Maturi Venkata Subba Rao (MVSR) Engineering College (Autonomous)
Department of Electrical & Electronics Engineering

Scheme of Instructions for B.E. (E.E.E.) for 8 Semesters

S. No	Course Work – Subject Area	Credits/ Semester								Credits Obtained/ Required
		I	II	III	IV	V	VI	VII	VIII	
1	Humanities and Social Sciences (HS)	**9**	**9**	**3**	**-**	**-**	**-**	**-**	**-**	**21/26**
2	Basic Sciences (BS)	**3**	**-**	**-**	**-**	**2**	**3**	**-**	**-**	**8/12**
3	Engineering Sciences (ES)	**7**	**9**	**7**	**-**	**-**	**-**	**-**	**-**	**23/20**
4	Professional Subjects –Core (PC)	**-**	**-**	**10**	**21**	**15**	**12**	**10**	**-**	**68/53**
5	Professional Subject-Electives (PE)	**-**	**-**	**-**	**-**	**3**	**3**	**6**	**6**	**18/18**
6	Open Subjects – Electives (OE)	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**3**	**9/18**
7	Project Work, Seminar and/or Internships (PW)	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**8**	**13/11**
8	Mandatory Courses (MC) (Non-Credit)	**-**	**-**	**-**	1	**-**	1	**-**	1	**3/3**
	TOTAL	**19**	**18**	**20**	**21**	**20**	**21**	**24**	**17**	**160/158**
	Contact Hours/ Week	**26**	**24**	**22**	**26**	**23**	**26**	**24**	**17**	

B.E. (E.E.E) I – SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/ week	CIE	SEE	Duration of SEE (Hr.)	
Theory Courses										
1	U21BSN01MT	Engineering Mathematics - I	3	1	-	4	30	70	3	4
2	U21BSN01CH	Engineering Chemistry	3	-	-	3	30	70	3	3
3	U21HSN01EG	English	2	-	-	2	30	70	3	2
4	U21ESN01CS	Programming for Problem Solving Using C	3	-	-	3	30	70	3	3
Practical/ Laboratory Courses										
5	U21BSN81CH	Chemistry Lab	-	-	4	4	25	50	3	2
6	U21HSN81EG	English Lab	-	-	2	2	25	50	3	1
7	U21ESN81CS	Programming for Problem Solving Using C Lab	-	-	4	4	25	50	3	2
8	U21ESN81ME	Workshop Practice	-	-	4	4	50	50	3	2
Total			**11**	**1**	**14**	**26**	**245**	**480**	**-**	**19**

* **3 Weeks** induction program will be organized before commencement of the coursework of Semester – I

BS: Basic Science,
ES: Engineering Science
HS: Humanities and Social Sciences

L: Lecture
T: Tutorial
P: Practical
D: Drawing

CIE: Continuous Internal Evaluation
SEE: Semester End Evaluation

Note:
1. Each contact hour is a clock hour
2. The duration of the practical class is two hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

Course Code	Course Title						Core/Elective
U21BSN01MT	**Engineering Mathematics - I**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**1**	**-**	**-**	**30**	**70**	**4**

Course Objectives

The objectives of this course is to

- Introduce the concepts of sequences, series and their properties
- Introduce the concepts of mean value theorems and curvature
- Introduce the concepts of multiple integrals
- Study vector differential and vector integral calculus

Course Outcomes

After completing this course, the student will be able to:

- Determine the convergence of infinite series using various tests of convergence
- Solve problems based on the fundamental theorem of differential calculus, find radius of curvature, evaluate and envelopes and expand functions using Taylor & MacLaurin series
- Evaluate Double and Triple integrals in Engineering Problems
- Solve problems based on vector differentiation.
- Solve problems based on vector integration

UNIT-I:

Infinite Series: Introduction to sequences, Infinite series, general properties of infinite series, geometric series, series of positive terms, Harmonic series(p-series),Comparison test, D' Alembert's ratio test, Raabe's test, Cauchy's nth root test, Alternating series, absolute and conditional convergence

UNIT-II:

Differential Calculus: Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem(without proofs) and their applications, Taylor and Maclaurin series, Curvature, Radius of curvature(Cartesian form),Centre of Curvature, Evolute and Involute, Envelope of a family of curves

UNIT-III:

Multiple Integrals: Introduction to functions of two and three variables, Double integrals, Change of order of integration, Change of variables from Cartesian to Plane Polar coordinates, Triple integrals(Cartesian)

UNIT-IV:

Vector Differentiation: Scalar and vector point functions, Vector operator del, Gradient, Unit normal vector, Directional derivative, Angle between surfaces, Divergence, solenoidal vector, Curl, Irrotational vector, Laplace operator applied to scalar and vector point functions.

UNIT-V:

Vector Integration: Line integral-work done, Surface integral, Volume integral, Green's theorem in a plane, Stoke's theorem, Gauss divergence theorem(without proofs) and their verifications.

Text Books:

1. R. K. Jain &S. R .K. Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, 5th Edition 2016.
2. B. S. Grewal, *Higher Engineering Mathematics*, Khanna Publications, 44th Edition, 2018.

Reference Books:

1. B.V. Ramana, Higher Engineering Mathematics, 23rd reprint, 2015.
2. N. Bali, M. Goyal, *AtextbookofEngineeringMathematics*, Laxmi publications, 2010
3. Erwin Kreyszig, *Advanced Engineering Mathematics*, John Wiley, 9th Edition, 2012.
4. B. Thomas Jr. and Ross L. Finney *Calculus and Analytic Geometry*.
5. M. Tom. Aposta, l *Calculus: One -Variable Calculus with An Introduction to Linear Algebra*, Vol 1

Course Code	Course Title						Core/Elective
U21BSN01CH	**Engineering Chemistry**						**Core**
Prerequisite	Contact Hour s per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**-**	**-**	**-**	**30**	**70**	**3**

Course Objectives

The objectives of this course is to

- To relate how the basic concepts and principles of chemistry can be applied to practical utility in a broader perspective of the society.
- To distinguish the ranges of electromagnetic spectrum and its interaction with matter and to develop knowledge of various spectroscopic techniques at atomic and molecular levels.
- To identify and apply various principles of electrochemistry and corrosion which are essential for an engineer in industry
- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineerTo provide an overview of ordinary differential equations and their applications.

Course Outcomes

After completing this course, the student will be able to:

- Explain and apply the knowledge of various electrodes, electrode potentials and Nernst equation to construct electrochemical cells and thereby to calculate EMF of cell.
- Analyze different types of corrosion, mechanism, factors affecting metallic corrosion and control corrosion by various methods.
- Explain the origin of UV-Vis absorption in terms of electronic transitions in determination of structures of various molecules and Analyze microscopic chemistry in terms of atomic and molecular orbitals
- Identify and make use of various polymers as material for engineering applications.
- Classify various energy sources and illustrate the importance and applications of renewable and non-renewable energy sources.
- Relate the concepts liquid crystals, composites and green chemistry to modify engineering processes and materials.

UNIT –I:

Electro Chemistry &Corrosion and It's control: Electro Chemistry: Electrochemical Cells-Electrolytic and galvanic cells-notation. Cell Reaction and Cell EMF. Electrode potential, Standard electrode potential. Electrochemical series and Applications. Free Energy and EMF. Nernst equation and its derivation, Applications -Numerical problems. Types of electrodes-Standard hydrogen electrode, Calomel electrode Silver-Silver Chloride, Quinhydrone and glass electrodes. Determination of pH using Quinhydrone electrode coupled with saturated Calomel electrode.

Corrosion: Definition, Causes and effects. Types of corrosion, Chemical corrosion, and its mechanism. Electrochemical corrosion and its mechanism. Galvanic corrosion, Concentration cell Corrosion-Waterline and Pitting corrosion. Factors effecting rate of corrosion. Corrosion control methods- Cathodic Protection –Sacrificial anode and impressed current cathode methods. Surface Coatings-Types. Electro plating and Electroless plating of metal coatings.

UNIT–II:

Molecular Structure & Spectroscopic techniques: Regions of electromagnetic spectrum, Molecular spectroscopy. Rotational Spectroscopy: Rotation of molecules, rotational spectra of rigid diatomic molecules, selection rules. Vibrational Spectroscopy: The vibrating diatomic molecule, simple and anharmonic oscillators of a diatomic molecule, selection rules, applications of IR spectroscopy. NMR Spectroscopy: Criteria for NMR activity (Magnetic and nonmagnetic nuclei), basic concepts and principle of ^{1}H NMR spectroscopy, Chemical shift, Magnetic Resonance Imaging.

UNIT-III:

Polymeric Materials: Polymers: Basic terminology - Monomer and its functionality, Polymers, and degree of polymerization. Types of Polymerizations- Chain Growth, Step Growth Polymerization – Examples. Plastics, Fibers, Elastomers – Characteristics and Examples. Preparation, Properties & Uses of the following polymers- PVC, Bakelite, Nylon 6:6,Buna-S, Butyl Rubber and Silicone Rubber. Conducting polymers: Concept, Classification of conducting polymers with examples. Mechanism of conduction in trans Poly-acetylene. Enhancement of conduction by doping. Applications of conducting polymers. Biodegradable polymers: Concept, Preparation, Properties, and applications of polylactic acid.

UNIT-IV:

Energy Sources: Introduction-Renewable and non-renewable energy sources with Examples. Chemical fuels: Definition, Classification of chemical fuels-primary, Secondary and Solid, Liquid, Gaseous fuels -examples. Solid fuels: Coal& its composition, and its ranking Liquid fuels: Petroleum- Fractional distillation of petroleum. Cracking and its significance. Knocking, Octane Number and Cetane number. Gaseous Fuels: LPG, CNG-composition, properties and uses .Biodiesel: Concept -Transesterification- Carbon neutrality. Advantages of Biodiesel. Batteries: Definition, Types of batteries-Primary batteries; Zn-Carbon battery. Secondary batteries; Construction, working & applications of Lead-acid, Lithium -ion batteries. Fuel cells: Definition, Types of fuels cells, Construction, Applications of working of H_2-O_2fuel cellsand Methanol-O_2fuel cells. Solar cells: Concepts of photovoltaic cell and its applications.

UNIT-V:

Liquid Crystals, Composites and Green Chemistry: Liquid Crystals: Introduction, classification of liquid crystals- Thermotropic and Lyotropic liquid crystals - Chemical constitution & liquid crystalline behavior. Molecular ordering in liquid crystals- Nematic, Smectic and Cholesteric liquid crystals - Applications. Composite materials: Concept ,composition, and characteristic properties of composites. Classification of composites based on matrix, reinforcement, and ply. Advantages and applications of composites. Green Chemistry: Concept, Principles of green Chemistry with Examples.

Text Book:

1. PC Jain, M Jain Engineering Chemistry, Dhanapathi Rai and sons (16th edition), New Delhi

Reference Books:

1. Sashi Chawla, Textbook of Engineering Chemistry, Dhanapathi Rai &sons, New Delhi.
2. O.G. Palanna, Engineering Chemistry, TMH Edition.
3. Puri, Sharma and Pathania Principles of physical chemistry, Vishal Publishing Co.
4. Polymer chemistry by Gowariker.
5. Fundamentals of Molecular Spectroscopy, by C.N. Banwell, McGraw Hill Publication.
6. Fundamentals ofSpectroscopy by Y. R. Sharma.
7. Shikha Agarwal, Engineering Chemistry fundamentals and applications, Cambridge University press.

Course Code	Course Title						Core/Elective
U21HSN01EG	**English**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**2**	**-**	**-**	**-**	**30**	**70**	**2**

Course Objectives

The objectives of this course is to enhance the English language abilities of students by

- Using authentic material for language learning
- Developing appreciation to a variety of content-rich texts
- Strengthening their grammar and vocabulary
- Improving reading and comprehension skills and also encouraging them to think critically and creatively
- Honing their writing skills

Course Outcomes

After completing this course, the student will be able to:

- Demonstrate the skill of reading to summarize, paraphrase and give an accurate account of authentic texts of various genres
- Infer and make predictions based on the comprehension of a text
- Employ Academic Vocabulary appropriately with a distinction of its formal and informal use
- Apply different reading strategies to comprehend different texts and decode new words encountered
- Undertake guided and extended writing using accurate grammatical structures and vocabulary

Unit-I

Reading : A.G. Gardener – "On Saying Please"
Vocabulary : Word formation-Prefixes, Suffixes, Root Words
Grammar : Articles, Prepositions, Determiners
Writing : Guided Writing (Expanding the outline/Writing from verbal cues)

Unit –II

Reading : Fritz Karinthy – "Refund "
Vocabulary : Word formation- Compounding and Blending, Contractions
Grammar : Transitions, Connectives
Writing : Paragraph-writing

Unit- III

Reading : Narayan Murthy – "Value System"
Vocabulary : Synonyms, Antonyms, One Word Substitutes
Grammar : Voice
Writing : Letter-writing

Unit- IV

Reading : Robert Frost – "Stopping by Woods on a Snowy Evening"
Vocabulary : Homophones, Homonyms, Homographs
Grammar : Narration (Direct-Indirect Speech)
Writing : Precis writing

Unit- V

Reading	:	Stephen Leacock – "On the Need for a Quiet College"
Vocabulary	:	Inclusive Language, Euphemisms
Grammar	:	Tenses
Writing	:	Paraphrasing and Summarizing

Text Books:

1. Board of Editors. Language and Life: A Skills Approach. Orient BlackSwan, 2018.
2. Sudharshana, NP and C Savitha, English For Engineers. Cambridge University Press, 2018.
3. Kumar, Sanjay and Pushp Lata, English Language and Communication Skills for Engineers. Oxford University Press,

Course Code	Course Title						Core/Elective
U21ESN01CS	**Programming for Problem Solving Using C**						**Core**
Prerequisite	Contact Hour s per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**-**	**-**	**-**	**30**	**70**	**3**

Course Objectives

The objectives of this course is to impart knowledge of

- To introduce the concept of computing environment, number systems, algorithms, flowcharts and implementation using variables with various data types and selection statements.
- To introduce the logic building techniques using control statements and arrays
- To understand modular and structure programming using functions and strings
- To learn the alternative to iteration using recursion and familiarization with structures and macros
- To understand memory management using pointers and dealing with files

Course Outcomes

After completing this course, the student will be able to:

- Formulate simple algorithms/flowcharts there by translating them into programs using variables with various data types and selection statements.
- Implement logic building techniques using control statements and arrays
- Apply modular and structure programming using functions and strings
- Analyze the iteration with recursion and implementation of structures and macros.
- Illustration of memory management techniques using pointers and implement the file handling approach

UNIT-I:

Introduction to computers: Introduction to components of a computer system, Operating system, Number system: Decimal, binary, octal, hexa decimal systems.
Algorithms/Flowcharts: Logical and Numerical problem solving
Introduction to C Programming: Structure of C, Execution phases in C (Compiler, interpreter, Linker, loader), C-tokens, syntax & semantics in compilation, Identifiers, variables, keywords, Data Types, Operators, precedence & associativity rules, Expression evaluation, Type conversion.
Selection statements: simple if, if-else, else-if ladder, nested if-else, switch

UNIT-II:

Iteration statements: while, do-while, for, **Unconditional statements:** break, continue, goto, return
Arrays: 1-D arrays, **Searching Techniques:** Linear, binary search, **Sorting algorithms:** bubble sort and selection sort,2-D arrays: Matrices

UNIT-III:

Strings: Defining & initializing strings, String manipulation functions (predefined, user-defined)
Functions: Taxonomy of functions, built-in functions, parameter passing techniques: call by value, Passing arrays to functions: Idea of call by reference
Storage classes: auto, register, static, extern

UNIT-IV:

Recursive functions: Recursion definition, Iteration vs Recursion, Example programs: GCD, Factorial, sum of digits, fibonacci
Structures: Defining & accessing structured data, Array of structures, passing structure to function, nested structures, Difference between structure & union
Preprocessor directives: Macros, #define, #if, #elif

UNIT-V:

Pointers: Introduction to pointers, Defining pointers, pointer arithmetic, Array of pointers, pointer to array, Null pointer, generic pointer, double pointers, passing pointer to function: call by address, Accessing structure using pointer, self-referential structure, Dynamic memory allocation

File Handling: I/O streams, File operations, file modes, Sequential/Random accessing files, command line arguments.

Text Book:

1. B.A. Forouzan and R. F. Gieverg, "A structured Programming Approach in C" language learning 2013.

Reference Books:

1. Paul Deitel & Harvey Deitel, *"C How to program"* 7th edition,PHI
2. A.K. Sharma,, *"Computer Fundamentals and Programming in C"* - Universities Press,2nd edition,2018
3. E. Balagurusamy, *"Programming in ANSI C"* -, TMH, 2008
4. Byron Gottfried - "*Theory and practice of Programming with C",* Schaum's Outline McGrawHill,1990
5. Pradip Dey, Manas Ghosh, *"Programming in C"*- Oxford University Press, 2nd edition
6. Brian W Kernighan and Dennis M Ritchie, *"The C programming Language",* Prentice Hall of India,1988