

FACULTY OF ENGINEERING
Scheme of Instruction & Examination
&
Syllabi

B.E. I Semesters of
Four Year Degree Programme in
Civil Engineering
Electronics and Communication Engineering
Electrical and Electronics Engineering
(Group-B)

(With effect from the Academic Year 2018 – 2019)
(As approved in the Faculty Meeting held on 26th June 2018)



Dean, Faculty of Engineering
Osmania University, Hyderabad
2018

SCHEME OF INSTRUCTION & EXAMINATION
B.E. I-Semester

S. No.	Course Code	Course Title	Scheme of Instructions				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	Duration in Hours	
Theory Course										
1	BS101MT	Mathematics-I	3	1	-	4	30	70	3	4
2	BS104CH	Chemistry	3	1	-	4	30	70	3	4
3	ES102CS	Programming for Problem Solving	3	-	-	3	30	70	3	3
Practical /Laboratory Course										
4	BS154CH	Chemistry Lab	-	-	3	3	25	50	3	1.5
5	ES152CS	Programming for Problem Solving Lab	-	-	4	4	25	50	3	2
6	ES154ME	Workshop/Manufacturing Process Lab	1	-	4	5	50	50	3	3
Total			10	02	09	23	190	360		17.5

BS:Basic Science**ES:**Engineering Science**L:**Lecture**T:**Tutorial**P:**Practical**D:**Drawing**CIE:**Continuous Internal Evaluation**SEE:**Semester End Examination (Univ. Exam)**Note:** Each contact hour is a Clock Hour.

CourseCode	CourseTitle					Core/Elective	
BS101MT	Mathematics-I (Common to All Branches)					Core	
Prerequisite	ContactHoursperWeek				CIE	SEE	Credits
	L	T	D	P			
-	3	1	-	-	30	70	4
CourseObjectives <ul style="list-style-type: none"> ➤ To introduce the concepts of sequences, series and their properties ➤ To introduce the concepts of functions of several variables and multiple integrals ➤ To study vector differential and integral calculus CourseOutcomes The students will be able to <ul style="list-style-type: none"> ➤ find the nature of sequences and series ➤ evaluate multiple integrals ➤ apply this knowledge to solve the curriculum problems 							

Unit-I

Sequences and Series: Sequences, Series, General properties of series, Series of positive terms, Comparison tests, tests of Convergence D' Alembert's ratio test, Cauchy's n^{th} root test, Raabe's test, Logarithmic test, Alternating series, Series of positive and negative terms, Absolute convergence and Conditional convergence.

Unit-II:

Calculus of one variable: Rolle's theorem, Lagrange's, Cauchy's mean value theorems, Taylor's series, Curvature, Radius of curvature, Circle of curvature, Envelope of a family of curves, Evolutes and Involutives.

Unit-III

Multivariable Calculus (Differentiation): Functions of two variables, Limits and continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions (Chain rule), Change of variables, Jacobian, Higher order partial derivatives, Taylor's series of functions of two variables, Maximum and minimum values of functions of two variables, Lagrange's method of undetermined multipliers.

Unit-IV

Multivariable Calculus (Integration): Double integrals, Change of order of integration, Change of Variables from Cartesian to plane polar coordinates, Triple integrals.

Unit-V

Vector Calculus: Scalar and vector fields, Gradient of a scalar field, Directional derivative, Divergence and Curl of a vector field, Line, Surface and Volume integrals, Green's theorem in a plane, Gauss's divergence theorem, Stoke's theorem (with proofs) and their verification.

Suggested Readings:

1. R.K. Jain & S.R. Kiyengar, *Advanced Engineering Mathematics*, Narosa Publications, 2014.
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, John Wiley, 9th Edition, 2012.
3. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publications, 43rd Edition, 2014.
4. G.B. Thomas, Maurice Weir and Joel Hass, *Thomas' Calculus*, Peterson, 12th Edition, 2010.
5. B.V. Ramana, *Higher Engineering Mathematics*, 23rd reprint, 2015.

Course Code	Course Title					Core/ Elective	
BS104CH	Chemistry (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	1	-	-	30	70	4
<p>Course Objectives</p> <ul style="list-style-type: none"> ➤ Correlate the properties of materials with their internal structure and use the for Engineering applications ➤ Apply the principles of electrochemistry in storage of electrical energy in batteries. ➤ Gains knowledge in causes of corrosion and its prevention. ➤ Attains knowledge about the disadvantages of hard water for domestic and industrial purposes. Also learns the techniques of softening of hard water and treatment of water for drinking purpose. ➤ Exposed to qualitative and quantitative parameters of chemical fuels. ➤ Aware eco-friendly materials and processes. <p>Course Outcomes</p> <p>On successful completion of this course, students will be able to:</p> <ul style="list-style-type: none"> ➤ Apply concept of electrode potential in identifying feasibility of electrochemical reaction; illustrate electro analytical techniques and working of batteries. ➤ Identify the mechanism of corrosion of materials on basis of electrochemical approach and devise corrosion control methods. ➤ Estimate the physical & chemical parameters of quality of water and explain the process of water treatment. ➤ Explain the influence of chemical structure on properties of materials and their choice in engineering applications. ➤ Classify chemical fuels and grade them through qualitative analysis. ➤ Relate the concept of green chemistry to modify engineering processes and materials. 							

UNIT-I

Electrochemistry and Battery Chemistry: Electrochemistry: Electrochemical cells, Electrolytic and Galvanic cells - notation, cell reaction and cell potentials. Types of electrodes, Calomel, Quinhydrone and Glass electrodes. Determination of pH of a solution by using Quinhydrone electrode. Thermodynamics of emf of cells, Nernst equation and its derivation. Applications of Nernst equation to electrode potential and emf of cells. Numerical problems. **Batteries: Primary batteries:** Zn-Carbon battery. **Secondary batteries:** Pb-Acid battery and Li-Ion battery, Applications. **Flow batteries (Fuel cells):** Methanol-Oxygen fuel cells, Construction, Applications.

UNIT-II

Water Chemistry and Corrosion: Water Chemistry: Hardness of water-Types and units of hardness, estimation of temporary and permanent hardness of water by EDTA method. Alkalinity of water and its determination. Water softening by Ion exchange and Reverse Osmosis methods. Numerical problems. Specifications of potable water. Sterilization by Chlorination. Break Point Chlorination.

Corrosion: Causes and its effects. Types of corrosion – Dry or Chemical corrosion and Wet or Electrochemical corrosion and their mechanism. Electrochemical corrosion –Waterline and Pitting Corrosion. Factors influencing rate of corrosion.

Corrosion control methods: Cathodic protection methods- Sacrificial anodic and impressed current methods. Surface coating methods: Hotdipping - Galvanizing.

UNIT-III

Engineering Materials: Polymers: Basics of terms polymers: Monomer and its functionality, Polymers and degree of polymerization. Classification of polymers – Thermoplastics &Thermosetting resins. Types of Polymerization (i) Addition (ii) Condensation (iii) Co-Polymerization. Mechanism of free radical polymerization Preparation, Properties &Uses of the following polymers: Plastics –PVC and Bakelite, Fibres -Nylon6:6, and Kevlar, Elastomers –Buna - S, Butyl and Silicone Rubbers.

Conducting polymers: Introduction, Classification and Mechanism of conduction in Polyacetylene, Applications of conducting polymers.

Biodegradable polymers: Introduction preparation, properties and applications of polylacticacid

UNIT-IV

Chemical Fuels: Classification of fuels: Introduction, definition and classification of chemical fuels –Primary and secondary fuels. Solid, liquid and gaseous fuels. Requirements of a good fuel. Calorific Value –HCV and LCV. Theoretical calculations of calorific value by Dulong's formula – Numerical problems.

Solid Fuels: Coal and its Ranking. Analysis of coal- Proximate and Ultimate analysis.

Liquid Fuels: Fractionation of Petroleum. Composition and uses of Gasoline, Diesel and Kerosene. Cracking &its Significance – Catalytic cracking by moving bed method, Knocking. Fuel rating – Octane and Cetane numbers.

Gaseous Fuels: LPG, CNG – Composition and Uses.

Combustion: Ignition temperature of a fuel, calculation of air quantities by weight and volume required for combustion of a fuel- Numerical problems.

UNIT-V

Green Chemistry and Composites: Green Chemistry: Concept, Principles of green chemistry – Atom Economy, Catalysis and examples of clean technology.

Biodiesel: Sources, Concept of Trans-esterification and carbon neutrality. Properties and significance

Composites: Introduction to composites, composition and characteristic properties of composites. Classification of composites based on matrix, reinforcement and ply. Applications of composites.

Suggested Readings:

1. Principles of Physical Chemistry by Puri, Sharma and Pathania S.N. Chand &Co. New Delhi (Latest edition).
2. Engineering Chemistry by PC Jain and M Jain Dhanpat Rai &Sons (15thEdn), NewDelhi.
3. Chemistry in Engineering and Technology by JC Kuriacose and J Rajaram, TMH, NewDelhi.
4. Engineering Chemistry by O G Palanna, TMH, and New Delhi.
5. Engineering Chemistry by S S Dara, S Chand &Sons, New Delhi.
6. Engineering Chemistry by Sashi Chawla. Dhanpat Rai &Sons, New Delhi.
7. Engineering Chemistry by Shikha Agrawal, Cambridge, NewDelhi.
8. Engineering Chemistry by Prasanta Rath, Cengage Learning India Pvt. Ltd.

Course Code	Course Title					Core/ Elective	
ES102CS	Programming for Problem Solving (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	-	-	-	30	70	3
<p>Course Objectives</p> <ul style="list-style-type: none"> ➤ To introduce the basic concepts of Computing environment, number systems and flow charts ➤ To familiarize the basic constructs of C language– data types, operators and expressions ➤ To understand modular and structured programming constructs in C ➤ To learn the usage of structured data types and memory management using pointers ➤ To learn the concepts of data handling using pointers <p>Course Outcomes <i>The students will be able to</i></p> <ul style="list-style-type: none"> ➤ Formulate simple algorithms for arithmetic and logical problems. ➤ Translate the algorithms to programs (inc language). ➤ Test and execute the programs and correct syntax and logical errors. ➤ Implement conditional branching, iteration and recursion. ➤ Decompose a problem into functions and synthesize a complete program using divide and conquer approach. ➤ Use arrays, pointers and structures to formulate algorithms and programs. ➤ Apply programming to solve matrix addition and multiplication problems and searching and sorting problems. ➤ Apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration. 							

Unit-I

Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.).

Idea of Algorithm: steps to solve logical and numerical problems.

Representation of Algorithm: Flow chart/Pseudo code with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Unit-II

Control Structures: Arithmetic expressions and precedence, Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching.

Arrays: Arrays (1-D,2-D), Character arrays and Strings

Unit-III

Basic Algorithms: Searching, Basic Sorting Algorithms (Bubble and Selection), Finding roots of Equations. **Functions:** Functions (including using built in libraries), Parameter passing in functions, call by value. **Passing arrays to functions:** idea of call by reference

Unit-IV

Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series. **Structure:** Structures, Defining structures and Array of Structures

Unit-V

Pointers –Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation), **Introduction to File Handling.**

Suggested Readings:

1. Byron Gottfried, Schaum's Outline of Programming with C, Mc Graw-Hill
2. A.K. Sharma, Computer Fundamentals and Programming in C, Universities Press, 2nd Edition, 2018.
3. E. Balaguruswamy, Programming in ANSI C, Tata Mc Graw-Hill
4. Brian W.Kernighan and Dennis M. Ritchie, the C Programming Language, Prentice Hall of India

Course Code	Course Title					Core/ Elective	
BS154CH	Chemistry Lab (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	3	25	50	1.5
<p>Course Objectives</p> <ul style="list-style-type: none"> ➤ Conduct experiments, take measurements and analyze the data through hands-on experience in order to demonstrate understanding of the theoretical concepts of quantitative Analysis while working in small group. ➤ Interpret the electro analytical principles with experimental results graphically ➤ Demonstrate writing skills through clear laboratory reports <p>Course Outcomes</p> <p>On successful completion of this course, students will be able to:</p> <ul style="list-style-type: none"> ➤ Apply the principles of Colorimetry and Electrochemistry in quantitative estimations. ➤ Estimate the rate constants of reactions from concentration of reactants /products as a function of time. ➤ Synthesize small drug molecules. 							

List of Experiments:

1. Introduction to Chemical Analysis.
2. Techniques of Weighing.

Volumetric Analysis:

3. Preparation of Standard Mohr's salt solution, Standardization of KMnO_4 and estimation of ferrous ion.
4. Estimation Iron(II) by Dichromatometry

Water Analysis:

5. Preparation of Standard Magnesium sulphate solution, standardization of EDTA and Estimation of Total Hardness.
6. Preparation of Standard Sodium Carbonate Solution, Standardization of HCl and Estimation of Carbonate and Bicarbonate Alkalinity.

Conductometry:

7. Estimation of HCl
8. Estimation of CH_3COOH and mixture of acids

Potentiometry

9. Estimation of HCl
10. Estimation of Iron

pH Metry:

11. Estimation of HCl

Colorimetry:

14. Verification of Beer-Lambert's law and estimation of Manganese.

Chemical Kinetics:

15. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate.

Drug Synthesis

16. Preparation of Aspirin

Note: Minimum ten experiments should be conducted in the semester

Suggested Readings:

1. Senior Practical Physical Chemistry, B.D. Khosla, A.Gulati and V.Garg (R. Chand &Co., Delhi)
2. An Introduction to Practical Chemistry, K.K. Sharma and D.S.Sharma (Vikas publishing, N.Delhi)

Course Code	Course Title					Core/ Elective	
ES152CS	Programming for Problem Solving Lab (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	4	25	50	2
<p>Course Objectives</p> <ul style="list-style-type: none"> ➤ Understand the fundamentals of programming in C Language. ➤ Write, compile and debug programs in C. ➤ Formulate solution to problems and implement in C. ➤ Effectively choose programming components to solve computing problems <p>Course Outcomes <i>The students will be able to</i></p> <ul style="list-style-type: none"> ➤ Choose appropriate data type for implementing programs in C language. ➤ Design and implement modular programs involving input output operations, decision making and looping constructs. ➤ Implement search and sort operations on arrays. ➤ Apply the concept of pointers for implementing programs on dynamic memory management and string handling. ➤ Design and implement programs to store data in structures and files. 							

Programming Exercise:

1. Finding maximum and minimum of given set of numbers, finding roots of quadratic equation.
2. Sin x and Cos x values using series expansion.
3. Conversion of binary to decimal, octal, hexadecimal and viceversa.
4. Generating Pascal triangle, pyramid of numbers.
5. Recursion: factorial, Fibonacci, GCD.
6. Matrix addition and multiplication using arrays, linear search and binary search using recursive and non-recursive procedures.
7. Bubble sort and selection sort.
8. Programs on pointers: pointer to arrays, pointer to functions.
9. Functions for string manipulations.
10. Programs on structures and unions.
11. Finding the number of characters, words and lines of given text file.
12. File handling programs

Suggested Readings:

1. Byron Gottfried, Schaum's Outline of Programming with C, Mc Graw-Hill
2. A.K. Sharma, Computer Fundamentals and Programming in C, Universities Press, 2018.
3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
4. Brian W. Kernighan and Dennis M. Ritchie, the C Programming Language, Prentice Hall of India.

Course Code	Course Title					Core/ Elective	
ES154ME	Workshop/Manufacturing Process (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	1	-	-	4	50	50	3
<p>Course Objectives</p> <ul style="list-style-type: none"> ➤ Identify _____ and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances. ➤ To provide hands on experience about use of different engineering materials, tools, equipments and processes these are common in the engineering field. ➤ To gain a good basic working knowledge required for the production of various engineering products. ➤ To study different hand operated power tools, uses and their demonstration. ➤ Adopt safety practices while working with various tools <p>Course Outcomes <i>The students will be able to</i></p> <ul style="list-style-type: none"> ➤ Demonstrate an understanding of and comply with workshop safety regulations. ➤ Identify and apply suitable tools for different _____ trades of _____ Engineering processes including drilling, material removing, measuring, chiseling. ➤ Study and practice on machine tools and their operations ➤ Undertake _____ jobs connected with Engineering Workshop trades including fitting, carpentry, sheet metal, house wiring, welding, smithy and foundry. ➤ Apply basic electrical engineering knowledge for house wiring practice 							

A. TRADE FOR EXERCISES:

1. Carpentry
2. Fitting
3. House wiring
4. Sheet metal working
5. Smithy
6. Welding
7. Plumbing

B. TRADES FOR DEMONSTRATION AND EXPOSURE:

1. Machining (Lathe & Drilling)
2. Injection molding
3. Mould making and casting
4. Basic Electronics lab instruments

C. PRESENTATIONS AND VIDEO LECTURES

1. Manufacturing Methods
2. Rapid Prototyping
3. Glass Cutting
4. 3D printing
5. CNCLATHE

D. IT WORKSHOP: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, operating system installation.**Suggested Reading:**

1. Venugopal, K, "Workshop manual", Anuradha Publications, Kumbakonam, TN, 2012
2. K.C. John, "Mechanical Workshop" 2nd Edn., PHI, 2010.
3. Hajra Choudary, "Elements of Workshop Technology" Vol.1, Asian Publishers, Edn., 1993.
4. G.S. Sawhney, "Mechanical Experiments and Workshop Practice", I.K. International Publishing House, New Delhi, 2009.

Note: At least two exercises from each trade.