SEMESTER I

NARAYANA ENGINEERING COLLEGE::NELLORE								
	CHEMISTRY FOR CIVIL ENGINEERING							R21
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	0	0	48	3	40	60	100

Pre-requisite: Basic concepts in chemistry, Advanced engineering materials, chemistry in day to day life, awareness on environment,

Course Objectives:

1. To familiarize chemistry for civil engineering and its applications.
2. To impart the concept of soft and hard waters, softening methods of hard water
3. To make the students to get awareness on environment.
4. To train the students on the principles and applications of advanced engineering materials.
5. To train the students on the principles and applications of soil chemistry.

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	**Illustrate** the concepts of **water technology and its applications (BL-3)**
CO 2	**Demonstrate the corrosion prevention methods and factors affecting corrosion(BL-3)**
CO 3	**Understand various causes of pollution ,global warming, ozone depletion, and acid rain.(BL-2)**
CO 4	**Explain the setting and hardening of cement and concrete phase (BL-2)**
CO 5	**Classify various soils physical and chemical properties and their impacts.(BL-3)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3													
CO2	3		3											
CO3	3		3											
CO4	3													
CO5	3													

NARAYANA ENGINEERING COLLEGE::NELLORE								
	PROBLEM SOLVING AND PROGRAMMING							R21
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	0	0	48	3	40	60	100

Pre-requisite: Mathematics Knowledge, Analytical and Logical skills

Course Objectives:

- To understand various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn the syntax and semantics of a C Programming language.
- To learn structured programming approach for problem solving.

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	Identify methods to solve a problem through computer programming. **(BL - 3)**
CO 2	Understand the use of operators and input/output. **(BL - 2)**
CO 3	Understand the difference and the usage of various control statements and Functions**(BL - 2)**
CO 4	Apply the Arrays and Pointers for solving problems. **(BL - 3)**
CO 5	Explain User-Defined Data Types and Files. **(BL - 2)**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3											1	
CO2	1	2	1										1	
CO3	1	2	1		2								2	2
CO4	2	2	3	2	1							2	3	2
CO5	3	3	2	2								1	2	

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Fundamentals of Computers and Programming	10 HOURS

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Algorithms, Flowcharts, How to Develop a Program.
Basics of C: Introduction**,** Character Set, Structure of a C Program, A Simple C Program, Variables, Data Types and Sizes, Declaration, Identifiers, Keywords, Constants, Assignment, and Initialization.

At the end of the Module 1, students will be able to:

1. Solve problems using language independent notations. **(BL - 3)**
2. Understand the compilers and interpreters. **(BL - 2)**
3. Understand Basic Structured of Programming in C. **(BL - 2)**
4. Develop algorithms and flowcharts for problems.**(BL - 3)**
5. Understand various Tokens in C language.**(BL - 2)**

MODULE -2	Operators and Input and Output	9 HOURS

Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Conditional Operator, Comma operator, size of operator, Expressions, L values and R values, Expression Evaluation- Precedence and Associativity, Type Conversion.
Input and Output: Basic Screen and Keyboard I/O in C, Formatted Input and Output, Unformatted Input and Output Functions**.**

At the end of the Module 2, students will be able to:

1. Illustrate the working of expressions.**(BL - 2)**
2. Understand the precedence and Associativity rules of operators. **(BL - 2)**
3. Understand the rules of type conversion. **(BL - 2)**
4. Explain the Formatted and Unformatted I/O functions. **(BL - 2)**

MODULE-3	Control Statements and Functions	10 HOURS

Control Statements: Selection Statements - if, Nested if, if-else, Nested if-else, else-if ladder, switch Looping Statements - while, do-while, for, Nested loops, Unconditional Statements - goto, break, Continue, return.
Functions: Introduction, Using Functions, Passing Arguments to a Function, Working with Function, Scope and Extent, Recursion, The C Preprocessor, Storage classes

NARAYANA ENGINEERING COLLEGE:NELLORE								
	ENGINEERING GRAPHICS							R2021
Semester	Hours / Week			Total hrs	Credits	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	0	1	4	80	3	40	60	100

Pre-Requisite: Basic Mathematics (Geometry)

Course Objectives:

1. To impart skills on using drawing instruments
2. To convey exact and complete information of any physical object.
3. To Construct Engineering Curves.
4. To Learn and practice basic AutoCAD commands.
5. To Instruct the utility of drafting & modelling packages in orthographic and isometric drawings

Course Outcomes: At the end of the course, student will be able to:	
CO 1	Define the qualities of precision and accuracy in engineering drawing. (BL-1)
CO 2	Draw engineering curves with different methods(BL-3).
CO 3	Develop the orthographic projection of points and straight lines(BL-3)
CO 4	Construct the planes and simple solids.(BL-3).
CO 5	Understand and practice basic AUTOCAD commands (BL-2)

COURSE CONTENT

Part-A Manual Drawing

TASK– 1	**Introduction and Conic sections**	10 Hours

Introduction to Engineering graphics: Principles of Engineering Graphics and their significance; various instruments used, drawing sheet sizes and title block, lettering, BIS conventions, types of lines and dimensioning methods.

Geometrical constructions: simple constructions, construction of Pentagon, Hexagon by general Method only.

Conic Sections:. Types of conics: Ellipse, Parabola and Hyperbola (Eccentricity method only),

TASK–-2	**Orthographic Projections**	10 Hours

Objectives and Principle of projection, Methods of projections, Comparison between firstangle and third angle projection.

Projections of points: Projection of points placed in different quadrants.

Projection of straight lines: Fundamental concepts**,** Line parallel, perpendicular and inclined to one and two reference planes placed in first quadrant only.

TASK–3	**Projections of Solids**	15 Hours

Projections of planes: Projection of planes (Triangle, Square, Pentagon, Circle) parallel,Perpendicular and inclined to one and two reference planes placed in first quadrant only.

Types of solids ; Polyhedra, Solids of revolution,

Projections of regular solids (Prisms, Pyramids, Cylinders and Cone),with its axis Perpendicular to one plane and parallel to other plane, Axis inclined to one plane and parallel to other plane.

TASK–4	**Isometric and Orthographic views**	10Hours

NARAYANA ENGINEERING COLLEGE:NELLORE								
	Chemistry for Civil Engineering lab							R2021
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	0	0	3		1.5	40	60	100

Pre-requisite: Nil

Course Objectives:

1. **To provide the learners hands-on-training on the practical applications of the concepts learnt in the theoretical sessions on water treatment, electrochemistry, lubricants, and using simple chemical methods.**

2. **The course will also train the learner to observe good lab practices, record readings and graphically represent the results, as well as analyze and interpret the influence of reaction conditions on the results.**

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	Analyze quality parameters of water samples from different sources
CO 2	Perform quantitative analysis using instrumental methods.
CO 3	Utilize the fundamental laboratory techniques for analyses such as titrations, separation/purification/ and Spectroscopy
CO 4	**To be able to analyze and gain experimental skill.**

CO-PO Mapping														
CO	**PO**												**PSO**	
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	3													
CO2	3													
CO3	3													
CO4	3													

1: Low, 2-Medium, 3- High

COURSE CONTENT	CO
Task-1 : Determination of Hardness of a ground water sample	
Objectives **1.** Determine the total hardness (total calcium and magnesium ion concentration) 2. Learn how to titrate with EDTA solution. 3.Determine permanent hardness and the temporary hardness	CO1
Task-2 : Estimation of DO by winklers method	
Objectives: 1. To determine the level of dissolved oxygen in a sample of water using Winkler's method. 2. Analyze the effects of various factors on the level of dissolved oxygen in a water sample (e.g., salt content, temperature, degree of mixing, and the presence of reducing compounds).	CO 1
Task- 3: Determination of chloride content of water.	
Objectives: 1. To determine the amount of chlorine present in given water sample. 2.Learn how to titrate with Silver nitrate and observe different levels of titration	CO 1
Task-4 : Potentiometry - determination of red -ox potentials and emf	

NARAYANA ENGINEERING COLLEGE::NELLORE								
	PROBLEM SOLVING AND PROGRAMMING							R21
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	0	0	48	3	40	60	100

Pre-requisite: Mathematics Knowledge, Analytical and Logical skills

Course Objectives:

- To understand various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn the syntax and semantics of a C Programming language.
- To learn structured programming approach for problem solving.

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	Identify methods to solve a problem through computer programming. **(BL - 3)**
CO 2	Understand the use of operators and input/output. **(BL - 2)**
CO 3	Understand the difference and the usage of various control statements and Functions**(BL - 2)**
CO 4	Apply the Arrays and Pointers for solving problems. **(BL - 3)**
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CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3											1	
CO2	1	2	1										1	
CO3	1	2	1		2								2	2
CO4	2	2	3	2	1							2	3	2
CO5	3	3	2	2								1	2	

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Fundamentals of Computers and Programming	10 HOURS

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Algorithms, Flowcharts, How to Develop a Program.
Basics of C: Introduction**,** Character Set, Structure of a C Program, A Simple C Program, Variables, Data Types and Sizes, Declaration, Identifiers, Keywords, Constants, Assignment, and Initialization.

At the end of the Module 1, students will be able to:

4. Solve problems using language independent notations. **(BL - 3)**
5. Understand the compilers and interpreters. **(BL - 2)**
6. Understand Basic Structured of Programming in C. **(BL - 2)**
4. Develop algorithms and flowcharts for problems.**(BL - 3)**
5. Understand various Tokens in C language.**(BL - 2)**

MODULE -2	Operators and Input and Output	9 HOURS

Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Conditional Operator, Comma operator, size of operator, Expressions, L values and R values, Expression Evaluation- Precedence and Associativity, Type Conversion.
Input and Output: Basic Screen and Keyboard I/O in C, Formatted Input and Output, Unformatted Input and Output Functions**.**

At the end of the Module 2, students will be able to:

5. Illustrate the working of expressions.**(BL - 2)**
6. Understand the precedence and Associativity rules of operators. **(BL - 2)**
7. Understand the rules of type conversion. **(BL - 2)**
8. Explain the Formatted and Unformatted I/O functions. **(BL - 2)**

MODULE-3	Control Statements and Functions	10 HOURS

Control Statements: Selection Statements - if, Nested if, if-else, Nested if-else, else-if ladder, switch Looping Statements - while, do-while, for, Nested loops, Unconditional Statements - goto, break, Continue, return.

NARAYANA ENGINEERING COLLEGE: NELLORE								
I-B. Tech	VECTOR CALCULUS COMPLEX VARIABLES & TRANSFORMS							R-2021
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	1	0	64	4	40	60	100

Pre-requisite: inter mathematics

Course Objectives: This course aims to providing the knowledge for the student about on

1. To enlighten the learners in the concept of vector differentiation and integration.
2. To understand the concept the limit, continuity & differentiation of complex variable
3. To Evaluate the improper integrals by complex integration
4. To understand the concepts of Laplace transforms and Inverse Laplace transforms & its properties.
5. To understand the concepts of Fourier series, Fourier transforms and its properties.

Course Outcomes: After successful completion of the course, the student will able to:

CO 1	Interpretate the different operators such as gradient, curl and divergence to find out point function (L-3)
CO 2	Understand the concept the limit, continuity & differentiation of complex variable (L-3)
CO 3	Evaluate the integral by using contour integration .(L-5)
CO 4	Apply the Laplace transform to convert time domain into frequency domain & Inverse Laplac transforms techniques to solve the differential equations. (L-3
CO 5	Develop the Fourier Series to the given periodic functions (L-3)

CO-PO Mapping

CO	PO												PSO	
	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3												
CO2	3	3												
CO3	3	3												
CO4	3	3												
CO5	3	3												

1- Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	Vector Calculus	Hours: 12h(9L+3T)

Scalar and vector point functions, vector operator del, del applies to scalar point functions Gradient, del applied to vector point functions-Divergence and Curl, Line integra circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

NARAYANA ENGINEERING COLLEGE:NELLORE								
	I T WORK SHOP							R2021
Semester	Hours / Week			Total hrs	Credits	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	0	0	4	64	2	40	60	100

Pre-requisite: Basic mathematics.

Course Objectives:

1. To know basic workshop processes and adopt safety practices while working with various tools and equipments
2. To identify, select and use various marking, measuring, holding, striking and cutting tools & equipments.
3. To know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
4. To gain knowledge about the usage of tools like Word processors, Spreadsheets, Presentations
5. To learn about Networking of computers and use Internet facility for Browsing andSearching

Course Outcomes: After successful completion of the course, the student will be able to	
CO 1	Understand the safety aspects in using the tools and equipments. (BL-2)
CO 2	Apply tools for making models in respective trades of engineering workshop.(BL-3
CO 3	Apply basic electrical engineering knowledge to make simple house wiring circuits and check their functionality.(BL-3)
CO 4	Understand to disassemble and assemble a Personal Computer and prepare the computer ready to use (BL-2)
CO 5	Apply knowledge to Interconnect two or more computers for information sharing (B 3)

COURSE CONTENT (TRADES FOR PRACTICE)

Trade -1 Carpentry (8 H)

Familiarity with different types of woods and tools used in wood working and make following joints from out of 300x40x25mm soft wood stock.

a) Half–Lap joint.
b) Mortise and Tenon joint

Trade-2 Fitting (8 H)

Familiarity with different types of tools used in fitting and do the fitting exercises out of 80 x 50 x 5 mm M.S. stock

a) V-fit b) Dovetail fit

Trade - 3 Sheet Metal Work (8 H)

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from out of 22 or 20 guage G.I. sheet

a) Tapered tray b) Conical funnel

Trade - 4 Electrical House Wiring (8 H)

NARAYANA ENGINEERING COLLEGE: NELLORE								
	ENGINEERING MECHANICS							R2021
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	1	0	48	4	40	60	100

Pre-requisite: Differentiation and integration topics in mathematics.

Course Objectives:

6. To learn the fundamentals of mechanics concept of force and its types.
7. To learn the effect of friction on equilibrium.
8. To develop knowledge in analyzing different types of trusses.
9. To gain proficiency in understanding the concept moment of inertia.
10. To learn kinematics, kinetics of particle and rigid body, related principles.

Course Outcomes: After successful completion of the course, the student will be able to:
Compute the resultant of system of forces in plane and space acting on bodies. (BL-3) Solve the mechanics problems associated with friction forces. (BL-3)
Determine the support-reactions and analyze the internal forces of the members of various trusses and frames. (BL-4)
Calculate the location of centroid of composite areas. (BL-4)
Apply transfer theorems to determine properties of various sections. (BL-4)
Solve problems related to kinetics. (BL-3)

COURSE CONTENT

MODULE – 1	**System of Forces**	**10 H**

Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems couple, moment of a force Varignon's theorem, concept of free body diagrams, concept of equilibrium of coplanar force systems.

MODULE -2	**Friction**	**09 H**

Definition of Friction and its applications, angle of friction, angle of repose, coefficient of friction. Typesof Friction, laws of static friction, Description and application of friction on blocks on horizontal and inclined planes.

MODULE-3	**Analysis of Trusses**	**09 H**

Introduction to plane trusses, analysis of plane trusses by method of Joints, method of sections & tension coefficient method.

MODULE-4	**Centroid & Moment of Inertia**	**10H**

Definition of Centroid & Centre of Gravity, Axes of Symmetry, Location of Centroid of Rectangle, Triangle, Semicircle, Quadrant and sector of a circle by method of integration. Numerical problems onCentroid of Composite sections.

Concept of Moment of inertia, perpendicular axis theorem, parallel axis theorem, and moment of inertia of Rectangular, Circular, Semicircular, Quadrant of a circle Triangular sections by method of integration. Numerical Problems on moment of inertia of composite section.

MODULE-5	**Kinematics & Kinetics**	**10 H**

Rectilinear and Curvilinear motion, Velocity, Acceleration, and Motion of a projectile, Relative motion. Kinetics of rectilinear motion, Newton's laws of motion, D'Alembert's principle, Work-energymethod, Impulse-momentum equation, Kinetics of circular motion, Rotation.

Total	**48 h**

NARAYANA ENGINEERING COLLEGE: NELLORE								
	MATERIAL SCIENCE and ENGINEERING							R2021
Semester	Hours / Week			Total hrs	Credits	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
II	3	0	0	48	3	40	60	100

Course Objectives:

1. To study structure of metals and types of solids.
2. To understand about equilibrium diagrams and properties of steel and iron.
3. To learn about heat treatment of steel.
4. To study about properties and structures of ceramic materials.
5. To study about properties and structures of composite materials.

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	Define bonds, crystallization of metals ,grain sizes of metals and alloys . (BL-1)
CO 2	Understand about construction of equilibrium diagrams and to study about phase diagrams.(BL-2)
CO 3	Understand properties and structures of various ferrous and non-ferrous metals and alloys.(BL-2)
CO 4	apply the concepts of heat treatment of alloys. (BL-3)
CO 5	Find various ceramic materials and composite materials (BL-1)

COURSE CONTENT

MODULE – 1	**Structure of Metals**	**10 H**

Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect ofgrain boundaries on the properties of metal / alloys – determination of grain size.

Constitution of Alloys : Necessity of alloying, types of solid solutions,

MODULE -2	**Equilibrium of Diagrams**	**10 H**

Experimental methods of construction of equilibrium diagrams, Isomorphism alloy systems, equilibrium cooling and heating of alloys, Lever rule, eutectic systems, peritectic reaction. Transformations in the solid state – allotropy, eutectoid, peritectoid reactions, phase rule.

MODULE-3	**Metals & Alloys**	**9 H**

Cast Irons and Steels : Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, tool and die steels.**Non-ferrous Metals and Alloys:**

Structure and properties of copper and its alloys, Aluminium and its alloys, Titanium and its alloys.

MODULE-4	**Heat treatment of Alloys**	**10 H**

Effect of alloying elements on Iron – Iron carbon system, Annealing, normalizing, Hardening, TTTdiagrams, tempering , Harden ability, surface - hardening methods, Age hardening treatment,.

MODULE-5	**Ceramics and Composites**	**9H**

Structure, properties and applications of ceramics, composites.

Introduction to super alloys and nano materials.

NARAYANA ENGINEERING COLLEGE: NELLORE								
	Physics for Mechanical Engineering							R21
Semester	Hours / Week			Total hrs	Credit	Max Marks		
	L	T	P		C	CIE	SEE	TOTAL
I	3	0	0	49	3	40	60	100

Pre-requisite:

Course Objectives:

6. To explain the significant concepts of Crystals and different types of ultrasonic's.
7. To impart knowledge in basic concepts of mechanics.
8. To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
9. To impart knowledge in basic concepts of Optical fibers and LASERs along with its¬ Engineering applications.
10. Familiarize types of sensors for various engineering applications

Course Outcomes: After successful completion of the course, the student will be able to:

CO 1	**Classify types of crystal structures**
CO 2	**Understand the basic concept of Oscillations**
CO 3	**Describe the phenomenon of interference, diffraction and polarization.**
CO 4	**Make use of the lasers and optical fibers**
CO 5	**Apply the different types of sensors for Engineering applications**

CO-PO Mapping

CO	PO												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	7												2	
CO2	9													
CO3	15												1	
CO4	9												2	
CO5	8												7	7

1: Low, 2-Medium, 3- High

COURSE CONTENT

MODULE – 1	CRYSTALLOGRAPHY AND ULTRASONICS	7 Hrs

Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters – Crystal systems, Bravias lattice, directions and planes in a crystal, Miller indices – inter-planar distances – Packing fractions of SC, BCC and FCC. Bragg's law-Laue method and powder methods for crystal structure