P.A.COLLEGE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution)
POLLACHI - 642 002
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CURRICULUM AND SYLLABI
I –B.E. PROGRAMME
REGULATION 2019

P.A.COLLEGE OF ENGINEERING AND TECHNOLOGY
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REGULATION 2019
B.E. COMPUTER SCIENCE AND ENGINEERING
CURRICULUM AND SYLLABUS

SEMESTER I

Sl.No.	COURSE CODE	COURSE TITLE	L	T	P	C
		Induction Programme	0	0	0	0
THEORY						
1	19CSHS101	Communicative English	3	0	0	3
2	19CSBS102	Engineering Mathematics - I	3	1	0	4
3	19CSBS103	Engineering Physics	3	0	0	3
4	19CSES104	Programming for Problem Solving	3	0	0	3
PRACTICAL						
5	19CSBS105	Physics Laboratory	0	0	3	1.5
6	19CSES106	Workshop Practice	0	0	4	2
7	19CSES107	Programming in C Laboratory	0	0	3	1.5
		Total	**12**	**1**	**10**	**18**

SEMESTER II

Sl.No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	19CSBS201	Engineering Chemistry	3	0	0	3
2	19CSBS202	Engineering Mathematics - II	3	1	0	4
3	19CSES203	Fundamentals of Electrical and Electronics Engineering	3	0	0	3
4	19CSES204	Engineering Graphics	2	0	4	4
5	19CSPC205	Python Programming	2	0	2	3
PRACTICAL						
6	19CSBS206	Chemistry Laboratory	0	0	3	1.5
7	19CSES207	Fundamentals of Electrical and Electronics Engineering Laboratory	0	0	3	1.5
		Total	**13**	**1**	**12**	**20**

INDUCTION PROGRAMME **SEMESTER I**

(Common to all branches)

Number of Days **21 Days**

Activities:

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovations

19CSHS101 **COMMUNICATIVE ENGLISH** **SEMESTER I**

(Common to all branches)

L T P C
3 0 0 3

COURSE OBJECTIVES:

The course is intended to:

- Make learners acquire listening skills with correct pronunciation, stress and Intonation.
- Emphasize the development of speaking skills amongst the learners of Engineering.
- Inculcate the habit of reading for effective and efficient communication.
- Equip the learners with writing skills needed for academic as well as work place contexts.
- Enable learners to fine-tune their linguistic skills with appropriate grammatical usage.

UNIT-I: LISTENING

9

Listening Comprehension, Pronunciation, Intonation, Stress,Pause, Rhythm, Listening to Short & Long Conversations/Monologues- Note -Taking.

UNIT-II: SPEAKING

9

Self Introduction, Making Oral & Formal Presentation, Communication at Work Place, Mock Interviews, Role Play Activities, Group Discussions,Debates, Delivering Welcome Address, Proposing Vote of Thanks, Introducing the Chief Guest at a function.

UNIT-III: READING

9

Reading Comprehension, Speed Reading, Interpreting Visual Materials (Signs, Post Cards, Pictures, and Labels Etc), Reading for Specific Information, Reading to identify Stylistic Features (Syntax, Lexis and Sentence Structures), Cloze Test.

UNIT-IV:WRITING

9

Phrase, Clause and Sentence Structures, Punctuation, Discourse Markers, Coherence, Precision in Writing, Graph & Process Description, Definition, Writing E-mail, Paraphrasing,

Note-making, Job Application with Resume, Writing Review of a Book/Movie, Creative Writing.

UNIT-V: GRAMMAR AND VOCABULARY

9

Word Formation with Prefix and Suffix, Synonyms and Antonyms, Tenses, Parts of Speech, Common Errors in English (Subject-Verb Agreement, Noun-Pronoun Agreement, Prepositions, Articles, Conditional statements, Redundancies, Clichés etc), Voices.

Contact periods:

Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods

REFERENCES:

1. Board of Editors, Using English, Orient Black Swan, 2015.
2. Practical English Usage, Michael Swan, OUP 1995.

3. Cambridge BEC Vantage Practice Tests, Self-study Edition, CUP, 2002.
4. Exercises in Spoken English. Parts 1-II, EFLC, Hyderabad, OUP, 2014.
5. Indlish. JyothiSanyal, Viva Books, 2006.
6. Communicative English. J. Anbazhagan Vijay, Global Publishers, Chennai 2018.

WEB REFERENCES:

1. www.cambridgeenglish.org/exams/
2. www.examenglish.com/BEC/BEC_Vantage.html
3. www.splendid-speaking.com/exams/bec_ speaking.html

COURSE OUTCOMES:

At the end of this course, the learners will be able to

CO1: Listen and comprehend the contexts delivered in English

CO2: Speak clearly, confidently, comprehensively and communicate with one or many listeners using appropriate communicative strategies

CO3: Read different genres of texts adopting various reading strategies

CO4: Write effectively and persuasively to enhance students' employability

CO5: Communicate cohesively, coherently and flawlessly avoiding grammatical errors and using a wide vocabulary range in speaking and writing contexts

19CSBS102 ENGINEERING MATHEMATICS I SEMESTER I

(Common to all branches)

L T P C
3 1 0 4

COURSE OBJECTIVES:

- To be familiarize with differentiation of single variable and its applications.
- To acquire knowledge of differentiation for more than one variable and its applications.
- To obtain the knowledge of definite and improper integration.
- To acquire the knowledge of multiple integration and related applications.
- To gain methods to solvedifferential equations with constant and variable coefficients.

UNIT-I: DIFFERENTIAL CALCULUS 9+3

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

UNIT -II: FUNCTIONS OF SEVERAL VARIABLES 9+3

Partial differentiation - Homogeneous functions and Euler's theorem - Total derivative - Change of variables - Jacobians - Partial differentiation of implicit functions - Taylor's series for functions of two variables - Maxima and minima of functions of two variables - Lagrange's method of undetermined multipliers.

UNIT-III: INTEGRAL CALCULUS 9+3

Definite and Indefinite integrals - Substitution rule - Techniques of Integration : Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

UNIT-IV: MULTIPLE INTEGRALS 9+3

Double integrals - Change of order of integration - Double integrals in polar coordinates - Area enclosed by plane curves - Triple integrals - Volume of solids - Change of variables in double and triple integrals.

UNIT-V: DIFFERENTIAL EQUATIONS 9+3

Higher order linear differential equations with constant coefficients - Method of variation of parameters - Homogenous equation of Euler's and Legendre's type - System of simultaneous linear differential equations with constant coefficients - Method of undetermined coefficients.

Contact periods:
Lecture: 45 Periods Tutorial: 15 Periods Practical: 0 Periods Total: 60 Periods

REFERENCES:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publisher, 43rd Edition, 2010.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015.
3. Anton, H, Bivens, I and Davis, S, "Calculus", Wiley, 10th Edition, 2016.
4. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.
5. Narayanan, S. and ManicavachagomPillai, T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2007.
6. Srimantha Pal and Bhunia, S.C, "Engineering Mathematics" Oxford University Press, 2015.
7. Weir, M.D and Joel Hass, "Thomas Calculus", 12th Edition, Pearson India, 2016

COURSE OUTCOMES:

Upon completion of this course, the students will be able to

CO1: Understand the limit definition and rules of differentiation to differentiate functions

CO2: Apply differentiation to solve maxima and minima problems

CO3: Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts

CO4: Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, inaddition to change of order and change of variables.

CO5: Apply various techniques in solving differential equations.

19CSBS103 ENGINEERING PHYSICS SEMESTER I

L T P C
3 0 0 3

COURSE OBJECTIVES:

To enhance the fundamental knowledge in Semiconductor Physics and its applications relevant to various streams of Engineering and Technology. Upon completion of this course the students will be familiar with

- The properties of electronic materials.
- The properties and applications of semiconductors.
- The application of magnetic and superconducting materials.
- Measurement of various parameters related to semiconductors.

- Applications and properties of engineered semiconductor materials and nano materials.

UNIT-I: ELECTRONIC MATERIALS
9

Classical Free electron theory of metals - Postulates-Electrical and Thermal conductivity of metals - Derivation of Wiedemann-Franz law-Lorentz number-Drawbacks of Classical theory- Occupationprobability- Effect of temperature- Density of energy states in meals (derivation) - Carrierconcentration in metals- Calculation of Fermi energy at0K-Types of electronic materials: metals, semiconductors and insulators.

UNIT-II: SEMICONDUCTORS **9**

Properties of semiconductors-elemental and compound semiconductor - Direct and indirect band Gaps- Intrinsic and extrinsic semiconductors- Fermi level -Carrier concentration in intrinsicsemiconductor - Dependence of Fermi level on temperature - Electrical conductivity- band gap determination - extrinsic semiconductors - Carrier concentration in P type and N type-Semiconductors-Dependence of Fermi level on impurity concentration and temperature for P type and N type semiconductors.

UNIT-III: MAGNETIC AND SUPERCONDUCTING MATERIALS **9**

Origin of magnetic moment -Bohr magneton - Dia, Para, and Ferro magnetic materials-DomainTheoryof ferromagnetism - Hysteresis - Hard and Soft magnetic materials. Superconductivity- Typesof superconductors -BCS theory of superconductivity (qualitative)- properties - Meissner effect, effect of magnetic field and heavy current-Applications of superconductors: Cryotron and Magneticlevitation.

UNIT-IV:MEASUREMENTS
9

Fourpoint probe and van der Pauw measurements for carrier density, resistivity, and hall mobility – HotPoint probe measurement - capacitance-voltage measurements - parameter extraction from diode I-Vcharacteristics -DLTS - Determination of band gap by UV-Vis spectroscopy-absorption/transmission.

UNIT-V:ENGINEERED SEMICONDUCTOR MATERIALS **9**

Density of states in 2D, ID and 0D (qualitatively) - Practical examples of low-dimensional systems such as quantum wells, wires, and dots -Nanomaterials - Properties- Methods of synthesize - Top- down & Bottom up Approach -Ball Milling - Chemical vapour deposition - Application of Nanomaterials.

Contact periods:
Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods

REFERENCES:

1. William D Callister and David G. Rethwisch, "Materials Science & Engineering: An introduction" ,9thEdition, Wiley, 2013.
2. Sze. S. M, "Semiconductor Devices: Physics and Technology", Wiley, 2008.
3. Bhattacharya P., "Semiconductor Optoelectronic Devices", Prentice Hall of India, 1997.
4. Singh J, "Semiconductor Optoelectronics: Physics and Technology". McGraw-Hill Inc 1995.
5. Rajendran. V, "Materials Science", Tata McGraw-Hill Publications, New Delhi, 2017.
6. Jayakumar S, "Materials Science". R.K.Publishers, 2008.

COURSE OUTCOMES:

Upon completion of this course the students will be able to

- Analyze the properties of conducting materials.
- List and analyze the properties of Semiconducting materials and devices.
- Identify, analyze the properties and applications of magnetic and superconducting materials.
- Interpret the various measuring instruments related to semiconductor parameters.
- List the properties and applications of engineered semiconducting materials

19CSBS104 PROGRAMMING FOR PROBLEM SOLVING SEMESTER I

L T P C

3 0 0 3

COURSE OBJECTIVES:

- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions, pointers, structures and union
- To perform file handling operations in C
- To learn dynamically allocated memory techniques and file operations in C.

UNIT-I:BASICS OF C PROGRAMMING 11

Generation and Organization of Computers - Number System - Binary - Decimal - Conversion - Problems. Need for logical analysis and thinking - Algorithm - Pseudo code - Flow Chart. Introduction to programming paradigms: Structure of C program - Data Types - Constants - Enumeration Constants - Keywords - Operators and Expressions - Input / Output statements.

UNIT-II :ARRAYS AND STRINGS 9

Decision making statements - Switch statement - Looping statements - Arrays - Initialization - Declaration - One dimensional and Two dimensional arrays - String : String operations - String Arrays - Simple programs : Sorting - Searching - Matrix operations.

UNIT-III :FUNCTIONS AND POINTERS 9

Introduction to functions: Function prototype, function definition, function declaration, function call, Built-in functions (string functions, math functions) - Recursion - Pointers - Pointer operators - Pointer arithmetic - Arrays and pointers - Array of pointers - Parameter passing: Pass by value, Pass by reference.

UNIT-IV: STRUCTURES AND UNION 9

Structure - Nested structures - Pointer and Structures - Array of structures - Example Program using structures and pointers - Self referential structures - Union - Programs using structures and Unions - Enumeration types - Bit fields - typedefs - Dynamic memory allocation - Storage classes.

UNIT-V: FILE PROCESSING 7

Files: File opening modes - Types of file processing: Sequential access, Random access - Preprocessor directives - Command line arguments.

Contact periods:
Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods

REFERENCES:

1. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
2. ReemaTheraja "Fundamentals of Computing and Programming in C", Second Edition, Oxford University Press, 2016
3. Yashavant P. Kanetkar. "Let Us C", BPB Publications, 15th revised edition, 2016.
4. Dawn Griffiths, David Griffiths, "Head First C", O'Reilly Publishers, 2012.
5. Paul J. Deitel and Harvey Deitel, "C How to Program", 7th ed., Pearson Education, 2013.

COURSE OUTCOMES:

Upon completion of the course, students will be able to

CO1: Develop simple applications in C using basic constructs

CO2: Design and implement applications using arrays and strings

CO3: Develop and implement applications in C using functions and pointers.

CO4: Develop applications in C using structures and union.

CO5: Design applications using sequential and random-access file processing.

19CSBS105 PHYSICS LABORATORY SEMESTER I

(Common to all branches)

L T P C
0 0 3 1.5

COURSE OBJECTIVES:

Upon completion of this course, the students will be familiar with,

- Physical and thermal properties of matter.
- Calibration of electrical devices, Laser diffraction and parameters of optical fibers.
- Compressibility of liquids and viscosity of liquids.
- Band gap energy of semiconductors and thickness of paper.
- Spectral wavelength and dispersive power of prism.

LIST OF EXPERIMENTS

1. Young's Modulus - Cantilever Bending - Koenig's Method
2. Torsional pendulum - Determination of Rigidity Modulus & Moment of Inertia
3. Young's Modulus - Non Uniform bending Method
4. Lee's Disc method - Thermal conductivity of a bad conductor
5. Ammeter and Voltmeter Calibration - Low Range
6. a) Laser - Particle size Determination
   b) Optical fiber - Determination of NA & Acceptance angle
7. Ultrasonic Interferometer - Velocity of sound & Compressibility of liquids
8. Poiseuille's method - Determination of Coefficient of viscosity of a liquid
9. Determination of Bandgap Energy of Semiconductor
10. Air Wedge - Determination thickness of a paper
11. Spectrometer - Diffraction Grating - Normal Incidence Method

12. Spectrometer - Determination of Dispersive power of a prism

Contact periods:
Lecture: 0 Periods Tutorial: 0 Periods Practical: 45 Periods Total: 45 Periods

COURSE OUTCOMES:
Upon completion of the course, the students will be able to
CO1: Determine the physical and thermal properties of matter
CO2: Calibrate electrical measuring instruments and thereby effectively using it for electronic application and understanding the principle of Laser diffraction and propagation through optical fibers and determine its parameters
CO3: Understand the ultrasonic wave propagation in liquids and determine the viscosity of liquids for engineering applications
CO4: Determine the band gap energy of semiconductor materials and thickness of paper
CO5: Identify the spectral wavelength and determine the dispersive power of prism

19CSES106 WORKSHOP PRACTICE SEMESTER I
(Common to all branches)

L T P C
0 0 4 2

COURSE OBJECTIVES:
- To make various basic prototypes in the carpentry trade such as Lap joint, Lap Tee joint, Dove tail joint, Mortise & Tenon and Cross-Lap joint.
- To make various Welding joints such as Lap joint, Lap Tee joint, Edge joint, Butt joint and Corner joint.

LIST OF EXPERIMENTS
1. Introduction to use of tools and equipments in Carpentry, Welding, Foundry and Sheet Metal
2. Safety aspects in Carpentry, Welding and Foundry
3. Half lap Joint and Dove tail Joint in Carpentry
4. Welding of Lap joint, Butt joint and T-joint
5. Preparation of Sand mould for cube, conical bush, pipes and V pulley
6. Fabrication of parts like tray, frustum of cone and square box in sheet metal
7. Electrical wiring – simple house wiring
8. Plumbing
9. CNC Machines demonstration and lecture on working principle.
10. Additive manufacturing demonstration and lecture on working principle.

Contact periods:
Lecture: 15 Periods Tutorial: 0 Periods Practical: 60 Periods Total: 75 Periods

COURSE OUTCOMES:
Upon on completion of this course, the student will be able to
CO1: Use tools and equipments used in Carpentry, Welding, Foundry and Sheet metal.
CO2: Make half lap joint and dovetail joint in carpentry.
CO3: Make welded lap joint, butt joint and T-joint.

CO4: Prepare sand mould for cube, conical bush, pipes and V pulley.
CO5: Fabricate parts like tray, frustum of cone and square box in sheet metal.

19CSES107 PROGRAMMING IN C LABORATORY SEMESTER I

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- To develop programs in C using basic constructs.
- To develop applications in C using strings, pointers, functions, structures.
- To develop applications in C using file processing.

LIST OF EXPERIMENTS

1. Programs using I/O statements and expressions.
2. Programs using decision-making constructs.
3. Write a program to find whether the given year is leap year or Not? (Hint: not every centurion year is a leap. For example 1700, 1800 and 1900 is not a leap year)
4. Design a calculator to perform the operations, namely, addition, subtraction, multiplication, division and square of a number.
5. Check whether a given number is Armstrong number or not?
6. Given a set of numbers like <10, 36, 54, 89, 12, 27>, find sum of weights based on the following conditions:
   i. 5 if it is a perfect cube.
   ii. 4 if it is a multiple of 4 and divisible by 6.
   iii. 3 if it is a prime number.
   Sort the numbers based on the weight in the increasing order as shown below
   <10,its weight>,<36,its weight><89,its weight>
7. Populate an array with height of persons and find how many persons are above the average height.
8. Populate a two dimensional array with height and weight of persons and compute the Body Mass Index of the individuals.
9. Given a string ―a$bcd./fg‖ find its reverse without changing the position of special characters. (Example input:a@gh%;j and output:j@hg%;a)
10. Convert the given decimal number into binary, octal and hexadecimal numbers using user defined functions.
11. From a given paragraph perform the following using built-in functions:
    a. Find the total number of words.
    b. Capitalize the first word of each sentence.
    c. Replace a given word with another word.
12. Solve towers of Hanoi using recursion.
13. Sort the list of numbers using pass by reference.

14 Generate salary slip of employees using structures and pointers.

15 Compute internal marks of students for five different subjects using structures and functions.

16 Insert, update, delete and append telephone details of an individual or a company into a telephone directory using random access file.

17 Count the number of account holders whose balance is less than the minimum balance using sequential access file.

18 **Mini project**

Create a ―Railway reservation system‖ with the following modules

- Booking
- Availability checking
- Cancellation
- Prepare chart

Contact periods:
Lecture: 0 Periods Tutorial: 0 Periods Practical: 45 Periods Total: 45 Periods

COURSE OUTCOMES:

Upon completion of the course, students will be able to

CO1: Develop C programs for simple applications making use of basic constructs, arrays and strings.
CO2: Develop C programs involving functions, recursion, pointers, and structures.
CO3: Design applications using sequential and random access file processing.

19CSBS201 ENGINEERING CHEMISTRY SEMESTER II
(Common to CSE, ECE and EEE)

L T P C

3 0 0 3

COURSE OBJECTIVES:

- To understand the principles of electrochemical reactions,electrode potential and applications of EMF measurements.
- To accustom the student about the principles and generation of energy in different types of batteries.
- To obtain the knowledge on concepts of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
- To acquaint the student with the concepts of important photophysical and photochemical processes and elemental analysis using spectroscopy.
- To develop the advanced engineering materials by using silicon wafer techniques.

UNIT-I: ELECTROCHEMICAL CELLS
9

Galvanic cells - redox reactions - electrodes metal and metal ion, hydrogen electrode and calomel electrode - electrode potentials-standard oxidation and reduction potentials - Nernst

equation and problems - EMF series and significance - Application of EMF measurements - pH measurement using glass electrode and fluoride measurement by ISE.

UNIT-II: BATTERIES

9

Batteries - components, characteristics - voltage, current, current capacity, power density, energy density, cycle life, shelf life and self discharge. Types of batteries - Primary - Zn/MnO_2, Zn/HgO, Zn/Ag_2O, $Li/SOCl_2$, construction, function and performance comparison - Secondary lead acid, nickel cadmium and lithium ion battery - construction, function and performance comparison.

UNIT-III: CORROSION

9

Corrosion - spontaneity - chemical corrosion - mechanism, nature of oxides – Pilling - Bedworth rule - electrochemical corrosion - mechanism-galvanic series and importance - prevention methods - design of materials, cathodic protection techniques(sacrificial anode and impressed current cathode), inhibitors - Protective coatings - inorganic coating - electroplating - surface preparation and plating method applied to Cr and Ni and galvanizing - organic coating - paints - constituents and functions.

UNIT-IV: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

9

Beer-Lambert's law - UV Visible spectroscopy and IR spectroscopy – principles - instrumentation (block diagram only) - Flame photometry-principles - instrumentation (block diagram only) - estimation of sodium by flame photometry - atomic absorption spectroscopy - principles instrumentation(block diagram only)-estimation of Ni by atomic absorption spectroscopy.

UNIT-V: SILICON WAFER TECHNOLOGY

9

Silicon for IC chips - single crystal - preparation by czechralsky and float zone processes - wafer preparation, P-N junction formation - ion implantation, diffusion and epitaxial growth techniques - insulator layer by oxidation - printing of circuits by photolithography - masking and electron beam methods - etching by chemical and electrochemical methods.

Contact periods:

Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods

REFERENCES:

1. Jain P.C. and Monica Jain, "Engineering Chemistry", DhanpatRai Publications Pvt. Ltd, New Delhi, 16" Edition, 2017.
2. Dara S.S, Umarae, "Text book of Engineering Chemistry", S. Chand Publications, 2004.
3. Agarwal, C.V, "Chemistry of Engineering Materials", 9" Edition, B.S. Publications, 2006.
4. Kuriakose J.C, and Rajaram J, "Chemistry in Engineering and Technology", vol.1 & I, Tata McGraw Hill Publishing company Pvt. Ltd, New Delhi, 2001.
5. Sharma Y.R,"Elementary Organic Spectroscopy", S. Chand Publications, 2013.
6. Tyagi M.S., "Introduction to semiconductor materials and devices",Wiley India 2012.
7. Puri B.R, Sharma L.R and Pathania M.S, "Principles of Physical chemistry", S.Nagin

Chand and Co. 2017.

COURSE OUTCOMES:

Upon completion of this course, the student will be able to

CO1: Understand the principles of electrochemical cells,EMF measurements and electrode potentials which makes them to apply in experimental instrumentation techniques.

CO2: Know the knowledge about different types of batteries with their functions which is useful for various engineering fields.

CO3: Be familiar with corrosion of the instruments and equipments they use in their field and also to learn the mechanisms and the preventive measures by various techniques.

CO4: Know about the different types of spectroscopic techniques and applications.

CO5: Gain the knowledge about the silicon chips and their fabrication methods and to apply in preparation of electrical and electronics instruments.

19CSBS202 ENGINEERING MATHEMATICS II SEMESTER II

(Common to all branches)

L T P C
3 1 0 4

COURSE OBJECTIVES:

- To obtain the knowledge of Eigen values and diagonalization of a matrix.
- To gain the knowledge of vector differentiation, integration and related applications.
- To be known about analytic functions with properties, construction of analytic function and the knowledge of conformal transformation.
- To obtain the knowledge of Cauchy's integral theorem, calculus of residues and complex integration around unit circle and semicircle.
- To be familiar with techniques of Laplace and Inverse Laplace transformation.

UNIT-I: MATRICES

9+3

Eigen values and Eigenvectors of a real matrix - Characteristic equation - Properties of Eigen values and Eigenvectors - Cayley-Hamilton theorem - Diagonalization of matrices - Reduction of a quadratic form to canonical form by orthogonal transformation -Nature of quadratic forms

.

UNIT-II: VECTOR CALCULUS

9+3

Gradient and directional derivative -Divergence and curl - Vector identities - Irrotational and Solenoidal vector fields - Line integral over a plane curve - Surface integral - Area of a curved surface - Volume integral - Green's, Gauss divergence and Stoke's theorems - Verification and application in evaluating line, surface and volume integrals

.

UNIT-III:ANALYTIC FUNCTIONS

9+3

Analytic functions - Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates - Properties -Harmonic conjugates - Construction of analytic function - Conformal mapping - Mapping by functions $w= z + c$, cz ,$\frac{1}{z}$, z^2 - Bilinear transformation.

UNIT-IV: COMPLEX INTEGRATION
9+3

Line integral - Cauchy's integral theorem - Cauchy's integral formula - Taylor's and Laurent's series - Singularities - Residues - Residue theorem - Application of residue theorem for evaluation of real integrals - Use of circular contour and semicircular contour.

UNIT-V: LAPLACE TRANSFORMS
9+3

Existence conditions - Transforms of elementary functions - Transform of unit step function and unit impulse function - Basic properties - Shifting theorems -Transforms of derivatives and integrals - Initial and final value theorems - Inverse transforms - Convolution theorem - Transform of periodic functions - Application to solution of linear second order ordinary differential equations with constant coefficients.

Contact periods:

Lecture: 45 Periods	**Tutorial: 15 Periods**	**Practical: 0 Periods**	**Total: 60 Periods**

REFERENCES:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, 43rd Edition, 2015.
2. Erwinkreyszig, "Advanced Engineering Mathematics", 10th Edition, John Wiley & Sons, 2016.
3. Bali N.P , Manish Goyal v and Watkins C., "Advanced Engineering Mathematics", FirewallMedia, New Delhi, 7th Edition, 2009.
4. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi , 3rd Edition, 2007.
5. O'Neil, P.V. "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2007.
6. Sastry, S.S, "Engineering Mathematics", Vol. I & II, PHI Learning Pvt. Ltd, 4th Edition, New Delhi, 2014.
7. Wylie, R.C. and Barrett, L.C., "Advanced Engineering Mathematics" Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to

CO1: Understand the concept of Eigen values and eigenvectors, diagonalization of a matrix, symmetric matrices, positive definite matrices and similar matrices

CO2: Acquire knowledge in Gradient, divergence and curl of a vector point function and related identities

CO3: Understand the properties and formation of analytic function, mappings of standard functions and Bilinear transformation

CO4: Understand calculus of residues to evaluate contour integration

CO5: Understand Laplace transform and inverse transform of simple functions, various related theorems and application to differential equations with constant coefficients

19CSES203 FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING **SEMESTER II**

L T P C
3 0 0 3

COURSE OBJECTIVES:

To understand and analyze basic electric circuits

- To study working principles of Electrical Machines and transformers
- To study working principle of basic electronic systems
- To understand the functioning of power electronic circuits and its applications

UNIT-I: DC CIRCUITS **9**

Electrical Circuit Elements-Voltage and Current Sources-Source transformation techniques-Ohm's law, Kirchhoff's laws - Analysis of simple circuits with DC excitation - Superposition, Thevenin and Norton's theorem - Star and Delta transformation.

UNIT-II: AC CIRCUITS

9

Representation of sinusoidal waveforms, Peak, RMS and Average value, Real power, Reactive power, Apparent power and Power factor. Analysis of single phase AC circuits consisting of R,L,C,RL,RC, RLC combinations(Series and Parallel) - Resonance in series circuits (Study of phenomenon).Three phase circuits - Relation between voltage and current in star and delta connections-Three phase balanced circuits.

UNIT-III: ELECTRICAL MACHINES AND TRANSFORMERS

9

Working and construction of Single phase transformer - EMF equation-Equivalent circuit - Regulation and Efficiency. Construction and Principle of operation of: Three phase induction motor and Single phase induction motor-Synchronous generators - Regulation and efficiency - Construction and Operation of DC generator and DC motor - Load test on DC motor and Swinburne's test - DC generator emf equation-Applications of all machines.

UNIT-IV: BASIC ELECTRONIC SYSTEMS

9

Semiconductor materials-Operation and characteristics of BJT, JFET, MOSFET, UJT and SCR. Amplifier circuits-Operational Amplifiers and its characteristics – Inverting-Non Inverting – Summing-Differential amplifiers. Linear IC applications: Voltage regulators-555 Timer and Phase locked loops.

UNIT-V: ENERGY,POWER ELECTRONICS AND MEASUREMENTS

9

Three phase Converter and Inverter Circuit Operation - UPS – SMPS-Batteries and Types-Design of battery for backup-Measuring Instruments: Digital voltmeter-Digital Storage Oscilloscope - Energy Consumption Calculation-Power factor improvement-Harmonics and its mitigation methods.

Contact periods:

Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods

REFERENCES:

1. Kothari.D.P, NagrathI.J, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. BimbhraP.S, "Electrical Machinery", Khanna Publishers, 2011.
3. Rashid M H, "Power electronics: circuits, devices, and applications", Pearson Education India, 2009.
4. SedhaR.S,"A Textbook of Applied Electronics", S.Chand and Company Limited, 2016
5. Nagsarkar T .K and SukhijaM. S, "Basic Electrical Engineering", Oxford Press, 2005.
6. NagrathI.J and Kothari D.P, "Electric Machines", McGraw Hill Education, 2010.
7. Hughes E, "Electrical and Electronics Technology" Pearson, 2010.
8. MahmoodNahvi and Joseph A. Edminister, "Electric Circuits", Schaum Outline series, McGraw Hill, Sixth edition, 2014.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to

CO1: Verify Ohm's law, Kirchhoff's laws and theorems for simple electrical circuits.
CO2: Solve problems on AC circuits and analyze three phase AC circuits.
CO3: Understand the performance of AC, DC machines and transformers.
CO4: Studying of analog electronic devices and Operational Amplifier applications.
CO5: Understanding of power electronic circuits and their application.

19CSES204 **ENGINEERING GRAPHICS** **SEMESTER II**

(Common to all branches)

L T P C

2 0 4 4

COURSE OBJECTIVES:

- Geometrical constructions
- Orthographic projection
- Performing section of solids and development of the same
- Pictorial view of solids
- Familiarization of CAD packages

UNIT-I:GEOMETRICAL CONSTRUCTIONS

6+12

Dimensioning - Lettering - Types of Lines - Scaling conventions - Dividing a given straight line in to any number of equal parts - Bisecting a given angle - Drawing a regular polygon given one side - Special methods of constructing a pentagon and hexagon.

UNIT-II: ORTHOGRAPHIC PROJECTIONS

6+12

Introduction to Orthographic projections - Projectionof points - Projection of straight lines with traces – conversion of pictorial views to orthographic views - Projection of solids

UNIT-III: SECTION OF SOLIDSAND DEVELOPMENT

6+12

Sectioning of solids - Development of surfaces

UNIT-IV: PICTORIAL VIEW

6+12

Isometric Projections – Conversion of orthographic views to Pictorial views (simple objects)

UNIT-V: COMPUTER AIDED DRAFTING
6+12

Introduction to computer aided drafting package to make 2-D Drawing. Object Construction - page layout - Layerand Line type - Creating, Editing and selecting the Geometric Objects - Mechanics - Viewing, Annotating, Hatching and Dimensioning the drawing - Creating Blocks and Attributes, Drafting - Create 2D drawing. A Number of chosen problems will be solved to illustrate the concepts clearly. (Demonstration purpose only, not be included in examinations)

Contact periods:
Lecture: 30 Periods Tutorial: 0 Periods Practical: 60Periods Total: 90Periods

REFERENCES:

1. Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai,2009.
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.
3. BasantAgarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
4. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50thEdition, 2010.
5. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
6. Luzzader, Warren.J. and Duff,John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
7. N S Parthasarathyand Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
8. Shah M.B. and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2009.

COURSE OUTCOMES:

Upon on completion of the course, the student will be able to

CO1: Represent solids as per international standards.
CO2: Generate and interpret multiple views through development, interpretation and sectional views
CO3: Generate and interpret orthographic views.
CO4: Generate and interpret pictorial views.
CO5: Towards the end of the course it is expected that the students would be matured to visualize the engineering components.

19CSES205 PYTHON PROGRAMMING SEMESTER II

L T P C
2 0 2 3

COURSE OBJECTIVES:

- To develop Python programs with conditionals and loops.
- To define Python functions and call them.

- To use Python data structures - lists, tuples, dictionaries.
- To do input/output with files in Python.
- To understand object oriented features.

UNIT-I : DATA, EXPRESSIONS, STATEMENTS
9

Python interpreter and interactive mode; values and types: int, float, Boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT-II: CONTROL FLOW, FUNCTIONS
9

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT-III: LISTS, TUPLES, DICTIONARIES
9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

UNIT-IV: FILES, MODULES, PACKAGES
9

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

UNIT-V: OBJECT ORIENTED FEATURES
9

Classes Principles of Object Orientation - Creating Classes - Instance Methods - File Organization - Special Methods - Class Variables - Inheritance - Polymorphism - Type Identification - Simple Character Matches - Special Characters - Character Classes - Quantifiers - Dot Character - Greedy Matches - Grouping - Matching at Beginning or End - Match Objects - Substituting - Splitting a String - Compiling Regular Expressions.

Lecture: 45 Periods Tutorial: 0 Periods Practical: 0Periods Total: 45 Periods

REFERENCES:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist ‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016.
2. Guido van Rossum and Python development team, - An Introduction to Python - Revised and updated for Python 3.6.2, Shroff Publishers and Distributors Pvt. Ltd., 2017.

3. Robert Sedgewick, Kevin Wayne, Robert Dondero, - Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
4. Timothy A. Budd, - Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd., 2015.
5. Wesley J Chun, - Core Python Applications Programming, Prentice Hall, 2012.
6. Allen B Downey, - Think Python, O'Reilly, 2012.

COURSE OUTCOMES:

Upon on completion of the course, the student will be able to

CO1: Structure simple Python programs for solving problems.
CO2: Decompose a Python program into functions.
CO3: Represent compound data using Python lists, tuples, dictionaries.
CO4: Read and write data from/to files in Python Programs.
CO5: Design applications using OOP concepts.

19CSBS206 CHEMISTRY LABORATORY SEMESTER II

(Common to all branches)

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- To make the student to acquire practical skills in the determination of water quality parameters through volumetric analysis.
- To provide exposure to the students with hands on experience on the determination of chemical substances present in solution by conductometric and potentiometric experiments.
- To quantify the Copper content by Iodometric method.
- To expose the students to testthe Saponification value of an oil.
- To equip the students with the principles of rate constant of a chemical reaction.

LIST OF EXPERIMENTS:

1. Estimation of hardness by EDTA method.
2. Estimation of chloride by Argentometric method.
3. Conductometric titration of mixture of acids and strong base.
4. Estimation of iron content of the given solution using Potentiometer.
5. Determination of Saponification value of oil.
6. Estimation of Iron by Spectrophotometry.
7. Estimation of HCl by pH titration.
8. Determination of the rate constant of reaction.
9. Estimation of Dissolved Oxygen by Iodometry.
10. Conductometric titration of strong acid and strong base.
11. Conductometric precipitation titration using $BaCl_2$ and Na_2SO_4.
12. Estimation of copper content of the given solution by Iodometry.

Contact periods:

Lecture: 0 Periods Tutorial: 0 Periods Practical: 45 Periods Total: 45 Periods

COURSE OUTCOMES:

Upon completion of the course, the student will be able to

CO1: Outfit with hands-on knowledge in the quantitative chemical analysis of water quality related parameters

CO2: Apply the EMF and conductometric measurements in quantitative analysis of substances

CO3: Equip with the methods and techniques involved in the Saponification process

CO4: Comprehend the rate constant of a chemical reaction with respect to time

CO5: Quantify the metal ion concentration of the given sample

19CSES207 FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY **SEMESTER II**

L T P C
0 0 3 1.5

COURSE OBJECTIVES:

- To familiarize with basic electrical wiring and measurements
- To provide basic laboratory experience on electronic circuits, DC machines, ACmachines and transformer
- To demonstrate internal view of machines and other advanced measurement devices

LIST OF EXPERIMENTS

1. Introductions to measuring instruments-voltmeter, ammeter, wattmeter, multimeter and Digital Storage Oscilloscope.
2. Resonance in RLC circuits, verification of laws in electrical circuits.
3. Measurement of phase difference between voltage and current.
4. Voltage Current relations in three phase circuit and three phase power measurement.
5. Op Amp and its applications in simple circuits.
6. Demonstration of cut out section of machines.
7. No load test on single phase transformer and equivalent test.
8. Load Test on single phase transformer.
9. Swinburne's Test, Speed Control and Load test on DC motor.
10. Direction change and load test on three phase induction motor.
11. Alternator load test and regulation test.
12. Demonstration of Power Quality Analyzer, AC and DC drives.

Contact periods:

Lecture: 0 Periods Tutorial: 0 Periods Practical: 45 Periods Total: 45 Periods

COURSE OUTCOMES:

Upon completion of the course, the student will be able to

CO1: Making electrical connections by wires of appropriate wires

CO2: Acquire exposure to common electrical components and measuring instruments

CO3: Verify Simple laws using electrical circuits

CO4: Do experiment to understand the characteristics of transformers and Electrical machines

CO5: Understand the working of Low Tension Switch gear components, AC and DC drives.