Subject Code : BTAS-17101

Subject Name : Engineering Mathematics

Programme : B.Tech	**L :** 3, **T :** 2 , **P :** 0
Branch : All Branches	**Teaching hrs :** = 40 hr
Semester : 1/2	**Credits :** 4
Theory / Practical : Theory	**Percentage of Numericals /DesignProblems:** 90 %
Int.Max.Marks : 40	**Duration of End Semester Exam (ESE) :** 3 hr

Prerequisites: Trigonometric formulas , methods of differentation , methods of integration , solution to first order ordinary differential equation- variable separable method to Homogeneous first order ordinary differential equations.

Co-requisites : Knowledge of making computer algorithms in C for curve tracing, and maxima- minima problems.

Additional Material Allowed in ESE : (i) Scientific Calculator (ii) Log Table

On Completion of the course , the student will have the ability to :

CO #	Course Outcome
CO1	Apply the standard calculus computations on parametric and polar curves
CO2	Understand the use of Taylor's and Maclaurin's series of one and two variables, the concepts of function of two or three variables.
CO3	Use the concept of multiple integration to find area &volumes.
CO4	Demonstrate an understanding towards the nature of curves by tracing the same using certain properties.
CO5	Apply concept of rank to solve system of linear equations and eigenvalues/eigenvectors to diagonalize the matrices.

BTAS-17101

PART-I

UNIT1: PARTIAL DERIVATIVES AND ITS APPLICATIONS: [9 hours]

Function of two or more variables, Partial differentiation, Homogeneous functions and Euler's theorem, Composite functions Total derivative, Derivative of an implicit function, Definition of Jacobian. Tangent and normal to a surface, Taylor's and Maclaurin's series for a function of two variables (without proofs), Errors and approximation,maxima and minima, Lagrange's method of multipliers.

UNIT 2: CURVE TRACING: [8 hours]

Increasing/decreasing, Maxima/minima, points of inflection, asymptotes, double points, cusp, nodes etc Tracing of Standard Cartesian, Parametric and Polar curve. Curvature of Cartesian curves.

UNIT 3: MUPLIPLE INTEGRALS: [6 hours]

Double and triple integral and their evaluation, change of order of integration, change of variable, Application of double and triple integration to find areas and volumes.

PART-II

UNIT 4: VECTOR CALCULAS: [10 hours]

Scalar and vector fields, differentiation of vectors, velocity and acceleration. Vector differential operators: Del, Gradient, Divergence and Curl, their physical interpretations. Formulae involving Del applied to point functions and their products. Line, surface and volume integrals. Application of Vector Calculus: Flux, Solenoidal and Irrotational vectors. Gauss Divergence theorem (without proof), Green's theorem in plane (without proof), Stoke's theorem (without proof) and their applications.

UNIT 5. LINEAR ALGEBRA: [7 hours]

Rank of a matrix, Elementary transformations, Linear independence and dependence of vectors, reduction to normal form, Consistency and solution of linear algebraic equations, Eigen values, Eigen vectors, Cayley-Hamilton Theorem, Reduction to diagonal form.

Text Books

1. Sandhu G.S., Pathania D.S., Aujla J.S., Pragya, Engineering Mathematics-I, First world Publications.
2. Jain, R.K and Lyengar, S.R.K., Advanced Engineering Mathematics, Narosa Publishing Company. · Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi.

Reference Books

1. Thomes, G.B, Finney, R.L. Calculus and Analytic Gemetry, Ninth Edition, Peason Education.
2. Kreyszig, E., Advanced Engineering Mathematics, Eighth edition, John wiley.
3. Peter. V. O‟ Nil, Advanced Engineering Mathematics, Wordsworth Publishing Company.
4. Taneja, H.C., Engineering Mathematics, Volume-I & Volume-II, I.K. Publisher.
5. Babu Ram, Advance engineering Mathematics, Pearson Education.
6. Bindra,. J.S., Applied Mathematics, Volume-I, Kataria Publications.

E books and online learning materials

(1) Advanced Engineering Mathematics, Alan Jeffrey, Academic Press, 19 June 2001. https://books.google.co.in/books/about/Advanced_Engineering_Mathematics.html?id=9nFDvk9yr3kC [Accessed on: Nov, 2, 2017]
(2) Engineering Mathematics, K. A. Stroud, Dexter J. Booth, Industrial Press, 2001. https://books.google.co.in/books/about/Engineering_Mathematics.html?id=FZncL-xB8dEC [Accessed on: Nov, 2, 2017]
(3) htttp://ocw.mit.edu/courses/mathematics/

Online Courses and Video Lectures:

(1) https://www.youtube.com/results?search_query=online+engineering+mathematics+teaching
(2) https://onlinecourses.nptel.ac.in/explorer/search?category=all

Subject Code : BTAS-17105

Subject Name : Engineering Chemistry

Programme : B.Tech	**L :** 3, **T :** 1 , **P :** 0
Branch : All Branches	**Teaching hrs :** 40 hr
Semester : 1/2	**Credits :** 3.5
Theory / Practical : Theory	**Percentage of Numericals /DesignProblems: 30** %
Int.Max.Marks : 40	**Duration of End Semester Exam (ESE) :** 3 hr
Ext.Max. Marks: 60	**Elective status:** Compulsory
Total Marks: 100	

Prerequisites: Chemical formulas, periodic table, metal and non metals, terms related to concentration, oxidation, reduction concept, different types of chemical reactions, normality equation, thermodynamics , equilibrium, colligative properties.
Co-requisites : Knowledge of applying different concepts of physical chemistry in present context.

Additional Material Allowed in ESE : (i) Scientific Calculator (ii) Log Table

On Completion of the course , the student will have the ability to :

CO #	Course Outcome
CO1	Identify the structure of unknown compounds and select a polymer according to the requirement.
CO2	Explain disadvantages of hard water and different softening and purification techniques.
CO3	Explore the use of different types of fuels according to the requirement.
CO4	Interpret the phase diagram and use it in concepts of metallurgy.
CO5	Protect machines / metallic parts from corrosion by using preventive measures and controlling different factors.
CO6	Understand the concept of design and working of different types of cell.

Scheme Code:2017

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PART-I

UNIT1: Molecular Spectroscopy : [6 hours]

Introduction, Beer- Lambert Law, UV/Visible Spectroscopy : Introduction, Instrumentation, Principle/Electronic transition, Chromophore, Factors causing absorption and intensities shift, Frank-Condon Principle and Applications**,** IR Spectroscopy :Introduction, Instrumentation, Principle, Hooke's law, selection rule, Fundamental modes of vibrations and types, Factors affecting vibrational frequency and Applications.

UNIT 2: Fuels : [5 hours]

Introduction, Classification of fuels, Comparison of solid , liquid and gaseous fuels, Characteristics of a good fuel, Calorific value, Theoretical determination of calorific value, Ultimate and Proximate Analysis, Petrol and diesel engines, Compression ratio, Knocking in both type of engines, Octane number, Leaded petrol, Cetane number, Alternative fuels(method of preparation and applications): Biodiesel, Power alcohol and Synthetic petrol.

UNIT 3: Water and its treatment: [6 hours]

Introduction, Hardness and Alkalinity of water, units and determination, Analysis and water quality parameters, Softening of water by lime-soda method, Ion-exchange method and Zeolite method, Boiler feed water: Specifications, Scale and sludge formation, Priming, foaming and Boiler corrosion ,Different methods for water purification and Desalination of Brackish water.

UNIT 4: Phase Rule: [5 hours]

Introduction, Phase, Component, Degree of freedom, Gibbs phase rule, phase diagrams of one component system – water system, Reduced phase rule, two component system – Lead-silver, Potassium iodide-water system and Colligative properties

PART-II

UNIT 5: Electrochemistry I : [5 hours]

Introduction,Electrolytes and electrolysis, Specific, molar and equivalent conductivity of electrolytic solutions, Migration of ions , Kohlrausch's Law, Transport number; definition and determination by Hittorf's method and moving boundary method, Application of conductivity measurements, Conductometric titrations.

UNIT 6: Electrochemistry II : [5 hours]

Introduction, Electrochemical cell, Difference from electrolytic cell, Measurement of electrode potential, Different types of electrodes, Electrochemical Series , Nernst equation and its applications, Different type of cells : Voltaic cell and Concentration cells, Cell notation, Calculation of thermodynamic functions from cell emf, Electrodes and potentiometry.

UNIT 7: Corrosion and its Prevention : [4 hours]

Introduction ,Different types of corrosion- Wet and Dry corrosion, Mechanism of wet corrosion, Galvanic corrosion, Concentration cell corrosion, Differential aeration corrosion, Soil corrosion, Microbial corrosion, Water-line , Intergrannular and Stress corrosion, Galvanic series, Passivation, Factors affecting corrosion, Methods for corrosion prevention and control.

UNIT 8: Polymers : [4 hours]

Introduction, Classification of polymers according to: origin, nature of monomers and chain structure, their behaviour when heated, nature of polymerization, functionality and tacticity, Types of polymerization with their general mechanisms, Different examples of polymers with their industrial use, Molecular weight of polymers, Different types of average molecular weight: number, weight and viscosity av. molecular weight, PDI, Degree of polymerisation, Variation of polymer properties with molecular weight and degree of polymerisation, Conductive polymers, Biodegradable polymers and Inorganic polymers.

Text Books

1. Engineering Chemistry , A.P.K. Sodhi, 7th Ed., Modern Publishers,2016.
2. Engineering Chemistry, Ramesh, S. and Vairam S. 1stEd.Wiley India, 2012 .
3. Principles of Physical Chemistry, Puri, B.R., Sharma,L.R., and Pathania, M.S., Vishal Publishing Co. 2008.
4. Engineering Chemistry: Fundamentals and Applications, Aggarwal, S., Cambridge University Press, 2015.

Reference Books

1. Physical Chemistry , P.W. Atkins, 8th Ed., Oxford University Press, 2006 (Indian Print).
2. Physical Chemistry , T. Engel & P. Reid, 1st ed., Pearson Education, 2006.
3. Physical Chemistry ,Castellan, 3rd Ed., Addison Wisley/Narosa, 1985 (Indian Print)
4. Physical Chemistry , G. M. Barrow, 6th Ed., New York, McGraw Hill, 1996.
5. Physical Chemistry , R. J. Silbey, R. A. Albert & Moungi G. Bawendi, 4th Ed., New York: John Wiley, 2005.

E books and online learning materials

1. Chemistry for Engineering Students, H..Brown, Thompson. https://books.google.co.in/books?isbn=143904791X [Accessed on: Nov, 4, 2017]
2. Engineering Chemistry by B. Sivasankar , Tata McGraw-Hill Pub. Co. Ltd, 2008. https://books.google.co.in/books?isbn=007066932 [Accessed on: Nov, 4, 2017]
3. .https://www.studynama.com/.../450-Engineering-chemistry-pdf-ebook-lecture-notes-f...

Online Courses and Video Lectures:

1. https://www.youtube.com/results?search_query=video+lectures+on+engg+chemistry
2. https://www.youtube.com/results?search_query=electrochemistry+class+12+full+lectures
3. http://www.gurug.net Unit-1 Water Technology (Hardness,Types & Estimation by EDTA Method) - Chemistry.
4. https://www.youtube.com/watch?v=CWOJW4357Bg
5. https://www.youtube.com/watch?v=jRVg4ue-_lc

Subject Code: BTCS-17101
Subject Name: Fundamentals of Computer Programming and Information Technology

Programme: B.Tech	**L:** 3, **T**: 1, **P**: 0
Branch: All Branches	**Teaching hrs: =** 40 hrs
Semester: 1/2	**Credits:** 3.5
Theory/Practical: Theory	**Percentage of Numerical /Design Problems:** 40%
Int. Max Marks: 40	**Duration of End Semester Exam (ESE):** 3 hrs
Ext. Max. Marks: 60	**Elective Status:** Compulsory
Total Marks: 100	

Prerequisites: Basic knowledge of computer system.
Co-requisites: --

On Completion of the course, students will have the ability to:

CO#	Course Outcome
CO1	Identify and analyze the advantage, limitations, and applications of computer system.
CO2	Apply the knowledge of word processor, spreadsheet and presentation software for office applications.
CO3	Design and develop program framework using Program Design Tools like algorithms, flowchart and pseducode.
CO4	Apply the syntax of procedure oriented language for solving problems.
CO5	Make use of core concepts like arrays and strings, functions, structures and union and pointers for developing programs in procedure oriented language.
CO6	Understand the life-long learning concepts of programming language.

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PART-I

UNIT -1: INTRODUCTION TO COMPUTER SYSTEM [3 hours]

Introduction to computer hardware and software, Block diagram of a computer system and its working, Peripherals devices, Memories – RAM, ROM, cache, primary and secondary storage devices.

UNIT -2: COMPUTER SOFTWARE [4 hours]

Introduction to computer software, operating system, operating system types and functions, Introduction to different features of Word processors, Spread sheets and presentation software, Evolution of Internet, Applications and services of Internet.

UNIT -3: INTRODUCTION TO PROGRAMMING IN C [5 hours]

Program design tools – algorithms, flowcharts, pseudo code. Procedure oriented programming and its features. Introduction to C language, Structure of C program, Compiling and linking C program.

UNIT -4: DATA TYPES AND I/O OPERATIONS [4 hours]

Character Set, Keywords, Identifiers, Constants, Variables, Data types, Type Modifiers, Reading and writing operations, Formatted and unformatted input and output.

UNIT -5: OPERATORS AND EXPRESSIONS [3 hours]

Introduction, Arithmetic operators, Relational operators, Logical operators, Increment and decrement operators, Conditional operators, Bitwise operators, Special operators. Precedence and associativity of operators.

PART-II

UNIT -6: CONTROLSTATEMENTS [5 hours]

Decision making statements – *if*, *if else*, Nested *if else*, *if else* ladder, *switch*. Looping statements – *while*, *do while*, *for*. Branching statements – *goto*, *break* and *continue*.

UNIT -7: ARRAYS AND STRINGS [5 hours]

Introduction to arrays, Types of arrays, Declaration and initialization of one dimensional and two dimensional arrays, Introduction to strings, Declaring and initializing string variables, Reading and writing strings from terminal, String handling functions.

UNIT -8: FUNCTIONS [3 hours]

Introduction to functions and its types, Elements of user defined function – function declaration, functions definition, function calling. Call by value, Call by reference, Returning value from function, Recursion, Storage classes.

BTCS-17101

UNIT -9: STRUCTURES AND UNION **[3 hours]**

Defining a structure, Declaring structure variables, Accessing structure members, Structure initialization, Operations on individual members, Unions.

UNIT -10: POINTERS **[5 hours]**

Understanding Pointers, Accessing address of a variable, Declaring pointer variables, Initialization of pointer variables, Accessing variable through pointer.

Text Books

(1) Programming in ANSI C, E. Balagurusamy, Tata McGraw Hill.
(2) C Programming Language, Brain W. Kernighan and Dennis M.Ritchie, Prentice Hall.
(3) Spirit of C, Henry Mullish and Herbert L. Cooper, Jaico Publishing House.

Reference Books

(1) Programming with C, Byron S. Gottfried, Tata McGraw Hill.
(2) Let us C, Y.P. Kanetkar, BPB Publications.
(3) Computer Programming in C, V. Rajaraman, Prentice Hall India.

E books and online materials

(1) C programming tutorial mark burgess
http://markburgess.org/CTutorial/C-Tut-4.02.pdf

Online Course and Video Lectures

(1) https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010/
(2) http://nptel.ac.in/courses/106105085/4

Engineering Drawing BTME-17101

L	T	P	Internal	External
1	4	0	40	60

Course Outcome:
At the end of the course, the student shall be able to

1. Grasp and understand various terms required in engineering drawing
2. Conceptualize, and deliver the fundamentals of engineering drawing for given application.
3. Apply rules and conventions as per International Standards for engineering drawing.
4. Learn and apply orthographic as well as Isometric projections as per engineering requirement.
5. Integrate ideas for offering efficient and effective solutions to the engineering problems.
6. Interpret the drawing in terms of engineering requirement

PART A

1. Introduction: Engineering Drawing/Technical Lettering, Visual Science, Drawing equipment and use of instruments, Conventional representation of lines as per IS Standards SP46:1988, Principles of Dimensioning.

2. Theory of Projections: Type of projections: Perspective, Orthographic and their basic principles, System of orthographic projection: in reference to quadrants and octants, illustration through simple problems of projection, Projection of points in quadrants and octants.

3. Projection of Lines: Concept of Line, True Length, True angle of inclination with HP, True angle of inclination with VP, Horizontal Trace, Vertical Trace, Line is parallel to both HP and VP, Line is contained by profile plane, Line is parallel to one plane and inclined to other plane, and inclined to both HP and VP by Rotation and Trapezoid methods only, Illustration through examples.

4. Projection of Planes: Difference between plane and lamina, Illustration through examples for Lamina is parallel to one and perpendicular to other, Lamina is perpendicular to one and inclined to other, Lamina is inclined to both reference planes.

PART B

5. Projection of Solids: Definition of solids, types of solids, and elements of solids, Projection of solids with its axis parallel to one and perpendicular to other, axis is parallel to one and inclined to other, axis is parallel to both HP and VP; axis is inclined to both HP and VP.

6. Section of Solids: Definition of Sectioning and its purpose, Types of sectional planes, Illustration through examples.

7. Development of Surfaces: Purpose of development, Parallel line and radial line Methods only, Illustration through examples.

8. Isometric Projections: Axonometric and their basic Principles, Isometric projection, Difference between isometric projection and isometric drawing, Isometric projection of solids such as cube, prism, pyramid and cylinder etc.

BTME-17101

Suggested Readings / Books

1. Agrawal B and Agrawal C M, "Engineering Graphics", Tata McGraw Hill Publishing Company Limited, 1st Edition, 2008, New Delhi.

2. Gill P S, "Engineering Graphics and Drafting", S.K. Kataria and Sons, 1st Edition, 2000, New Delhi.

3. Bhatt N D amd Panchal V M, "Elementary Engineering Drawing-Plane and Solid Geometry", Charotar Publishing House, 37nd Edition, 1996, Anand.

4. Parthasarathy N S and Murali V, "Engineering Drawing", Oxford University Press, 1st Edition, 2016, New Delhi.

5. Bertoline G R , Wiebe E N, Miler G L L & Mother J L, "Technical Graphics Communication", Irwin McGraw Hill, 6th Edition, 2010, New York.

BTME-17102 Elements of Mechanical Engineering

L	T	P
3	1	0

Course Outcome:
After studying this course the students shall be able to:
1. Understand fundamental principles of thermodynamics, processes, their properties and engineering applications.
2. Identify, formulate and solve mathematical problems/equations related to various laws of thermodynamics.
3. Explain application and solve mathematical problems related to Gas Power Cycles.
4. Describe the working and applications of IC engines.
5. Understand engineering materials, their selection and properties.
6. Suggest engineering materials for various applications

PART-A

1. Basic Concepts of Thermodynamics (08)

Definition of thermodynamic: Need to study thermodynamics; Application areas of thermodynamic; Difference between Microscopic (Statistical) thermodynamics and Macroscopic (Classical) thermodynamics; Brief concept of continuum; **Thermodynamic System** : definition, types (Open, Closed and Isolated) and their examples; **Thermodynamic System Boundary** : definition, types and their examples; **Surroundings**; Control(fixed) mass and Control Volume concept and their example ; Thermodynamic State; **Thermodynamic Property**: definition, types citing their examples; condition for any quantity to be a property; State postulate; Thermodynamic equilibrium (which includes Thermal, Mechanical and Chemical equilibrium etc.); Thermodynamic path; **Thermodynamic process:** definition, **concept of reversible process**, quasi-static (or, quasi-equilibrium) process, irreversible process, conditions for reversibility and how these are met with, non-flow processes and flow processes, method of representation of reversible and irreversible process on property diagrams; Cyclic process; **Thermodynamic Cycle:** definition and its concept; Energy and its forms (microscopic and macroscopic); Physical insight to internal energy; Energy transfer across system boundary i.e. transient energies (heat and work); Difference between heat and work; Sign conventions for heat and work interactions; heat and work as path functions; Equality of Temperature and Zeroth law of Thermodynamics.

2. First Law of Thermodynamics and its applications (10)

Definition, essence and corollaries or consequences of first law of Thermodynamics; Expressions for First law of Thermodynamics for a control mass undergoing a Cycle and for process (i.e., a change in state of a control mass) ; Concept of Enthalpy and total energy and differentiation between the two – a thermodynamic property; Compressible and incompressible substances, Specific heats, Difference between Internal Energy and Enthalpy of compressible and incompressible substances; Representation of first law of thermodynamics as rate equation; Analysis of non-flow/ flow process for a control mass undergoing constant volume, constant pressure, constant temperature, adiabatic and polytropic processes; Free Expansion Process and its examples, its representation on Property diagram; Review of concepts of control volume; Expressions of first law of thermodynamics for a control volume (i.e. open system) ; Steady State Steady Flow process and its examples; First law analysis of Steady State Flow process e.g. isochoric, isobaric, isothermal, isentropic and polytropic process; Throttling process and its applications; Flow energy or inertial energy of flowing fluids or, Energy transport by mass; Application of Steady State Flow Energy Equation to various engineering devices.

3. Second Law of Thermodynamics (12)

Limitations of first law of thermodynamics; and how 2nd law is fully able to explain away and thus overcome those shortcomings of Ist law; Thermal Reservoirs, source and sink (Low temperature and high

temperatures); **Heat Engine, Heat Pump and Refrigerator**: definitions, working, efficiency/performance and their real life examples. Justification as to why the actual efficiency of Heat Pump and Refrigerator shall

BTME-17102

also be ≤ 100% though on the face of it seems to be more than 100%; Various statements of Second Law of Thermodynamics and their equivalence; Philosophy of Carnot cycle and its consequences viz. how each of the individual four processes constituting the cycle contribute in optimizing the output and efficiency of the cycle; **Carnot Engine, Carnot Refrigerator and Carnot Heat Pump:** definitions, working, efficiency/performance and Limitations of the cycle; Carnot theorem for heat engines, refrigerators and heat pumps; derivation of Carnot efficiency/COP (which seems to be more than 100%); Thermodynamic Temperature Scale; Clausius theorem and Inequality; Philosophy and concept of entropy; Entropy changes during various processes; Temperature - Entropy Chart and representation of various processes on it; Principle of Increase of Entropy; Applications of Entropy Principle; Quality of Energy viz. high and low grade energies; Degradation of Energy; Third Law of Thermodynamics.

PART-B

4. Gas Power Cycles (08)

Introduction; Concept and philosophy of Air Standard Cycle along with associated assumptions and advantages; Air Standard Efficiency; Nomenclature of reciprocating piston-cylinder arrangement with basic definitions such as swept volume, clearance volume, compression ratio, mean effective pressure etc; Otto Cycle (or constant volume heat addition cycle), Diesel cycle (or constant pressure heat addition cycle) and Dual cycle (Mixed or Composite or Limited Pressure cycle) with their representation on P-V and T-S charts, their Air-standard (thermal) Efficiencies, Comparison of Otto, Diesel and Dual cycle under some defined similar parametric conditions.

5. IC Engines (04)

Introduction to heat engines; Merits of I.C. Engines and their important applications, Classification and constructional features of I.C. Engines; working of two stroke and four stroke Petrol and Diesel engines and their comparison.

6. Engineering Materials (05)

Materials and Civilization, Materials and Engineering, Classification of Engineering Materials, Mechanical Properties of Materials: elasticity, plasticity, strength, ductility, brittleness, melleability, toughness, resilience, hardness, machinability, formability, weldability. Properties, Composition, and Industrial Applications of materials: metals (ferrous- cast iron, tool-steels, stainless steels and non ferrous- Aluminum, brass, bronze), polymers (natural and synthetic , thermoplastic and thermosetting), ceramics (glass, optical fibre glass, cements), composites (fibre reinforced, metal matrix), smart materials (piezoelectric, shape memory, thermochromic, photochromic, magnetorheological), Conductors, Semiconductors and insulators, Organic and Inorganic materials. Selection of materials for engineering applications.

Suggested Readings / Books

1. Nag P.K. “Engineering Thermodynamics”, Tata McGraw Hill.
2. Yadav R., “Thermodynamics and Heat Engines”, Central Publishing House, Allahabad.
3. Rogers G and Mayhew Y, “Engineering Thermodynamics”, Pearson Education.
4. Rao Y.V.C, “An Introduction to Thermodynamics”, New Age International (P) Limited Publishers.
5. Khanna O.P, “Material Science and Metallurgy”, Dhanpat Rai Publications.

Scheme Code: 2017

Subject Code : BTAS-17108

Subject Name : Engineering Chemistry Laboratory

Programme : B.Tech	**L :** 0, **T :** 0 , **P :** 2
Branch : All Branches	**Teaching hrs :** 20 hr
Semester : 1/2	**Credits :** 1
Theory / Practical : Theory	**Percentage of Numericals /DesignProblems: NA**
Int. Max. Marks : 30	**Duration of End Semester Exam (ESE) :** 1 hr
Ext. Max. Marks: 20	**Elective status:** Compulsory
Total Marks: 50	

Prerequisites: Knowledge of glass apparatus to be used in lab. for volumetric analysis, handling of chemicals in lab., knowledge of molecular weight, equivalent weight, concentration expressions and normality equation
Co-requisites : Knowledge of calibration of instruments
Additional Material Allowed in ESE : (i) Scientific Calculator (ii) Log Table

On Completion of the course , the student will have the ability to :

CO #	Course Outcome
CO1	Correlate the impurities with hardness, chloride content and alkalinity of water.
CO2	Be able to select a lubricant for particular type of a machine and analyse the importance of temperature for viscosity.
CO3	Study different characters of fuels and select a fuel according to requirement.
CO4	Be able to handle sophisticated instruments to interpret the results to calculate other parameters.
CO5	Understand the advantages of chromatography.
CO6	Know to maintain different reaction conditions to get maximum yield of the product, if possible by green chemistry approach.

BTAS-17108

Each student is required to perform two experiments from each of the 5 titles depending on his/her branch and aptitude.

Title1. Analysis of Effluents

S. No	Experiment Name	Reference Unit of Theory Subject
1	Determination of hardness of water by EDTA method	Unit III
2	Determination of chloride content in water	Unit III
3	Determination of alkalinity in water	Unit III
4	Determination of turbidity in water	Unit III

Title2. Analysis of Fuels and Lubricants

S. No	Experiment Name	Reference Unit of Theory Subject
1	Determination of absolute and relative viscosity	Unit II
2	Determination of acid value and aniline point of oil	Unit II
3	Determination of Flash and Fire Point	Unit II
4	Determination of moisture, volatile and Ash content by proximate analysis.	Unit II

Title3. Instrumental Analysis

S. No	Experiment Name	Reference Unit of Theory Subject
1	Determination of conc. of solution conductometrically	Unit V,VI
2	Determination of conc. of solution pH metrically	Unit V,VI
3	Determination of wavelength abs. and unknown conc. of solution.	Unit I
4	Determination of Surface Tension of a Liquid using Stalagmometer.	

Title 4. Synthesis and Green Chemistry Experiments

S. No	Experiment Name	Reference Unit of Theory Subject
1	Prepration of a polymer	Unit VIII
2	Prepration of aspirin	
3	Bas Catalysed aldol condensation	Unit VIII
4	Acetylation of primary amines using eco friendly method	

Title 5. Chromatography

S. No	Experiment Name	Reference Unit of Theory Subject
1	Seperation of ions by ion-exchange method.	Unit III
2	Separation of plant pigments by column chromatography	Unit III
3	Separation of metallic ions by paper chromatography method.	
4	Determination of Rf value of amino acids by TLC and identification of the amino acid present	Unit I

BTAS-17108

Text Books:

Practical Engineering Chemistry , K. Mukkanti, B.S. Publications, 2009

Reference Books:

1. Experiments in Applied Chemistry, Sunita Rattan, S. K. Kataria &Sons, 2002.
2. Vogel's Textbook of Quantitative Chemical Analysis, Mendham et.al.,Pearson Education Ltd.,2006.

E books and online learning materials:

1. Text Book of engineering chemistry , R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.,2009 https://www.bvrit.ac.in/...engineering_chemistry/Engineering%20Chemistry.pdf
2. www.vpkbiet.org/pdf/FE/Lab_Manual_Chem.pdf

Online Courses and Video Lectures

1. https://www.youtube.com/watch?v=O-MRC0dskHg
2. https://www.youtube.com/watch?v=vayqcY21ojQ
3. https://www.youtube.com/watch?v=FMFtVsPYAIY
4. https://www.youtube.com/watch?v=b1PbQ7jjVVM
5. https://www.youtube.com/watch?v=VzJ60uMdFe8
6. https://www.youtube.com/watch?v=amFOhvc6p74
7. https://www.youtube.com/watch?v=3Sd8D0SQ-8s
8. https://www.youtube.com/watch?v=f-oNngiG9ek
9. https://www.youtube.com/watch?v=ZCzgQXGz9Tg
10. https://www.youtube.com/watch?v=UmWMlKJAdSk

Subject Code: BTCS-17102
Subject Name: Fundamentals of Computer Programming and Information Technology Laboratory

Programme :	B.Tech	**L:** 0, **T**: 0, **P**:2	
Branch:	All Branches	**Teaching hrs: =**	20 hrs.
Semester:	1/2	**Credits: 1**	
Theory/Practical:	Practical	**Percentage of Numerical/Design Problems:** N/A	
Int. Max Marks:	30	**Duration of End Semester Exam (ESE):**	1 hrs
Ext. Max. Marks:	20	**Elective Status:** Compulsory	
Total Marks:	**50**		

Prerequisites: Basic knowledge of computer programming.

On Completion of the course, students will have the ability to:

CO#	Course Outcome
CO1	Understand the working of basic component of computer system and applications.
CO2	Demonstrate the knowledge of world processor spreadsheet and presentation software.
CO3	Design and develop the program by using design tools.
CO4	Design and develop the program by using core concepts like arrays and string, functions, structures and union and pointers of procedure oriented programming.
CO5	Apply and choose appropriate techniques and important aspect required to formulate the program in procedure oriented language.
CO6	Recognize and build the programs to solve the engineering problems.

BTCS-17102

Instructions: Students are required to prepare a file containing lab exercises based on programming only, where as the oral examination will from the entire syllabus.

S. No.	**Experiment Name**	Ref. Unit of Theory Subject (BTCS- 17101)
1	Familiarization with the Computer System, Navigating with Window Explorer and Working with Control Panel, Exploring the Internet.	UNIT I
2	Familiarization with Word processors, and its features: creating, editing, printing and saving documents, spell check, tables, mail merge, print a document, etc.	UNIT II
3	Familiarization with spreadsheet and its features: create and save a workbook with single and/or multiple worksheets, insert and delete a row and/or column in a worksheet, apply operations on range of cells using built-in formulae, print a worksheet, import and export data to or from worksheet, etc.	UNIT II
4	Familiarization with presentation software and its features: create and save a new presentation, apply design templates to a presentation, preview and print a presentation, add clip art, chart, pictures and table in a slide, set animation, etc.	UNIT II
5	Write a program to convert temperature from degree centigrade to Fahrenheit.	UNIT III
6	Write a program to find the nature of the roots as well as value of the roots. However, in case of imaginary roots, find the real part and imaginary part separately.	UNIT IV
7	Write a program, which takes two integer operands and one operator form user, performs the operation and then prints the result. (Consider the operators +, -, ×, /, % and use switch statement). For example, the input should be in the form: 5 + 3 the output should come Result = 8	UNIT V
8	Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first n terms of the sequence. For example, for n = 8, the output should be 0 1 1 2 3 5 8 13.	UNIT VI
9	The number such as 1991 is a palindrome because it is same number when read forward or backward. Write a program to check whether the given number is palindrome or not.	UNIT VI
10	Write a program to swap numbers the concept of user defined function.	UNIT VIII
11	Write a program to enter the elements of one dimensional array by user and display it on screen.	UNIT VII
12	Write a program for addition of two matrix $A_{m\times n}$ by $B_{p\times q}$.	UNIT VII
13	Write a program to illustrate the concept of string handling functions.	UNIT VIII
14	Write a program to perform the addition and multiplication of two complex numbers using structures.	UNIT IX
15	Write a program using pointers to compute the sum of all elements stored in an	UNIT X

	array.	

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Reference Books

(1) Programming in ANSI C, E. Balagurusamy, Tata McGraw Hill.
(2) C Programming Language, Brain W. Kernighan and Dennis M.Ritchie, Prentice Hall.
(3) Spirit of C, Henry Mullish and Herbert L. Cooper, Jaico Publishing House.
(4) Programming with C, Byron S. Gottfried, Tata McGraw Hill.