scenario	K3
C206.3	Ability to apply the descriptive analytics tools and generate solutions	K5
C206.4	Understanding of Predictive Analytics and applications	K2
C206.5	Knowledge of Prescriptive Analytics and demonstrating business process improvement	K2

Course Code & Title: C207 & BA4207 Marketing Management

	CO Statements	Knowledge Level
The students should be able to		
C207.1	Applied knowledge of contemporary marketing theories to the demands of business and management practice.	K1
C207.2	Enhanced knowledge of marketing strategies for consumer and industrial marketing	K4
C207.3	Deep understanding of choice of marketing mix elements and managing integrated marketing channels	K1
C207.4	Ability to analyze the nature of consumer buying behaviour	K5
C207.5	Understanding of the marketing research and new trends in the arena of marketing	K5

Course Code & Title: C211 & BA4211 - Business Ethics

	CO Statements	Knowledge Level
The students should be able to		
C211.1	The learners can handle issues of business ethics and offer solutions ethical perspectives	K2
C211.2	The learners are able to apply the basic concepts of Indian ethos and value systems at work.	K5
C211.3	The learners can handle issues of business ethics and offer solutions in ethical perspectives	K3
C211.4	The learners are professionally efficient and skillful in value systems and culture	K5
C211.5	The learners are capable in ethically manage business towards well-being of the society.	K2
C211.6	The learners can be socially effective in undertaking business responsibilities.	K3

Course Code & Title: C212 & BA4212 - Data Analysis and Modeling (Laboratory)		
	CO Statements	Knowledge Level
The students should be able to		
C212.1	The learners can handle issues of business ethics and offer solutions ethical perspectives	K2
C212.2	The learners are able to apply the basic concepts of Indian ethos and value systems at work.	K5
C212.3	The learners can handle issues of business ethics and offer solutions in ethical perspectives	K3
C212.4	The learners are professionally efficient and skilful in value systems and culture	K5
C212.5	The learners are capable in ethically manage business towards wellbeing of the society.	K2

SEMESTER3

Course Code & Title: C301 & BA4301-Strategic Management		
	CO Statements	Knowledge Level
The students should be able to		
C301.1	Ability to understand the Strategic management process and social responsibility of business organizations	K2
C301.2	In-depth understanding about the need for developing competitive advantage for organizations	K2
C301.3	Provides insights into various corporate and business level strategies	K3
C301.4	Facilitates to identify the various control systems required for organizational strategy implementation process	K3
C301.5	Enhances the cognitive knowledge about various strategic issues and development of new business models	K4

Course Code & Title: C302 & BA4302 International Business		
	CO Statements	Knowledge Level
The students should be able to		
C302.1	In Depth knowledge of driving factors of international Business	K4
C302.2	Understanding of theories of trade and investment practiced in the global world	K2
C303.3	Deep Insights in to various market entry strategies followed by Global Organizations	K4
C304.4	Ability to identify the various global production and supply chain issues and have an	K3
C304.5	Understanding of foreign exchange determination system	K2

Course Code & Title: C001 & BA4001 Security Analysis and Portfolio Management		
	CO Statements	Knowledge Level
The students should be able to		
C001.1	Understand the concept of investment and identify the investment alternatives to investors	K2
C001.2	Learn the nuances of fundamental analyses and technical analyses	K3
C001.3	Analyse and evaluate the value of securities	K4
C001.4	Explain how to construct an efficient portfolio	K2
C001.5	Explore the various methods through which portfolio evaluation could be done	K5

Course Code & Title: C002 & BA4002 Financial Markets		
	CO Statements	Knowledge Level
The students should be able to		
C002.1	Understanding the basic concepts of the finance markets in India	K2
C002.2	Identify the underlying structure and functions of Indian financial markets	K3
C002.3	Familiarize the methods of issuing shares and the role of intermediaries in the primary market	K3
C002.4	Learn about the trading mechanism in stock market	K3
C002.5	Describe the instruments, participants and trading in debt market	K5

Course Code & Title: C003 & BA4003 Banking and Financial Services		
	CO Statements	Knowledge Level
The students should be able to		
C003.1	Understand the overall structure and functions of Indian Financial System	K2
C003.2	Gain knowledge about regulations governing the Indian Banking system	K3
C003.3	Price various types of loans proposed by banks to various prospective borrowers with different risk profiles and evaluate the performance of banks	K5
C003.4	Familiarise the students with the concept of e-banking	K2
C003.5	In-depth understanding of fee-based and fund-based financial services in India	K2

Course Code & Title: C008 & BA4008- Retail Marketing		
	CO Statements	Knowledge Level
The students should be able to		
C008.1	To provide insights on retail operation	K1
C008.2	To understand effective methods and strategies required for retail management	K2
C008.3	To understand how to utilize resources and techniques used in retail management.	K2
C008.4	To understand analysis of store location, merchandising, products and pricing.	K2
C008.5	To gain knowledge about shopping behaviour	K4

Course Code & Title: BA4011- Services Marketing		
	CO Statements	Knowledge Level
The students should be able to		
C011.1	Demonstrate an extended understanding of the similarities and differences in service-based and physical product based marketing activities	K6
C011.2	Develop and justify marketing planning and control systems appropriate to service-based activities	K6
C011.3	Demonstrate integrative knowledge of marketing issues associated with service productivity,	K6
C011.4	Develop blueprint for the services sector and develop a better appreciation of the necessary strategies to create a service excellence	K6
C011.5	Recognize the challenges faced in services delivery as outlined in the services gap model	K4

Course Code & Title: C014 & BA4014 -Digital Marketing		
	CO Statements	Knowledge Level
The students should be able to		
C014.1	To examine and explore the role and importance of digital marketing in today's rapidly changing business environment	K4
C014.2	To focuses on how digital marketing can be utilised by organisations and how its effectiveness can measured	K3
C014.3	To know the key elements of a digital marketing strategy	K2
C014.4	To study how the effectiveness of a digital marketing campaign can be measured	K2
C014.5	To demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM,	K6

Course Code & Title: C015 & BA4015 – Strategic Human Resource Management		
	CO Statements	Knowledge Level
The students should be able to		
C015.1	Understand the relationship of HR strategy with overall corporate strategy, the strategic role of specific HR systems	K2
C015.2	Appreciate SHRM in the context of changing forms of organisation and will have a better understanding of the tools and techniques used by organizations to meet current challenges.	K3
C015.3	To be more sensitive to cross-cultural issues and understanding of international approaches to dealing with people in organisations. Students will look at HRM in a broader, comparative and international perspective to deal with complex issues and manifold risks.	K2
C015.4	Providing an overview of the counselling and coaching processes and techniques, Developing alternative approach to dealing with problem situations in organizations	K3
C015.5	Understand the career development theories and models and gain necessary self-insight, skills and techniques to become effective HR managers	K2

Course Code & Title: C016 & BA4016 -Industrial Relations and Labour Legislations

	CO Statements	Knowledge Level
The students should be able to		
C016.1	Industrial relations system and Trade unions	K2
C016.2	Industrial Disputes and labour welfare measures	K2
C016.3	Labour legislation introduction and legal provisions for factory workers, wages and Bonus	K4
C016.4	Legal provisions for equal remuneration, gratuity, compensation, industrial employment and Apprenticeship	K2
C016.5	Legal provisions for EPF, ESI, Maternity, contract labours, and child labour prevention.	K2

Course Code & Title: C017 & BA4017 -Organizational Design, Change and Development

	CO Statements	Knowledge Level
The students should be able to		
C017.1	The fundamentals of organizational design and structure	K1
C017.2	Change process , types, and models of change in organizations	K2
C017.3	The fundamentals of organizational development	K1
C017.4	Organizational development Interventions	K3
C017.5	Organizational evolution and sustenance	K4

SEMESTER 4

Course Code & Title: C411 & BA4411 -Project Work

	CO Statements	Knowledge Level
The students should be able to		
C411.1	Establish the thesis is of sufficiently high standard to merit the award of the degree for which it is submitted	K6
C411.2	Investigate the awareness of original work sits in relation to the wider research field	K5
C411.3	Understand the writing, justification and defending aspects in response to the examiners' questions	K2
C411.4	Learns the results from the work comprehensively through presentation	K3
C411.5	Presenting work in a conference or publish the work in a peer reviewed journal	K6

DEPARTMENT OF MANAGEMENT STUDIES

Course Code & Title:

As per Autonomous Regulation 2023, the lists of courses are given in the Table.

Table - List of Courses with Course Code:

S/N	COURSE CODE (NBA)	COURSE CODE (Autonomous)	TITLE OF THE COURSE
SEMESTER - I			
1	C101	23MB101	MANAGEMENT CONCEPTS AND ORGANIZATIONAL BEHAVIOR
2	C102	23MB102	MANAGERIAL ECONOMICS
3	C103	23MB103	ACCOUNTING FOR MANAGEMENT
4	C104	23MB104	RESEARCH METHODOLOGY
5	C105	23MB105	DESIGN THINKING AND INNOVATION
6	C106	23MB106	STATISTICS FOR MANAGEMENT
7	C111	23MB111	SEMINAR ON EMERGING TRENDS IN BUSINESS MANAGEMENT-I
8	C112	23MB112	MS-OFFICE FOR MANAGERS
9	C113	23MB113	BUSINESS COMMUNICATION (LAB)
SEMESTER - II			
9	C201	23MB201	MARKETING MANAGEMENT
10	C202	23MB202	FINANCIAL MANAGEMENT
11	C203	23MB203	HUMAN RESOURCE MANAGEMENT
12	C204	23MB204	BUSINESS ANALYTICS
13	C205	23MB205	OPERATIONS MANAGEMENT
14	C206	23MB206	LEGAL ASPECTS OF BUSINESS
15	C207	23MB207	QUANTITATIVE TECHNIQUES FOR DECISION MAKING
16	C208	23MB211	SEMINAR ON EMERGING TRENDS IN BUSINESS MANAGEMENT - II
17	C209	23MB212	DATA ANALYSIS AND BUSINESSMODELLING (LAB)
SEMESTER - III			
18	C301	23MB301	INTERNATIONAL BUSINESS
19	C302	23MB302	STRATEGIC MANAGEMENT
20	C007	23PMB07	SECURITY ANALYSIS & PORTFOLIO MANAGEMENT
21	C008	23PMB08	BANKING & FINANCIAL SERVICES
22	C010	23PMB10	FINANCIAL MARKETS

23	C013	23PMB13	STRATEGIC HUMAN RESOURCE MANAGEMENT
24	C014	23PMB14	ORGANIZATIONAL CHANGE AND DEVELOPMENT
25	C016	23PMB16	TRAINING AND DEVELOPMENT
26	C025	23PMB25	SUPPLY CHAIN MANAGEMENT
27	C026	23PMB26	LOGISTICS MANAGEMENT
28	C027	23PMB27	WAREHOUSE MANAGEMENT
SEMESTER - IV			
29	C411	23MB411	PROJECT WORK & RESEARCH PAPER PUBLICATION

Course Outcomes with K – Level mapping for all courses

SEMESTER 1

Course Code & Title: C101&23MB101 - Management Concepts and Organizational Behavior		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	The student will be able to UNDERSTAND and various management concepts and skills required in the business world.	K2
C101.2	The student will be able to EXPLAIN how In-depth knowledge of various functions of management in a real time management context.	K1
C101.3	The student will be able to UNDERSTAND complexities associated with management of individual behavior in the organizations	K3
C101.4	The student will be able to ANALYZE the skillset to have manage group behavior in Organizations	K4
C101.5	The student will be able to IDENTIFY Insights about the current trends in managing organizational behaviour	K1

Course Code & Title: C102 & 23mb102 - Managerial Economics		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Understand the basic concept with the help of economic principles.	K3
C102.2	Appraise the knowledge of demand and supply under different business decisions	K4
C102.3	Examine the concept of production function and role of technology.	K3
C102.4	Analyze the importance of matching costs with different time frames.	K4
C102.5	Differentiate the output and price decision of firms under different market structures.	K4

Course Code & Title: C103 & 3MB103 - Accounting for Management		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Comprehend the basic principles of accounting.	K2
C103.2	Prepare and interpret the financial statements, namely Trading Accounts, Profit and Loss Account and Balance Sheet	K3
C103.3	Assess the financial soundness of the company using Ratio analysis.	K5
C103.4	Construct the Fund flow statements and analyze the financial statements using fund flow.	K4
C103.5	Differentiate the output and price decision of firms under different market structures.	K4

Course Code & Title: C104 & Research Methodology		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Understand the research process, Research Problem and literature review.	K2
C104.2	Identify the criteria for evaluating data collection methods, and Preparation of Questionnaire Design	K3
C104.3	Apply the principles of sampling and data preparation to the contemporary business research problems.	K3
C104.4	Assess different types of testable hypotheses and interpret the statistical test.	K3
C104.5	Construct a report writing and proposal writing in business research.	K4

Course Code & Title: C105 & Design Thinking and Innovation		
	CO Statements	Knowledge Level
The students should be able to		
C105.1	The student will be able to Understand the Fundamentals of Design Thinking	K2
C105.2	The student will be able to Explain how Frame Problems and Generate Innovative Ideas.	K1
C105.3	The student will be able to Practice Scale and Implement Innovative Solutions	K3
C105.4	The student will be able to Analyze Integrate Design Thinking into Business Strategy	K4
C105.5	The student will be able to Identify and Scale and Implement Innovative Solutions.	K1

Course Code & Title: C106 & 23MB106 -Statistics for Management		
	CO Statements	Knowledge Level
The students should be able to		
C106.1	To facilitate objective solutions in business decision making.	K2
C106.2	To understand and solve business problems.	K2
C106.3	To apply statistical techniques to data sets, and correctly interpret the results	K3
C106.4	To develop skill-set that is in demand in both the research and business environments	K4
C106.5	To enable the students to apply the statistical techniques in a work setting	K4

Course Code & Title: C111 & 23MB111 - Seminar on Emerging Trends in Business Management – I		
	CO Statements	Knowledge Level
The students should be able to		
C111.1	To enable the learners on successful completion of the course the learner will be able to read and analyze books.	K4

Course Code & Title: C112 & MS-Office for Managers		
	CO Statements	Knowledge Level
The students should be able to		
C112.1	On successful completion of the course the learner will be able to work on Ms-Word, Ms-Excel and Ms-Power point	K4

Course Code & Title: C113 & Business Communication		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	On successful completion of the course the learner will be able to work on Ms-Word, Ms-Excel and Ms-Power point	K4
C113.2	Exercise critical thinking by designing and developing content for presentations.	K3
C113.3	Participate effectively in groups with emphasis on listening, thinking & responding	K2

SEMESTER 2

Course Code & Title: C201 & 23MB201 - Marketing Management		
	CO Statements	Knowledge Level
The students should be able to		
C201.1	Comprehend the various concepts in marketing and the global marketing Environment of firms.	K2
C201.2	Analyze the consumer buying behavior by apply the principles of segmentation, targeting and positioning.	K4
C201.3	Examine the product mix and brand strategy for the product and services	K3
C201.4	Compare the pricing and channel strategy based on real world market and company objectives	K2
C201.5	Selecting media strategy to reach the target audience and deliver the brand promise through an IMC campaign for a variety of brands.	K5

Course Code & Title: C202 & 23MB201 - Financial Management		
	CO Statements	Knowledge Level
The students should be able to		
C202.1	Examine the risk return trade off involved in the functions of financial management.	K3
C202.2	Weigh investment opportunities using investment appraisal techniques and select appropriate investments.	K5
C202.3	Compare the impact of specific and overall cost of capital on capital structure.	K4
C202.4	Defend the capital structure decisions made using leverage	K5
C202.5	Relate the influence of dividend policy adopted by the firm on the share prices.	K4

Course Code & Title: C203 & 23MB203 - Human Resource Management		
	CO Statements	Knowledge Level
The students should be able to		
C203.1	Classify the functions of human resources and understanding the strategies for existing environment.	K2
C203.2	Appraise the methods of recruitment and prepare a selection strategy for a specific job.	K4
C203.3	Demonstrate appropriate implementation, monitoring and assessment procedures of training and design compensation schemes that are cost effective, improve productivity and comply with the legal framework.	K4
C203.4	Demonstrate knowledge on appraisal method and develop strategies to empower employees	K3
C203.5	Investigate the enrichment concepts in HRM with its latest trends	K4

Course Code & Title: C204 & 23MB204 - Business Analytics		
	CO Statements	Knowledge Level
The students should be able to		
C204.1	Ability to understand the role of Business Analytics in decision making.	K2
C204.2	Ability to identify the appropriate tool for the analytics scenario.	K4
C204.3	Ability to apply the descriptive analytics tools and generate solutions.	K3
C204.4	Understanding of Predictive Analytics and applications.	K2
C204.5	Knowledge of Prescriptive Analytic improvements and demonstrating business process	K5

Course Code & Title: C205 & 23MB205 - Operations Management		
	CO Statements	Knowledge Level
The students should be able to		
C205.1	Interpret the concepts in operation management and product design	K3
C205.2	Appraise the appropriate forecasting techniques to different business situations.	K5
C205.3	Elucidate the factors influencing location, process and layout decision.	K5
C205.4	Examine the various techniques in the strategic operations planning decisions.	K4
C205.5	Analysis the functions of inventory in operation and examine the suitable modern operations management techniques for improving productivity.	K4

Course Code & Title: C206 & 23MB206 - Legal Aspects of Business		
	CO Statements	Knowledge Level
The students should be able to		
C206.1	Describe data by measures of location and dispersion for managerial decision making.	K2
C206.2	Present data in tables and charts and make meaningful interpretation from charts comprehend probability concepts and apply probability concepts to various business problems	K3
C206.3	Use probability concepts to various business problems	K3
C206.4	Apply probability distributions to business situations.	K3
C206.5	Examine the pattern of relationship between variables and make a prediction about dependent variable and perform distribution – free tests.	K4

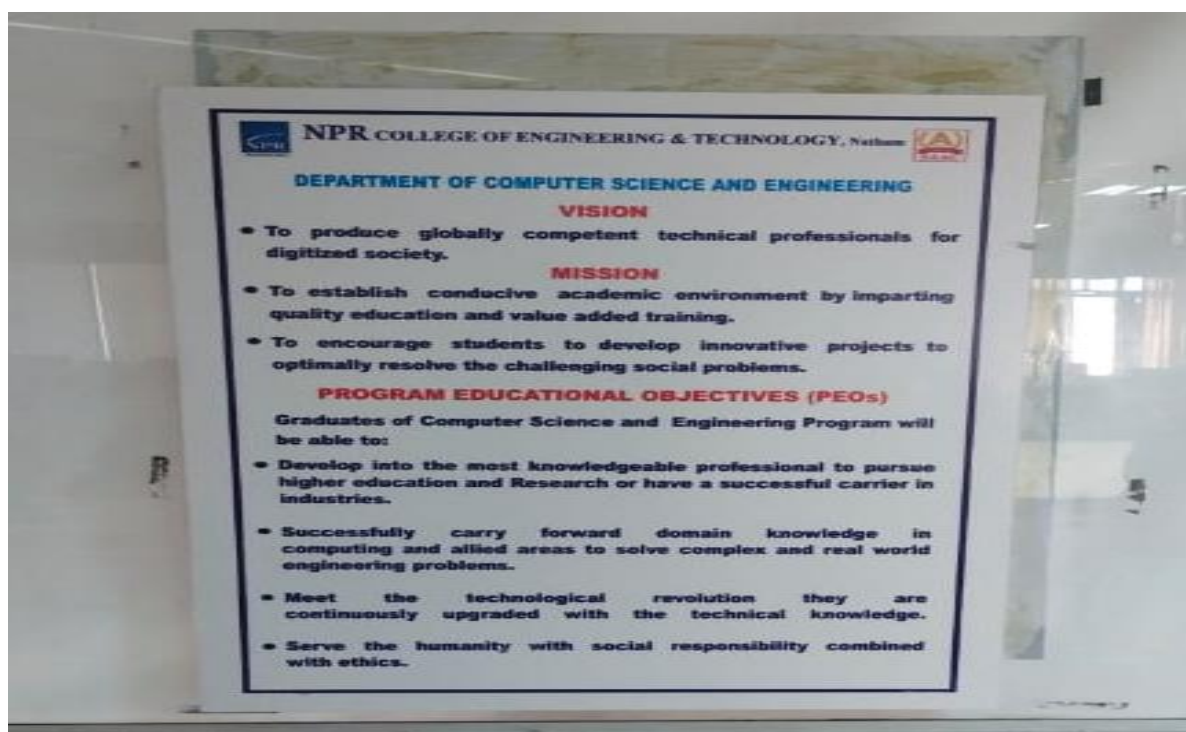
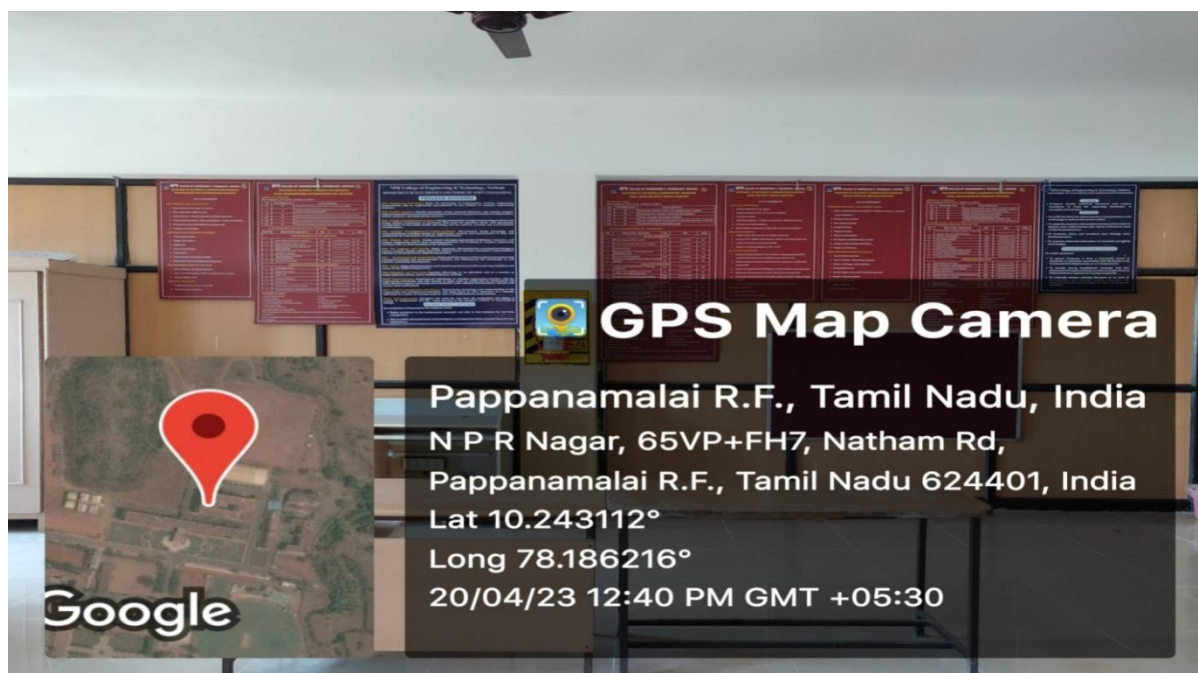
Course Code & Title: C207 & 23MB207 - Quantitative Techniques for Decision Making		
	CO Statements	Knowledge Level
The students should be able to		
C207.1	Formulate and use linear programming techniques to solve and justify decisions in different operational functions of business.	K3
C207.2	Understand and use transportation and assignment problems to implement the best routes and allocation of resources in matching supply and demand.	K3
C207.3	Formulate and appraise the different network models for minimizing costs, distance and time in industrial and business projects.	K5
C207.4	Examine the optimal strategies that are formulated for a conflicting business situation where two or more competitors are involved.	K4
C207.5	Appraise the decision theory models and select the best outcome from the different alternatives in situation.	K5

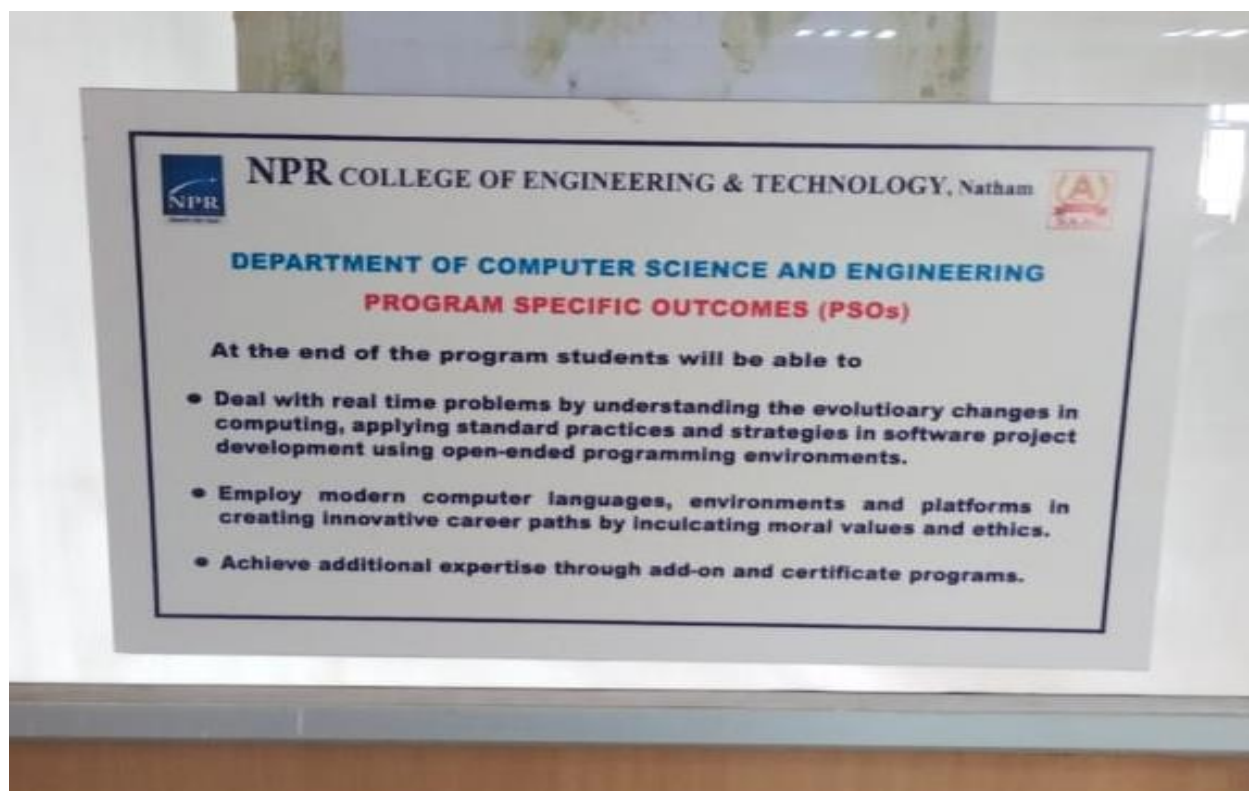
Course Code & Title: C211 & 23MB211 - Seminar on Emerging Trends in Business Management - II		
	CO Statements	Knowledge Level
The students should be able to		
C211.1	On successful completion of the course the will enrich the knowledge on Emerging trends in Management	K3

Course Code & Title: C212 & 23MB212 - Data Analysis and Business Modeling (Laboratory)

	CO Statements	Knowledge Level
The students should be able to		
C212.1	Use statistical software for data preparation and summarize the data (make better analysis and presentation of the data)	K2
C212.1	Perform data cleaning activities and make better analysis and presentation of the data.	K3
C212.1	Find group differences using parametric and non - parametric test for a given data set.	K3

2.6.1 DISSEMINATION OF PROGRAMME OUTCOMES





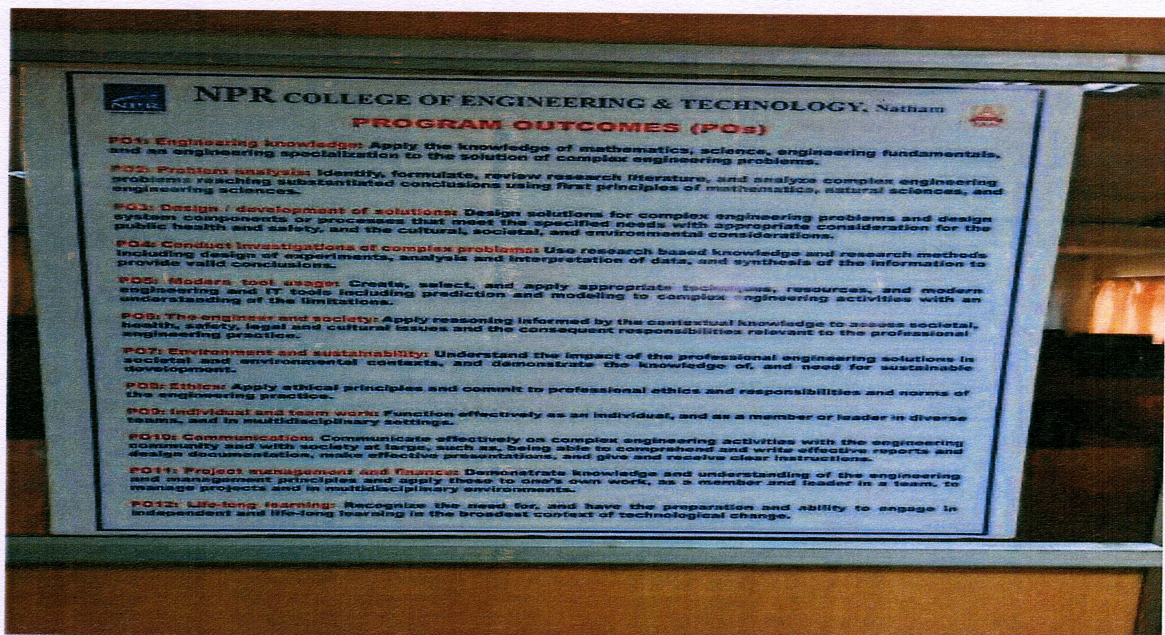
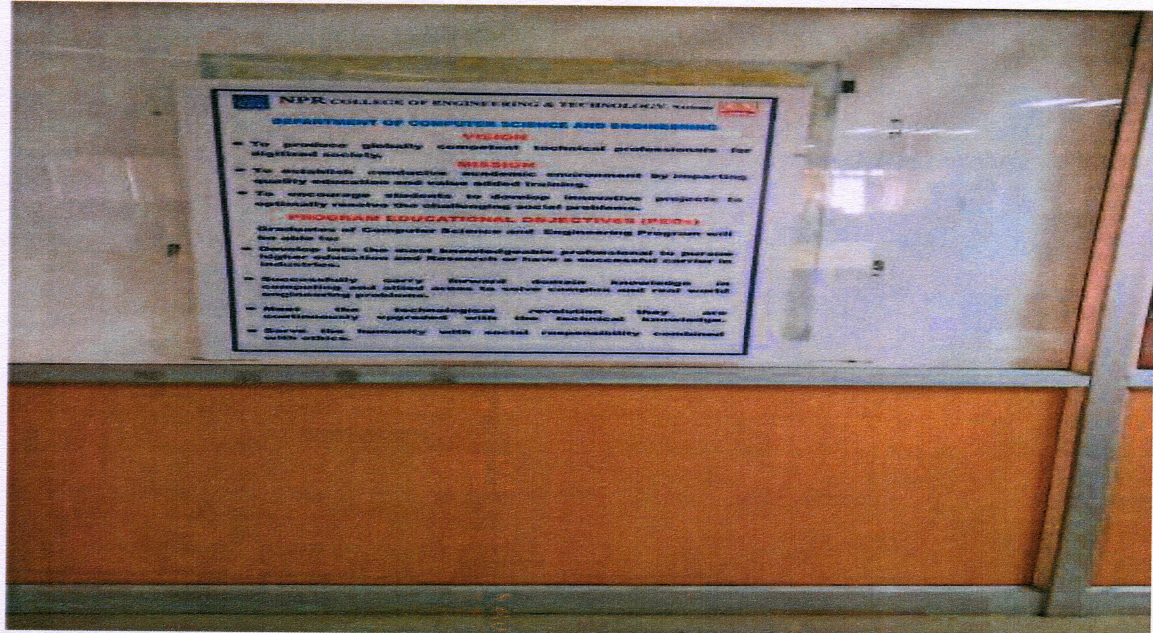


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