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BACHELOR OF TECHNOLOGY

ALL BRANCHS (Except Biotech)

1. **Course Title: Professional Communication** **Subject Code**: **THU-101**
2. **Contact Hours: 40** L: 2 T: - P: 1-
3. **Semester: I**
4. **Mode of Examination: Written**
5. **Course Outcomes:** After completion of the course students will be able to:

CO1. Comprehend grammatical rules so that it is easier for them to converse and write in correct English.
CO2. Enhance their speaking skills through improvement in their vocabulary.
CO3. Develop an understanding of effective nonverbal expressions and speaking skills which will instill in them the confidence of a good speaker.
CO4. Demonstrate advanced interpersonal communication, business etiquette and relationship building skills
CO5. Use the skills and knowledge of communication in their professional life and in career building exercise.

Detailed Syllabus

s.n.	CONTENTS	Practical	Contact Hrs
1	**UNIT *I*** ***Functional grammar*** 1) Parts of speech 2) Different verb forms 3) Identification of tenses 4) Formation of sentences using different form of tenses 5) Usage of parts of speech 6) Spotting errors 7) Concord : agreement of verb- with subject , with tense	1) Usage of parts of speech in describing events, places and introducing self. 2) Quiz related to verb forms 3) Relating anecdotes in different tenses 4) urge students to converse using different parts of speech 5) practice with students how to spot grammatical errors 6) Practice exercises to be done. Teaching to identify the errors. 7) Language lab activities	**18**
11	***UNIT II*** ***Vocabulary building*** 1) One word substitution 2) Synonyms 3) Antonyms 4) Homonyms 5) Avoiding Indianism in usage of English language	1) Exercises to use words in sentences. 2) Rigorous sessions on vocabulary building in language lab. 3) Play method of pointing commonly made errors by speaking English. Teach through common mistake example: like 'do the needful', 'pindrop silence', 'waiting on the gate' etc	**6**
	Unit – III ***Communication*** 1) Introduction to communication : Non verbal aspects 2) Etiquettes of telephone conversation. 3) Role play: Mock Sessions	1)Teaching with the help of videos how to use kinesics, proximics, tone , pitch, pace ,accent ,modulation of voice and appearance and other facial parts to show a positive body language. **2) Role play:** I. Identify the situation II. Set up a scenario in enough detail for it to feel "real." III. Assign roles IV. Act out the scenario. V. Discuss what students have learnt.	**6**
	Unit – IV ***Effective handling of issues***	V1)Involve the students in small talk on weather, health, appreciation of a film,	**6**

	1) Use of concept of small talks 2) Giving and receiving feedback 3) Handling complaints effectively	introducing themselves. VII) Show some videos on small talk. VIII) Lang lab: activity on how to make a conversation.	
	Unit – V ***Written communication*** 1) Memo writing 2) Notice/ Report writing 3) Agenda, minutes of the meeting	1)Hold a meeting on any issue in the class and give each student the task of preparing a notice and the agenda of the meeting. Let one group prepare the minutes of the meeting . 2)This could also be given as class work assignment	**4**
		Total	**40**

Reference Books:

- Professional communication by Rajhans Gupta- Pragati Prakashan
- Professional communication by R.P. Singh –Oxford
- Business communication by M.K. Sehgal and Vandana Khetrapal-excel books
- Basic technical communication by Malti Agarwal- Krishna Educational
- English in easy by Chetan Anand Singh- B.S.C Publication
- Thesaurus- Oxford publication
- Pronunciation book on linguistics-oxford publication
- English pronouncing dictionary by Daniel Jones-Cambridge university press

1. Course Title: Advanced Professional Communication Subject Code: THU-201

2. Contact Hours: 40 hours L: 2 **T:** 0 **P:** 0

3. Semester: II

4. Mode of Examination: Written

5. **Course Outcomes: After completion of the course students will be able to:**

CO1. Understand and correctly apply rules of grammar for enhancing intrapersonal and interpersonal skills.
CO2. Demonstrate develop clear thinking, coherence in writing and apply unity in writing.
CO3. Use correct vocabulary in their spoken and written English.
CO4. Evaluate and assess the speaking patterns of self and others to excel in interviews and extemporaneous speaking.
CO5. Understand the importance of effective use of written, oral and digital communication modes geared to a range of business audiences.

Advanced Professional Communication THU-201

	CONTENTS	Practical work	Contact Hrs
	Unit – I ***Writing Skills*** 1) Précis writing: Do's and don'ts: 3) Paragraph Writing –Descriptive, Imaginative, Analytical and informative 4) Essay writing(300 words)	1).Exercise to be given to instill in the students the précis skills. 2). making it mandatory for students to read good easy books, autobiographies, newspaper	**8**
	Unit II ***Advanced vocabulary*** 1) Idioms and phrases 2) Phrasal Verbs. 3) Technical words(jargons)	1)Lang. Lab activities	**6**
	Unit III ***Soft skills*** 1) Interviews- definition, purpose, preparation ,types, do's and don'ts simulation exercise 2) Extempore speaking: simulation exercises 3) Art of conversation in formal settings: simulation exercises 4) JAM session: simulation exercise Group discussion: dos and don'ts, simulation exercise	1)Mock interview sessions to be conducted as part of practical exercise. Giving students the feedback of their limitations. 2) Showing some good videos on interview, available on net. 3)Making all students to deliver a talk of their choice. This must be done as a surprise class task, to assess the speakers' ability to speak. Corrections to be done without discouraging the speakers. 4) Group discussion sessions must be done regularly. Urge each student to give his/her opinions on the subject being discussed. Let there be peer evaluation of	**10**

		the performance. A lot marks at the end of each GD Session. This will encourage the students to speak. 4)Hold JAM competition at class level , Reward the good speakers and organize inter-departmental sessions to encourage maximum participation. Every student must be encouraged to speak in JAM.	
	Unit IV ***Technical writing- I*** 1) Technical Report writing(Project report, feasibility report, research report) 2) Research paper writing(format, RM) 3) Technical Proposal writing(format, structure, types)	1)Show the students some samples of technical reports and teach briefly research methodology.	**10**
	Unit V ***Technical writing II*** 1) Principles of business correspondence 2) Drafting CVs , job application. 3) Presentation skills.		**6**
		Total	**40**

References

- Professional communication by Rajhans Gupta- Pragati Prakashan
- Professional communication by R.P. Singh –Oxford
- Business communication by M.K. Sehgal and Vandana Khetrapal-excel books
- Basic technical communication by Malti Agarwal- Krishna Educational
- English in easy by Chetan Anand Singh- B.S.C Publication
- Thesaurus- oxford publication
- Pronunciation book on linguistics-oxford publication
- English pronouncing dictionary by Daniel Jones-Cambridge university press

1. **Course Title:** Engineering Physics **Subject Code**: TPH 101/201

2. **Contact Hours**: L: 3 T: --- P:**Semester**: I / II ---

3. **Credits:** 3

4. **Pre-requisite**: Basic Knowledge of Physics

5. **Course Outcomes**: After completion of the course students will be able to

1. Define the wave nature of light through different phenomenon.
2. Extend the knowledge of Laser, fiber optics and polarization in engineering problems.
3. Understand the concept of theory of relativity.
4. Examine the behavior of Electromagnetic Waves (EM) using Maxwell Equations.
5. Explain the properties of Superconductors.
6. Discuss quantum theory of radiation and applications of Schrodinger wave equations.

UNIT	CONTENTS	Contact Hrs
Unit/Module-I	**Interference:** Conditions of interference, Spatial and temporal coherence, Bi-prism experiment, interference in wedge shaped film, Newton's rings. **Diffraction:** Fraunhofer diffraction at single slit and n-slits (Diffraction Grating). Rayleigh's criteria of resolution. Resolving power of grating.	**9**
Unit/Module- II	**Polarization:** Basic theory of double refraction,Malus law, Ordinary and Extra-ordinary ray, Production and detection of plane, circularly and elliptically polarized light, specific rotation and polarimeters. **Laser:** Spontaneous and Stimulated emission of radiation, Einstein Coefficients'Principle of laser action. Construction and working of Ruby and He-Ne laser photovoltaic effect. **Fiber Optics:** Introduction to Fiber Optics, types of fiber, acceptance angle and cone, numerical aperture	**9**
Unit/Module-III	**Special theory of relativity:** Inertial and non inertial frames, Galilean transformation, Michelson-Morley experiment, Einstein postulates of special theory of relativity, Lorentz transformation equation, length contraction, time dilation, variation mass of velocity, Mass energy relation.	**8**

Unit/Module-IV	**Superconductivity:** Essential properties of Superconductors, zero resistivity, Type I, Type II superconductors and their properties. **Electromagnatism:** Displacement current, Three electric vectors (**E**, **P**, **D**), Maxwell's equations in integral and differential forms. Electromagnetic wave propagation in free space.	**8**
Unit/Module-V	**Quantum Mechanics:**Quantum concept and radiation, Wave particle duality (de-Broglie concept of matter waves), Heisenberg's uncertainty principle, Schrodinger's wave equation in one dimension under a conservative force field, wave function and its significance, Eigen values and Eigen functions for particle confined in one dimensional infinite potential box (rigid box).	**8**
	Total	**42**

Text Books:

- Ajoy Ghatak, "Optics", 4th Edition, Tata Mc Graw Hill, 2009
- N. Subrahmanyam Brijlal & M. N. Avadhanulu, "Optics :", 24th Edition, S. Chand, 2010
- A. Beiser, "Concepts of Modern Physics", Tatac Mc Graw Hill
- Resnick, Krane, Halliday, "Physics (vol I&II)", 5th Edition, Wiley, 2007
- Robert Resnick, "Introduction to Special Relativity", Wiley Publishers, 2007

Reference Books:

- John R. Taylor, Chris D. Zafiratos, Michael A. Dubson, "Modern Physics", 1st Edotion, Pearson Education , 2007
- Gerd Keiser, "Optic Fiber Communication" 5th Edition, Tata Mc. Graw Hill, 2017
- Alastair I M Rae, Jim Napolitano, "Quantum Mechanics" 6th Edition, Wiley, 2015
- David J. Griffiths, "Introduction to Electrodynamics", 3rd Edition, Prentice, 2011
- Charles P. Poole, Jr. Frank J. Owens , "Introduction to Nanotechnology", Wiley, 2017
- Hug D. Young & Roger A. Freedman, "University Physics", 12th Edition, Pearson Publication, 2008
- Alan Giambattista, Betty Mc. Carthy Richardson, Robert C Richardson, "Fundamentals of Physics", 1st Edition, Tata Mc Graw Hill, 2009

1. **Subject Code:** TMA 101 **Course Title:** **Engineering Mathematics-I**

2. **Contact Hours:** **L:** 3 **T:** 1 **P:** 0

3. **Semester: I**

4. **Credits:** 4

5. **Pre-requisite: Basic Knowledge of Mathematics**

6. **Course Outcomes: After completion of the course students will be able to**

CO1. Understand the concept of matrices.
CO2. Solve the system of linear equations.
CO3. Understand the concept of differential calculus and apply to various discipline of Engineering.
CO4. Analyze the maximum / minimum values of functions of two or more variables with its application to engineering systems.
CO5. Solve the multiple integrals and apply to find the area and volumes.
CO6. Utilize the vector calculus in different engineering systems.

7. Detailed Syllabus

UNIT	CONTENTS	Contact Hrs
Unit - I	**Matrices** Elementary row and column transformations. Rank of a matrix, linear dependency and independency, Consistency of a system of linear equations, Hermitian, Skew-Hermitian, Unitary matrices, Characteristic equation, Cayley-Hamilton theorem, Eigen values and Eigen vectors, Diagonalization.	**10**
Unit - II	**Calculus-I: Sequence and Series:** Leibnitz test, Cauchy Root test and Ratio test Introduction of differential calculus, higher order derivatives, Successive Differentiation, Leibnitz's theorem, Limits, Continuity and Differentiability of two variables, Partial Differentiation, homogeneous function, Euler's theorem, Taylor's and Maclaurin's expansions of one and two variables.	**12**
Unit – III	**Calculus-II** Extrema (Maxima/ Minima) of functions of two variables, method of Lagrange's multipliers. Introduction of Jacobian, properties of Jacobian, Jacobian of implicit and explicit functions, functional	**7**

	dependence.	
Unit – IV	**Multiple Integrals** Introduction to integration, Double and triple integrals, Change of order of integration, Beta and Gamma functions. Applications to area, volume, Dirichlet's integral.	**7**
Unit – V	**Vector Calculus** Introduction to Vectors, Gradient, Divergence and Curl of a vector and their physical interpretation, Line, Surface and Volume integrals, Green's, Stoke's and Gauss's divergence theorem (without proof).	**9**
	Total	**45**

Reference Books:

- C. B. Gupta, S. R. Singh and Mukesh Kumar, "Engineering Mathematics for Semesters I and II" McGraw Hill Education, First edition 2015.
- Ramana, B. V., "Higher Engineering Mathematics", Tata McGraw Hill publications, 2007
- R. K. Jain, S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa Publication, 2004.
- Grewal, B. S., "Higher Engineering Mathematics", 40e, Khanna Publications, India, 2009
- Kreyszig, Erwin., "Advanced Engineering Mathematics", 9e, Wiley Publications, 2006.

1. **Subject Code:** TMA 201 **Course Title:** **Engineering Mathematics-II**

2. **Contact Hours:** **L:** 3 **T:** 1 **P:** 0

3. **Semester: II**

4. **Credits:** 4

5. Pre-requisite: Basic Knowledge of Mathematics

6. Course Outcomes: After completion of the course students will be able to

CO1. Solve the linear ordinary differential equations.
CO2. Apply the Laplace transforms in linear and simultaneous linear differential equations.
CO3. Apply the Fourier series for signal analysis in various engineering discipline.
CO4. Classify the partial differential equations and to solve homogeneous partial differential equations with constant coefficients.
CO5. Apply method of separation of variables to solve 1D heat, wave and 2D Laplace equations.
CO6. Find the series solution of differential equations and comprehend the Legendre's polynomials, Bessel functions and its related properties.

7. Detailed Syllabus

UNIT	CONTENTS	Contact Hrs
Unit - I	**Differential equation** Ordinary differential equation of first order (Exact and reducible to exact differential equations), linear differential equations of nth order with constant coefficients, Complementary functions and particular integrals, Euler Homogeneous differential equation, Method of variation of parameters and its applications.	**8**
Unit - II	**Laplace Transform** Introduction of Laplace Transform, Its Existence theorem and properties, Laplace transform of derivatives and integrals, Inverse Laplace transform, Laplace transform of periodic functions, Unit step function and Dirac delta function, Convolution theorem, Applications to solve simple linear and simultaneous linear differential equations.	**10**
Unit – III	**Fourier series** Periodic functions, Fourier series of periodic functions of period 2π, Euler's formula, Fourier series having arbitrary period, Change of	**7**

	intervals, Even and odd functions, Half range sine and cosine series.	
Unit – IV	**Partial differential equations** Introduction to partial differential equations, Solution of linear partial differential equations with constant coefficients of second order and their classifications: parabolic, hyperbolic and elliptic partial differential equations. Method of separation of variables for solving partial differential equations, one dimensional Wave and heat conduction equations, Laplace equation in two dimensions.	**12**
Unit – V	**Special Function** Series solution of differential equations, Legendre's differential equations and Polynomials, Bessel's differential equations and Bessel's Functions, Recurrence relations, Generating Functions, Rodrigue's formula.	**9**
	Total	**45**

Reference Books:

- C. B. Gupta, S. R. Singh and Mukesh Kumar, "Engineering Mathematics for Semesters I and II" McGraw Hill Education, First edition 2015.
- E. Kreyszig, Advanced Engineering Mathematics, Wiley India, 2006.
- B. S. Grewal, Higher Engineering Mathematics, Khanna Publications, 2009.
- C. Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya, 1996.
- R. K. Jain, S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa Publication, 2004.

<table>
<tr><td colspan="8">ELECTRICAL ENGINEERING DEPARTMENT</td></tr>
<tr><td colspan="8">Course:- Bachelor of Technology (Electrical Engineering)</td></tr>
<tr><td colspan="2">Semester First/Second</td><td colspan="2">Subject Title</td><td colspan="3">Basic Electrical Engineering</td><td>Code</td><td>TEE 101/201</td></tr>
<tr><td colspan="2">Course Components</td><td colspan="2">Credits</td><td colspan="3" rowspan="2">Contact Hours</td><td>L</td><td>T</td><td>P</td></tr>
<tr><td colspan="2">Foundation Course (FC)</td><td colspan="2">04</td><td>03</td><td>01</td><td>--</td></tr>
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Pre-requisite:	Basic Knowledge of Mathematics and Physics	
Course Objectives		
CO 1	**Understand** and **analyze** basic electric circuits	
CO 2	**Assess** the various characteristics of Alternating Current/Voltage.	
CO 3	**Understand** the concept of three-phase AC circuits.	
CO 4	**Summarize** the basic characteristics of single-phase transformer.	
CO 5	**Introduce** the components of low voltage electrical installations	
CO 6	**Understand** the working principles of electrical machines	
Unit No.	***Content***	***Hours***
Unit -1	**DC Circuits:** Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, Mesh and Node analysis with DC source. Superposition, Thevenin's and Norton Theorems, Maximum Power Transfer theorem	**9**
Unit -2	**AC Circuits:** Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections	**8**
Unit -3	**Transformers:** Magnetic circuit, BH characteristics, ideal and practical transformer, equivalent circuit, losses and efficiency of transformers, auto-transformer.	**8**
Unit -4	**Electrical Machines:** Working principle and e.m.f equation of dc machine, torque speed characteristic of separately excited dc motor, working principle of three phase induction motor.	**8**
Unit -5	**Electrical Installations:** Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, RCD, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement.	**9**
	Total Hours	**42**

Test/ Reference Books:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. V. N Mittle and Arvind Mittle, "Basic Electrical Engineering" Tata McGraw-Hill Education Pvt. Ltd. (2005)
4. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
5. L.S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. V.D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

1. **Subject Code:** TCS 101 **Course Title:** FUNDAMENTALS OF COMPUTERS AND INTRODUCTION TO PROGRAMMING
2. **Contact Hours:** **L:** 3 **T:** - **P:** -
3. **Semester: I**

4. Pre-requisite: Basic Knowledge of Mathematics

5. Course Outcomes: After completion of the course students will be able to

1. Learn the concepts of IT and understand the fundamentals of basic building blocks of computer science.
2. Understand basic data types and syntax of C programming. .
3. Propose solution to problem by using tools like algorithm and flowcharts.
4. Analyze and select best possible solution for decision-based problems using decision making skills.
5. Develop the aptitude to solve iterative problems using different types of looping statements.
6. Implement complex problem as a collection of sub problems by applying modularization in applications using functions.

6. Detailed Syllabus

UNIT	CONTENTS	Contact Hrs
Unit - I	Generation of computers, Computer system memory hierarchy, Input/Output, RAM/ROM, Software & Hardware, Understand bit, byte, KB, MB, GB and their relations to each other, Operating System overview, Computer Networks Overview Algorithms and Flow Charts – Examples of Flow charts for loops and conditional statements	**8**
Unit - II	First C program - Hello world, How to open a command prompt on Windows or Linux How to read and print on screen - printf(),scanf(),getchar(), putchar() Variables and Data types - Variables,Identifiers, data types and sizes, type conversions, difference between declaration and definition of a variable, Constants Life of a C program (Preprocessing, Compilation, Assembly, Linking, Loading, Execution), Compiling from the command line, Macros, Operators – equality and assignment, Compound assignment operators, Increment and decrement operators, Performance comparison between pre and post increment/decrement operators, bitwise operators (AND, OR, NOT and XOR), Logical Operators, comma operator, precedence and associativity, Logical operators (AND, OR),	**10**
Unit – III	Conditional statements (if statement, if-else statement, ternary statement or ternary operator, nested if-else statement, switch statement), Difference between performance of if else and switch, Advantages of if else and switch over each other Loops – 'for' loops, 'while' loops, 'do while' loops, entry control and exit control, break and continue, nested loops	**8**
Unit – IV	Arrays –Single and Multi-dimensional arrays, Initializing arrays, computing address of an element in array, row major and column major form of an array, character strings and arrays, segmentation fault, bound checking, Sorting Algorithms – Bubble sort, insertion sort, selection sort	**10**
Unit – V	**Functions** – Function prototype, function return type, signature of a function, function arguments, call by value, Function call stack and Activation Records, Recursion v/s Iteration, passing arrays (single	**7**

	and multi-dimensional) to functions, **Storage classes-** Automatic, Static, Register, External, Static and Dynamic linking implementation, C program memory (show different areas of C program memory and where different type of variables are stored), scope rules	
	Total	**43**

Text Books:

- Peter Prinz, Tony Crawford,"C in a Nutshell", 1stEdition, Oreilly Publishers, 2011.
- Peter Norton, "Introduction to computers", 6thEdition, TMH, 2009.

Reference Books:

- Steve Oualline, "Practical C programming", 3rdEdition, Orielly Publishers, 2011.
- Brian W Kernighan, Dennis M Ritcie,"The C Programming Language", 2ndEdition, Prentice Hall, 1988. R3. Herbert Schildt," C: The Complete Reference", 4thEdition.TMH, 2000.
- E.Balagurusamy,"Programming in ANSI C",6th Edition, McGraw Hill 2015
- YashwantKanetkar,"Let Us C",8th Edition,BPB Publication 2007

1. Subject Code: TCS 201 **Course Title:** Programming for Problem solving

2. Contact Hours: **L:** 3 **T:** - **P:** -

3. Semester: II

4. Pre-requisite: Basic Knowledge of Mathematics and Computer Fundamentals

5. Course Outcomes: After completion of the course students will be able to

1. Learn and apply concepts of strings for providing solutions to homogenous collection of data types
2. Propose solution to problem by using tools like algorithm and flowcharts.
3. Apply the concept of pointers to optimize memory management by overcoming the limitations of arrays.
4. Process and analyze problems based on heterogeneous collection of data using structures.
5. Apply concepts of file handling to implement data storage and retrieval tasks.
6. Implement the basic real life problems using python

6. Detailed Syllabus

UNIT	CONTENTS	Contact Hrs
Unit - I	Strings – Declaration of strings, Initialization of strings using arrays and pointers, Standard library functions of <string.h>header file, Null-terminated strings, Char arrays and pointers, Pointers and Strings, comparing two strings, find substring in a string, tokenizing a string with strtok() function, pointer-based string-conversion function – atoi()	**6**
Unit - II	**Pointers** –Basic of pointers and addresses, Pointers and arrays, Pointer arithmetic, passing pointers to functions, call by reference, Dynamic memory management in C - malloc(), calloc(), realloc(), free(), memory leak, Dangling, Void, Null and Wild pointers **Structures** - Structures, array of structures, structure within structure, union, typedef, self-referential structure, pointer to structure	**10**
Unit – III	**File Handling** - Opening or creating a file, closing a file, File modes, Reading and writing a text file using getc(), putc(), fprintf() ,fscanf(),fgets(), fputs(),Difference between append and write mode, Reading and writing in a binary file, counting lines in a text file, Search in a text file, Random file accessing methods- feof(), fseek(), ftell() and rewind() functions,	**8**
Unit – IV	**Introduction to Python-** History of Python, Need of Python Programming, Python features, Installation of Python in Windows and Linux, First Python Program, Running python Scripts, Variables, Reserved words, Lines and indentation, Quotations, Comments, Input output. Data Types, Operators and Expressions: Standard Data Types – Numbers, strings, Boolean, Operators – Arithmetic Operators, comparison Operators, assignment Operators, logical Operators, Bitwise Operators.	**10**
Unit-V	Control flow – if, if-elif-else, for, while, break, continue, pass, range(), nested loops,	**10**

	Data structures – List, Tuple, Dictionary File Handling – Reading text file, writing text file, copying one file to another	
	Total	**44**

Text Books:

- Peter Prinz, Tony Crawford,"C in a Nutshell", 1stEdition, Oreilly Publishers, 2011.
- YashwantKanetkar,"Let Us C",8th Edition,BPB Publication 2007

Reference Books:

- Steve Oualline, "Practical C programming", 3rdEdition, Orielly Publishers, 2011.
- Brian W Kernighan, Dennis M Ritcie,"The C Programming Language", 2ndEdition, Prentice Hall, 1988. R3. Herbert Schildt," C: The Complete Reference", 4thEdition.TMH, 2000.
- E.Balagurusamy,"Programming in ANSI C",6th Edition, McGraw Hill 2015

1. **Subject Code:** THF 101/201 **Course Title:** HEALTHY LIVING AND FITNESS

2. **Contact Hours:** **L:** 1 **T:** - **P:** -

3. **Semester: I/II**

4. **Pre-requisite: Basic Knowledge of Biology**

5. **Course Outcomes:** After completion of course the students should be able to comprehend:
   1. The benefits of healthy life style
   2. Importance of balanced food and proper diet in daily
   3. Problems related to addiction and benefits of yoga
   4. Basic first aid procedures.

6. Detailed Syllabus

UNIT	CONTENTS	Contact Hrs
Unit - I	**Human Body** Awareness of important body organs, their location and broad functions. **Diet and Health** Importance of breakfast, fruits, whole grains Knowledge about constituents of diet, proteins, fats, carbohydrate, vitamins and minerals. Importance of fiber.	**2**
Unit - II	**Life style Diseases** Harmful effects of junk/ processed foods. Dangers of obesity Diseases ensuing because of lifestyle eg. Diabetes, heart diseases etc.	**3**
Unit – III	**Exercise** Benefits of exercise and yoga. **Addictions** Chewing/ unhealthy harmful products Drinking Smoking	**3**
Unit – IV	**Importance of Mental Health** Stress management Anxiety and depression Awareness of commonly encountered diseases/ailments	**3**
Unit – V	**First Aid** First aid in commonly encountered emergency	**1**
	Total	**12**

1. Subject Code: TCH 101/201 **Course Title:** Engineering Chemistry

2. Contact Hours: **L:** 3 **T:** - **P:**

3. Semester: I/II

4. Pre-requisite: Basic Knowledge of Chemistry

5. Course Outcomes: After completion of the course students will be able to

i. Knowledge of various properties of materials depending upon bond formation.
ii. understand the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques and their applications thereof
iii. Understand the chemistry of fuel, their classification and applications
iv. Apply the basic principle of electrochemistry in corrosion control and industrial applications
v. Understand the chemistry of water and its industrial and domestic application
vi. Categorize various types of polymer and their applications
vii. Learn and apply the concepts of analytical chemistry for sample analysis by chemical methods

6. Detailed Syllabus

UNIT	CONTENTS	CONTACT HRS
UNIT - I	**ATOMIC AND MOLECULAR STRUCTURE** VSPER theory and its application for structure of NH_3, NH_4^+, H_2O, H_3O^+, SO_2 and XeF_4 Molecular Orbital Theory, Formation of homo and heteronuclear diatomic molecules Hydrogen Bonding and its application Metallic Bonding (Band theory)	6
UNIT- II	**SPECTROSCOPIC TECHNIQUES AND APPLICATION** Basic Principles of spectroscopy and its applications: UV-Vis, Vibrational (IR) and Rotational, NMR	7
UNIT - III	**FUELS** Classification of fuels and characteristics of a good fuel, calorific value and its determination by Bomb Calorimeter (Numerical problems), Proximate analysis of coal, Cracking of heavy oil residues – thermal and catalytic cracking, knocking , octane number and cetane number Composition and uses of Natural gas, CNG, LPG. Bio fuels as alternative sources of energy (biomass, biogas).	5
UNIT-IV	**ELECTROCHEMISTRY & CORROSION** Electrode potential, standard electrode potential, factors affecting the electrode potential of a cell. Nernst equation: electrochemical series and its application, Electrochemical cell: Daniel cell, Concentration cells, electrolyte concentration cell	5

	Numerical problems based on electrode potential and emf of a cell. Corrosion its causes and effects, Theories of corrosion – Chemical & Electrochemical corrosion	
UNIT-V	**WATER AND ITS TREATMENT** Hardness of water: Causes, Types, expression and its measurement, its disadvantages, Boiler troubles: Sludges, Scales and Caustic Embrittlement Softening of water by L-S process, Zeolite process and Reverse osmosis process, Ion Exchange process, Calgon Process Numerical problems based on L-S Process, Zeolite Process and hardness of water.	5
UNIT-VI	**POLYMERS** Polymerization, degree of polymerization, functionality of monomer, Classifications of polymers on the basis of tacticity, mode of formation, structure of monomer unit , Mechanism of addition polymerization, Preparation, Properties and uses of Kevlar & PMMA, Plastics: definition, preparation, classification and applications, Fibers: Preparation, properties and uses of Nylon- 6,6 Nylon and Dacron, Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; Applications of Conducting polymers. Bio-degradable Polymers.	6
UNIT-VII	**ANALYTICAL CHEMISTRY** Qualitative and Quantitative Chemistry, Volumetric and Gravimetric Analysis; Principles of Volumetric Analysis; Concept of pH, buffer, Concept of strength and concentration of solution; Standard Solution: Preparation and Types; Normality, Molarity, Molality and interconversion of strength Titration-Principles and Classification: Redox, Acid-Base, Complexometric, Precipitation Oxidation Number and calculation of oxidation number in compounds	6

Total Contact Hours- 40

Text Books:

- University Chemistry, B.H.Mahan
- Chemistry, Principles and Application, M.J.Sienko and R.A. Plane

Reference books

- J.D.Lee" Concise Inorganic Chemistry" W.J.Wiley India, 5th Edition (1996)
- K L Kapoor A text book of Physical ChemistryVol. 5 , Macmillan India, 1stEdition (2004)

1. Subject Code: **TEC101/201** Course Title: **Basic Electronics Engineering**

2. Contact Hours: **L:** **3** **T**: **0** **P**: **0**

3. Credits: 3

4. Semester: **I/II**

5. Subject Area: **Core Course**

6. Pre-requisite: **Basic semiconductor Physics.**

7. **Course Outcome:**	• Identify the terminology associated with electronics and explain the basic concepts of PN junction diode. • To apply the basicsof diode to analyze the rectifier circuits and DC power supply • Understand transistor (BJT) basics and analyze biasing circuits. • Analysis of different mathematical operations using Operational amplifiers. • Understanding and implementation of concepts of digital electronics. • After successful completion of the course the students will be able to analyze and design simple electronics circuits.

8. **Details of the Course:**

Sl. No.	Contents	Contact Hours
1	**SEMICONDUCTORS AND JUNCTION DIODE CHARACTERISTICS:** Classification of solids based on energy band theory, Intrinsic semiconductors, Extrinsic Semiconductors– P-type and N-type, Electrons and Holes in intrinsic and Extrinsic semiconductors, Mobility and conductivity, Mass Action Law, charge densities in semiconductors, Drift and Diffusion current, Open circuited PN Junction diode, Current components and V- I Characteristics of PN Junction Diodes.	8
2	**RECTIFYING CIRCUITS AND D.C. POWER SUPPLY:** Introduction to power supply, Rectifiers circuit: Half wave, Center tapped full wave and Bridge rectifier circuits. Rectifier performance parameter analysis, Filter circuits: L, C and Pi filters, Zener Diode: Concept of Zener and Avalanche Breakdown. Analysis and Design of ZenerRegulator circuits.	6
3	**TRANSISTOR BIASING AND BIAS STABILIZATION:** Construction and characteristics of bipolar junction, transistors (BJT's)-Common Base, Common Emitter, Common Collector configuration, Transistor biasing and bias stabilization: - the	10

	operating point, stability factor analysis of fixed base bias, collector to base bias, Emitter resistance bias circuit and self-bias circuit.	
4	**INTRODUCTION TO OPERATIONAL AMPLIFIERS** Introduction to Integrated Circuits- Advantages and Limitations. Characteristics of an Ideal op-amp, Introduction of 741 IC. Inverting and Non-inverting op-amp circuits, Adder or Summing Amplifier, Difference Amplifier, Voltage follower. Op Amp as Integrator and Differentiator.	6
5	**NUMBER SYSTEMS & BOOLEAN ALGEBRA:** Number systems and their conversion, Addition & Subtraction of binary, octal and hexadecimal numbers , multiplication & division of binary numbers, fractional numbers, Boolean algebra, logic gates , De-Morgan's theorem, implementation of basic gates using universal gates, implementation of logic functions using basic gates & universal gates, SOP & POS form of logic expression, canonical form, conversion from SOP &POS form to canonical form, simplification of Boolean function: Algebraic method, Karnaugh map method(two, three &four variable K-map with don't care condition.	10
	Total	**40**

11**. Suggested Books:**

SL. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
	Text Books	
1.	Jacob Millmann&Halkias,*Integrated Electronics*,TMH, 2nd Edition	2010
2.	Mano M. Morris and Ciletti M. D.,*Digital Design,* Pearson Education, 4th Edition.	2004
	Reference Books	
1.	Kalsi H.S., '*Electronics Instrumentation*', TMH	2004
2.	Boylestad and L. Robert and Nashelsky Louis, '*Electronics Devices and Circuits Theory* ',PHI/Pearson Education, 9th Edition.	2010

1. **Subject Code:** TEV 101/ 201 **Course Title:** Environmental Science

2. **Contact Hours:** **L:** 2 **T:** - **P:** -

3. **Semester: I/ II**

4. **Pre-requisite: Basic Knowledge of Science**

5. **Course Outcomes:** After completion of the course students will be able to
   1. To create environmental awareness and knowledge.
   2. To encourage participation in environmental conservation practices.
   3. To develop critical thinking and apply those to the analysis of a problem or question related to the environment.
   4. To evaluate impact of various human induced activities on the environment
   5. To design possible solutions to the real environmental problems.
   6. To create research and innovation related with different aspects of environmental science.

7. Detailed Syllabus

UNIT	CONTENTS	Contact Hrs
Unit - I	**Environmental Science and Ecosystem** **a**. Definition of Environmental Science, multidisciplinary nature, Objective, scope and importance. **b**. Concept of an ecosystem, structure and function, energy flow, ecological succession, food chains, food webs, ecological pyramids. **c**. Introduction, types, characteristic features, structure and function of the following ecosystem: • Forest ecosystem • Grassland ecosystem • Desert ecosystem • Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	**08**
Unit - II	**Natural Resources and Biodiversity** **a**. Renewable and non- renewable resources. **b**. Natural resources and associated problems: • Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people. • **Water Resources:** Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems, water conservation, rainwater harvesting, watershed management. • **Mineral Resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies. • **Food Resources:** World food problems, Changes in landuse by agriculture and grazing, Effects of modern agriculture, Fertilizer/ pesticide problems, Water logging and salinity • **Energy Resources:** Increasing energy needs, Renewable/ non renewable, Use of Alternate energy sources, urban problems related to energy, Case studies • **Land resources:** Land as a resource, land degradation, man-induced land-slides,	**16**

	soil erosion and desertification, wasteland reclamation **c**. Role of an individual in conservation of natural resources, equitable use of resources for sustainable lifestyles. **d**. Definition of biodiversity, levels of biodiversity, value of biodiversity, threats to biodiversity (habitat loss, poaching of wildlife, man-wildlife conflicts). **e**. Biodiversity at global, national and local levels, India as a biodiversity nation, biogeographical classification of India, hotspots of biodiversity. **f**. Endangered and endemic species of India. **g**. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.	
Unit – III	**Environmental Pollution** **a.** Definition, causes, effects and control measures of Air Pollution, water pollution, soil pollution, marine pollution noise pollution, thermal pollution, nuclear hazards. **b.** Solid waste Management: causes, effects and control measures of urban and industrial wastes **c.** Role of an individual in prevention of pollution, pollution case studies, pollution case studies	**08**
Unit – IV	**Important Environmental and Social Issues, Management and Legislation** **a.** Climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocaust. Case studies. **b.** Sustainable development, Resettlement and rehabilitation of people (its problems and concerns, case studies), Environmental ethics (issues and possible solutions), consumerism and waste products. **c.** Disaster management: floods, earthquake, cyclone and landslides. **d.** Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, **e.** Issues involved in enforcement of environmental legislation, Public Awareness **f.** Population growth (variation among nation), Population explosion (family welfare programme), Environment and human health, human rights, value education, HIV/ AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health, case studies.	**14**
Unit – V	**Field work** a. Visit to a local area to document environmental assets- river/ forest/ grasslands/ hill /mountain. b. Visit to a local polluted site- Urban/ Rural/ Industrial/ Agricultural c. Study of common plants, insects, birds d. Study of simple ecosystems- pond, river, hill slopes, etc.	**01**
	Total	**40**

Text Books:

1. Joseph K. & Nagendran R.: Essentials of Environmental studies; Pearson Edition
2. Santra S. C., Environmental Science; Central Book Agency.
3. Dhameja, S. K.:Environmental Studies; Katson books.
4. Srivastava Smrti: Environmental Studies; Katson books.
5. Deswal, S. & Deswal A.: A Basic Course In Environmental Studies; Dhanpat Rai & Co.

ELECTRICAL ENGINEERING DEPARTMENT							
Course: - Bachelor of Technology (ELECTRICAL ENGINERING)							
Semester	First/Second	***Subject Title***		Basic Electrical Lab		***Code***	PEE 151/251
Course Components		***Credits***		***Contact Hours***	***L***	***T***	***P***
Foundation Course (FC)		01			00	00	02
Examination Duration (Hrs)		***Theory***	***Practical***	***WEIGHTAGE :EVALUATION***	***CWA***	***MSE***	***ESE***
		00	03		25	25	50

Course Objectives	
CO 1	Verification of various laws and theorems of DC circuit
CO2	Understanding of different parameters involved in Electrical measurement
CO3	Understanding of Resonance phenomenon
CO4	Evaluating different Transformer parameters.

Experiment No.	***Name of the Experiment***
1.	To verify Kirchhoff's voltage law (KVL) in D.C. circuits
2.	To verify Kirchhoff's current law (KCL) in D.C. circuits
3.	To verify superposition theorem for DC circuits.
4.	To verify Thevenin's theorem for DC circuits
5.	To verify Norton's theorem for DC circuits '
6.	To verify maximum power transfer theorem in DC circuits.
7.	To find out the meter constant of a single-phase energy meter.
8.	To measure the power and power factor of a three-phase balanced circuit by two wattmeter methods
9.	To perform Open Circuit Test on single phase transformer to find out core loss
10.	To perform Short Circuit Test on single phase transformer to find out copper loss
11.	To Study the reversing of direction of rotation of 3-phase induction motor by phase reversal method.
12.	To draw the current versus frequency characteristics in RLC series circuit
13.	To draw the current versus frequency characteristics in parallel RLC circuit

1. **Subject Code**: PPH 151/251 **Course Title**: Physics Lab

2. **Contact Hours**: L: 0 T: 0 P: 2

3 . **Semester**: I / II

4. **Credits:** 1

5. **Pre-requisite**: Basic Knowledge of Experiments in Physics

6. **Course outcomes:** After the completion of the course students will be able to

1. Find the electrical and magnetic properties of materials and extend the knowledge of nanotechnology using electroplating.

2. Understand the principle and characteristics of photo devices and optical fiber.

3. Apply the methods of calibration to analog instruments.

4. Determine the wavelength of light and specific rotation of optically active substance through the experiments based on phenomena of optics.

Students have to perform any twelve experiments:

1. To determine the wavelength of monochromatic light by Newton's ring experiment.
2. To determine refractive index of transparent liquid by Newton's ring experiment.
3. To determine the specific resistance of the constantan wire using Carey- Foster's bridge.
4. To determine the wavelength of monochromatic light using Fresnel Biprism experiment
5. To determine the energy band gap of given semiconductor by Four-probe method.
6. (a) To determine the wavelengths of spectral line of Mercury light using plane transmission grating.
   (b) To determine the wavelengths of given Laser light using plane transmission grating.
7. To study the variation of magnetic field with distance along the axis of circular coil carrying current and to determine the radius of coil.
8. To determine the magnetic susceptibility of a paramagnetic substance by Quincke's method.
9. To determine the specific rotation of Sugar Solution using Half Shade Polarimeter.
10. To study the characteristics of Solar Cell
11. a)To calibrate Voltmeter by using potentiometer.
    b) To calibrate Ammeter by using potentiometer.
12. To determine Planck's constant by photoelectric method and study the variation of intensity with distance.
13. To determine the electro chemical equivalent of Copper.
14. To Verify Law of Malus.
15. To study Hall Effect and determine the hall voltage, hall coefficient, current density and carrier mobility of a given semiconductor.
16. To determine the numerical aperture and acceptance angle of an optical fiber.

1. **Subject Code:** **PME 153/253** **Course Title:** **Engineering Graphics & Design**

2. **Contact Hours:** L: **1** T: **0** P: **4**

3. **Credits:** **3**

4. **Semester**: **I & II**

5. **Course Outcomes**: Upon completion of this course, students will be able to
   - **CO1.** Prepare Engineering drawings as per BIS conventions.
   - **CO2.** Prepare Computer generated drawings using CAD software.
   - **CO3.** Use the knowledge of Orthographic projections to represent engineering information/Concepts.
   - **CO4.** Prepare isometric drawings of simple objects and also have an exposure to solid modeling.

6. **Detailed Syllabus**

MODULE	CONTENTS	Contact Hrs
I	**Introduction to Computer Aided Sketching** Introduction, Drawing Instruments and their uses, BIS conventions, lettering, Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar, and description of most commonly used tool bars, navigational tools. Coordinate system and reference planes. Definitions of HP, VP, RPP& LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line convention, material conventions and lettering. Computer Aided Design(CAD) software: Modeling of parts and Assemblies.	**10**
II	**Orthographic projections of points, lines and planes:** Introduction, Definitions - Planes of projection, reference line and conventions employed. First angle and Third angle projection. ***Projections of points*** in all the four quadrants. ***Projection of lines*** (located in first quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems) ***Projection of planes***: triangle, square, rectangle, pentagon, hexagon, and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates.)	**25**
III	**Projections of Solids:** Projections of right regular prisms, pyramids and cones with axis inclined to both the planes. (Solids resting on HP only)	**10**
IV	**Development of lateral surfaces of solids:** Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. Development of lateral surfaces of above solids, their truncations.	**10**

V	**Isometric Projections:** Principles of Isometric projection - Isometric Scale, Isometric Views, Conventions, Isometric views of planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice - Versa.	**10**
VI	**Demonstration of a Simple Team Design Project that Illustrates** Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modeling software for creating associative models at the component and assembly levels.	**10**
Total		**75**

Text Books:

1. Engineering Graphics- K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers, Bangalore.
2. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - International Publishing house Pvt. Ltd., New Delhi, 3rd revised edition-2006.
3. Engineering Drawing- N.D. Bhatt and V.M. Panchal, 48th edition, 2005 Charotar publishing House, Gujarat.

CAD Softwares:

1. **AUTOCAD 2016**
2. **CREO 2.0**

1. **Subject Code: PME 151/PME251** **Course Title: Workshop and Manufacturing practices**

2. **Contact Hours:** L: **1** T: **0** P: **4**

3. **Credits:** **3**

4. **Semester**: **I & II**

5. **Course Outcomes:** Upon completion of this laboratory course.

CO1. Students will be able to fabricate components with their own hands.

CO2. They will also get practical knowledge of the dimensional accuracy with different manufacturing processes.

CO3. By assembling different components, they will be able to produce small devices of their interest.

CO4. They will also get practical knowledge of conventional and non-conventional manufacturing methods.

Module no.	Contents	Contact hrs.
I	**Machine shop** Introduction to Machine shop, Different machines used in manufacturing, Different types of Lathe Machines, Parts of Centre Lathe Machine and their applications, Types of chucks, To perform facing, Plain turning and Step turning operations with centre lathe machine on mild steel work piece.	8hrs
II	**Fitting Shop** Different steps involve in Fitting Shop. Measuring, Marking, Cutting and finishing & their types. Tools used in Fitting Shop. Types of steel on the basis of carbon content, Application of steel. To perform practical in fitting shop.	8hrs
III	**Carpentry Shop** Basis introduction of wood and timber, Types of seasoning, Tools used of making work piece in lab, Types of carpentry joints	4hrs
IV	**Welding (Arc and Gas welding)** Definition of welding, Types of welding method, Types of welded joints, position, flames. Tools equipment's used in welding shop. To perform electric arc welding and gas welding(for safety as well as performing the practical)	8hrs
V	**Casting** Introduction to foundry and casting, foundry tools and equipment used in making of pattern, Types of casting materials and processes, Types of sands.	4hrs
VI	**Black Smithy** Basic introduction to Black Smithy shop, Types of furnaces, Types of hammers, Types of tongs, Different tools and equipment used in black smithy shop.	4hrs

VII	**Non Metal Cutting** Introduction of non-metallic materials, their uses and applications. Laser cutting techniques and with its demonstration and uses.	8hrs

1. Subject Code: **PCH151/251** Course Title: **Engineering Chemistry Lab**

2. Contact Hours: L: - T: - P: 3

3. Semester: I/II

4. Pre-requisite: Basic Knowledge of Chemistry Practical

5. Course Outcomes: After completion of the course students will be able to

1. Analyze the water quality parameter.
2. Understand the concept of viscosity, surface tension and their applications.
3. Analyze the ores and bleaching powder sample
4. Knowledge of pH metric and calorimetry and their application in industry.

6. Detailed Syllabus: Any Twelve Experiments out of Fourteen Experiments.

UNIT	CONTENTS	CONTACT HRS
EXP- 1	**To determine the alkalinity of the given water sample containing carbonate (CO_3^{2-}) ions and bicarbonate (HCO_3^-) ions by titrating it against standard HCl solution [N/10] using phenolphthalein and methyl orange as indicators.**	**3**
EXP - 2	**To determine the chloride ion (Cl^-) content in the given water sample by Argentometric method (Mohr's method) using N/50 $AgNO_3$ as a standard solution and potassium chromate (K_2CrO_4) as an internal indicator.**	**3**
EXP-3	**To determine the temporary and permanent hardness of given water sample by titrating it against standard solution of M/100 Ethylene Diamine Tetracetic Acid (EDTA) using Eriochrome black-T (EBT) as an internal indicator.**	**3**
EXP-4	**To determine the coefficient of viscosity of the given sample solution by Ostwald's viscometer (Viscosity of water = 0.0101 Poise).**	**3**
EXP - 5	**To determine the ferrous ion (Fe^{++}) content in given sample solution of Mohr's salt ($FeSO_4.(NH_4)_2SO_4.6H_2O$) by titrating it against standard N/30 potassium dichromate ($K_2Cr_2O_7$) solution by using potassium ferricyanide $K_3[Fe(CN)_6]$ as an external indicator.**	**3**
EXP - 6	**To determine the surface tension of the given sample**	**3**

	solution by drop number method.	
EXP - 7	**To determine the percentage of available chlorine in the given sample of 1 gram bleaching powder by titrating it against standard solution of N/25 sodium thiosulphate ($Na_2S_2O_3$) using starch $(C_6H_{10}O_5)_n$ as an internal indicator.**	**3**
EXP – 8	**To determine the alkalinity of the given water sample containing carbonate (CO_3^{2-}) ions and hydroxide (OH^-) ions by titrating it against standard HCl solution [N/10] using phenolphthalein and methyl orange as indicators.**	**3**
EXP – 9	**To determine the rate constant of a reaction**	**3**
EXP – 10	**To determine the acid value of oil**	**3**
EXP – 11	**To determine the Copper (Cu^{++}) ion content in the given sample of copper ore (blue vitriol) by titrating it against standard N/30 sodium thiosulphate solution using KI and starch as indicator by Iodometeric titration.**	**3**
EXP - 12	**Synthesis of phenol-formaldehyde resin/urea-formaldehyde resin**	**3**
EXP - 13	**To determine the strength of unknown HCl solution by titrating it against N/10 NaOH solution with the help of pH meter.**	**3**
EXP - 14	**Determination of adsorption isotherm of acetic acid on activated charcoal**	**3**

Text Books:

- Sunita Rattan, " Comprehensive Engineering Chemistry", S.K. Kataria & Sons Delhi, Indi, 2nd Edition (2009)
- Shashi Chawala , "Theory and Practicals of Engineering Chemistry", Dhanpat Rai and Company, India 3rd Edition (2012)

1. Subject Code: **PEC 151/251** Course Title:**Basic Electronics Engg Lab.**

2. Contact Hours: **L:** **0** **T:** **0** **P:** **2**

3. Credits: 1

4. Semester: **I/II**

5. Subject Area: **Core Course**

6. Pre-requisite: **Physics.**

7. **Course Outcomes:**	• An in-depth understanding of basic active and passive components. • Characteristics of diode and transistors. • Implementation of electronic circuits on the bread board. • An in-depth understanding of basic logic gates.

8. **Details of the Course:**

Sl. No.	**Contents**
1.	Familiarization of Electronics measuring instrument and components.
2.	Measure the Voltage and frequency using a CRO.
3.	Measurement of Resistance, Capacitance, Voltage and Current using Digital Multimeter.
4.	Study V-I characteristics of PN junction diode.
5.	Study of logic gates
6.	Study V-I characteristics of PN junction diode and determine the static and dynamic resistance from the characteristic curve.
7.	Study V-I characteristics of Zener diode and determine its voltage regulation.
8.	Study of a Half Wave rectifier circuit with and without capacitor filter.
9.	Study of a Full Wave rectifier circuit with and without capacitor filter.
10.	Study the input and output characteristics of common base (CB) transistor.
Innovative	
1.	Study of summer using Op-Amp IC.
2.	Study of subtractor using Op-Amp IC.
3.	Study of half adder using logic gates.
4.	As suggested by the concerned faculty/lab in charge.