Bapatla Engineering College

(*Autonomous*)

BAPATLA

ACADEMIC RULES & REGULATIONS and SYLLABUS (2020-2021)

First Year B.Tech.

Bapatla Engineering College:: Bapatla

(Autonomous under Acharya Nagarjuna University) *(Sponsored by Bapatla Education Society)* BAPATLA-522102, Guntur District, A.P.

www.becbapatla.ac.in

Bapatla EnginEEring CollEgE :: Bapatla
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Electronics and Communications Engineering
Effective from the Academic Year 2020-2021 (R20 Regulations)
First Year B. Tech (SEMESTER – I)

Code No.		Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EC101 / MA01	BS	Linear Algebra and ODE	3	1	0	4	30	70	100	3
20EC102 / PH01	BS	Waves and Modern Physics	3	1	0	4	30	70	100	3
20EC103 / CY01	BS	Engineering Chemistry	3	1	0	4	30	70	100	3
20EC104 / CS01	ES	Problem Solving with Programming	3	1	0	4	30	70	100	3
20EC105/ CE01	MC	Environmental Studies	3	0	0	3	30	70	100	0
20ECL101 / CYL01	BS	Engineering Chemistry Lab	0	0	3	3	30	70	100	1.5
20ECL102	ES	Hardware Lab	0	0	3	3	30	70	100	1.5
20ECL103 / CSL01	ES	Problem Solving with Programming Lab	0	0	3	3	30	70	100	1.5
		TOTAL	15	4	9	28	240	560	800	16.5

CIE: Continuous Internal Evaluation SEE: Semester End Examination
L: Lecture, T: Tutorial, P: Practical
BS: Basic Science Courses ES: Engineering Science Courses
MC: Mandatory Course

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Electronics and Communications Engineering
Effective from the Academic Year 2020-2021 (R20 Regulations)
First Year B. Tech (SEMESTER – II)

Code No.		Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EC201 / MA02	BS	Numerical Methods and Advanced Calculus	3	1	0	4	30	70	100	3
20EC202	ES	Basic Instrumentation	3	1	0	4	30	70	100	3
20EC203 / EL01	BS	Communicative English	3	1	0	4	30	70	100	3
20EC204 / CS02	ES	Programming with C ++	3	1	0	4	30	70	100	3
20EC205	ES	Circuit Theory	3	1	0	4	30	70	100	3
20EC206	PC	Fundamentals of Digital Electronics	3	1	0	4	30	70	100	3
20ECL201 / PHL01	BS	Physics lab	0	0	3	3	30	70	100	1.5
20ECL202 / ELL01	BS	English Communication and Skills Lab	0	0	3	3	30	70	100	1.5
20ECL203 / CSL02	ES	Programming with C ++ Lab	0	0	3	3	30	70	100	1.5
		TOTAL	18	6	9	33	270	630	900	22.5

CIE: Continuous Internal Evaluation SEE: Semester End Examination
L: Lecture, T: Tutorial, P: Practical
BS: Basic Science Courses ES: Engineering Science Courses
PC: Professional Core

Linear Algebra and ODE
I B. Tech – I Semester (Sub. Code: 20EC101 / MA01)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

COURSE OBJECTIVES:

CO1: To learn about solving a system of linear homogeneous and non-homogeneous equations, finding the inverse of a given square matrix and also its Eigen values and Eigen vectors.

CO2: Identify the type of a given differential equation and select and apply the appropriate analytical technique for finding the solution of first order and higher order ordinary differential equations.

CO3: Create and analyze mathematical models using first and second order differential equations to solve application problems that arises in engineering.

CO4: To learn about solving linear Differential equations with constant coefficients with the given initial conditions using Laplace transform technique.

COURSE OUTCOMES: Students will be able to

CLO-1: Apply elementary row operations to find the rank of a matrix, to solve a system of linear equations and to find the inverse of a matrix.

CLO-2: Find the Eigen values and Eigen vectors of the given square matrix and also compute the higher powers of the given matrix.

CLO-3: Solve separable, linear, exact differential equations with and without initial conditions.

CLO-4: Distinguish between linear and non-linear differential equation.

CLO-5: Write the piecewise continuous functions in terms of unit step functions and hence find its Laplace transforms.

CLO-6: Solve linear differential equation with constant coefficients and unit step input functions using Laplace transforms technique.

SYLLABUS

UNIT - I

Linear Algebra: Rank of a Matrix; Elementary transformations of a matrix; Gauss-Jordan method of finding the inverse; Consistency of linear System of equations: Rouches theorem, System of linear Non-homogeneous equations, System of linear homogeneous equations; vectors; Eigen values; properties of Eigen values(without proofs); Cayley-Hamilton theorem (without proof).

[Sections: 2.7.1; 2.7.2; 2.7.6; 2.10.1; 2.10.2; 2.10.3; 2.12.1; 2.13.1; 2.14; 2.15.]

[12 Hours]

UNIT - II

Differential Equations of first order: Definitions; Formation of a Differential equation; Solution of a Differential equation; Equations of the first order and first degree; variables separable; Linear Equations; Bernoulli's equation; Exact Differential equations; Equations reducible to Exact equations: I.F found by inspection, I.F of a Homogeneous equation, In the equation M dx+ N dy=0.

Applications of a first order Differential equations: Newton's law of cooling; Rate of decay of Radio-active materials.

[Sections: 11.1; 11.3; 11.4; 11.5; 11.6; 11.9; 11.10; 11.11; 11.12.1; 11.12.2; 11.12.4; 12.6; 12.8] [12 Hours]

UNIT – III

Linear Differential Equations: Definitions; Theorem; Operator D; Rules for finding the complementary function; Inverse operator; Rules for finding the Particular Integral; Working procedure to solve the equation; Method of Variation of Parameters; Applications of Linear Differential Equations: Oscillatory Electrical Circuits.

[Sections: 13.1; 13.2.1; 13.3; 13.4; 13.5; 13.6; 13.7;13.8.1;14.1;14.5]

[12 Hours]

UNIT – IV

Laplace Transforms: Definition; conditions for the existence; Transforms of elementary functions; properties of Laplace Transforms; Transforms of derivatives; Transforms of integrals; Multiplication by t^n; Division by t; Inverse transforms- Method of partial fractions; Other methods of finding inverse transforms; Convolution theorem(without proof); Application to differential equations: Solution of ODE with constant coefficients using Laplace transforms.

[Sections:21.2.1; 21.2.2; 21.3; 21.4; 21.7; 21.8; 21.9; 21.10; 21.12; 21.13; 21.14; 21.15.1]

[12 Hours]

TEXT BOOK:

1. B. S. Grewal ― Higher Engineering Mathematics‖, 44th edition, Khanna publishers, 2017.

REFERENCE BOOKS:

1. Erwin Kreyszig, –Advanced Engineering Mathematics, 9th edition, John Wiley & Sons.
2. N. P. Bali and M. Goyal, ―A Text book of Engineering Mathematics Laxmi Publications, 2010.

WAVES AND MODERN PHYSICS

(Common for ECE, EEE, EIE)

I B. Tech – I Semester (Sub. Code-20EC102 / PH01)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

COURSE OBJECTIVES:

CO1: To familiarize the students in getting knowledge about modern optics and their Engineering applications.
CO2: To make aware of the students to obtain circuit knowledge regarding electrical, Electronics and Magnetism.
CO3: To make the students to understand the quantum theory and solving the various Physical problems using quantum mechanics.
CO4: To get the knowledge of various methods of analytical techniques for material testing.

COURSE OUTCOMES: Student will be able to

CLO1: Learn about principle and working of different types of lasers and their applications.
CLO2: Know about principle, types of optical fibres of their importance in communication.
CLO3: Analyze the electromagnetic principles in electrical and electronic circuits and Maxwell‘s equations.
CLO4: Study about quantum mechanics and its applications.
CLO5: Read about properties and applications of ultrasonics in various fields.
CLO6: Know about radio isotopes and their applications.

SYLLABUS

UNIT – I (ADVANCED OPTICS)

Lasers: Interaction of radiation with matter. Einstein co-efficient, Properties of laser, Population inversion, LASER principle, pumping schemes-Three level and four level laser, types of lasers: solid-state lasers (Ruby), gas lasers (He-Ne), Semiconductor lasers; applications of lasers in industry and medicine.

Fibre Optics: Importance of optical fibre, Structure and principle of optical fibre, acceptance angle and numerical aperture, Types of optical fibres based on modes and refractive index, V-number, losses associated with optical fibres, fibre optical communication, advantages of optical fibres

UNIT – II (ELECTRO-MAGNETIC INDUCTION AND MAXWELL’S EQUATIONS)

Maxwell’s equations in vacuum and conducting medium. Velocity of electromagnetic wave in vacuum. Electromagnetic oscillations in LC circuit, LCR series resonance in A. C circuit and resonant frequency, Quality factor. Concept of skin effect, Energy in an electromagnetic field; Flow of energy and Pointing vector. Principle of circulating charge and cyclotron, Hall Effect.

UNIT – III (MODERN PHYSICS)

Dual nature of light, Debroglie concept of matter waves, Davission – Germer experiment, Heisenberg uncertainty principle and applications (non existence of electron in nucleus and finite width of spectral lines), one dimensional time independent and dependent Schrodinger wave equation, physical significance of wave function, application of Schrödinger wave

equation to particle in a one dimensional potential box, concept of quantum tunnelling and construction and working of Scanning Tunnelling Electron Microscope.

UNIT – IV (ANALYTICAL TECHNIQUES)

Ultrosonics: Properties of ultrasonics, Production of ultrasonic waves by magnetostriction and piezo-electric method, Determination of velocity of ultrasonic wave in liquids by Ultrasonic interferometer. Medical applications, Ultrasonic Imaging technique (Doppler Ultrasound Imaging advantages and limitations), industrial applications, **NDT**: Pulse echo technique, Time of flight diffraction technique.

Nuclear Techniques: Radio isotopes and its applications (medical and Industrial), GM counter, Scintillation counter.

TEXT BOOK:

1. Engineering physics M. V. Avadhanulu, P.G.KshirsagarS.Chand& Company Pvt. Ltd.
2. Engineering physics, PalaniSwamy,Scitech publication

REFERENCE BOOKS:

1. Basic engineering physics – Dr.P.srinivasaRao, Dr.K.Muralidhar, Himalaya Publication.
2. Applied physics – Dr. P. Srinivasa Rao, Dr. K. Muralidhar, Himalaya publication.

Bapatla EnginEEring CollEgE :: Bapatla
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ENGINEERING CHEMISTRY

(Common to all branches)

I B. Tech – I Semester (Sub. Code: 20EC103 / CY01)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

COURSE OBJECTIVES: The student should be conversant:

CO1: With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.

CO2: To understand the thermodynamic concepts, energy changes, concept of corrosion & its control.

CO3: With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of knocking and anti-knocking characteristics.

CO4: With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers.

COURSE OUTCOME:

After studying this course, students will be able to:

CLO-1: Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.

CLO-2: Apply their knowledge in converting various energies of different systems and protection of different metals from corrosion.

CLO-3: Have the capacity of applying energy sources efficiently and economically for various needs.

CLO-4: Design economically and new methods of organic synthesis andsubstitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.

SYLLABUS

UNIT – I (Water Chemistry)

Introduction: water quality parameters

Characteristics: Alkalinity, Hardness - Estimation & simple numerical problems,

Boiler Troubles - Sludges, Scales, Caustic embrittlement, boiler corrosion, Priming and foaming;

Internal conditioning- phosphate, calgon and carbonate methods.

External conditioning - Ion exchange process & Zeolite process

WHO Guidelines, Potable water, Sedimentation, Coagulation, Filtration. Disinfection methods: Chlorination, ozonization and UV treatment.

Salinity – Treatment of Brackish water by Reverse Osmosis and Electrodialysis. [15 Periods]

UNIT – II

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies.Free energy and emf.Cell potentials, the Nernst equation and applications.

Corrosion: Types of corrosion - Chemical or dry corrosion, Electrochemical or wet corrosion; Galvanic, stress, pitting and differential aeration corrosion; Factors effecting corrosion, **Corrosion control** – Cathodic protection, and electro plating (Au) & electoless Ni plating. [15 Periods]

UNIT – III (Fuels)

Classification of fuels; Calorific value of fuels (lower, higher)

Solid fuels: Determination of calorific value (Bomb Calorimeter) & related problems, Coal ranking,

Liquid Fuels: Petroleum refining and fractions, composition and uses. Knocking and anti-knocking Agents, Octane number and Cetane number; Bio fuels- Biodiesel, general methods of preparation and advantages

Gaseous fuels: CNG and LPG, Flue gas analysis – Orsat apparatus. [15 Periods]

UNIT – IV

Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution (SN^1, SN^2), addition (Markownikoff's and anti-Markownikoff's rules), elimination (E_1& E_2), Synthesis of a commonly used drug molecule. (Aspirin and Paracetamol)

Polymers: Conducting polymers: Classification, Intrinsic and Extrinsic conducting polymers and their applications**.** Plastics: Thermoplasts and thermosetting plastics, Bskelite and PVC. Bio degradable polymers: types, examples - Polyhydroxybuterate (PHB), Polyhydroxybuterate – co – β - hydroxyvalerate (PHBV), applications. [15 Periods]

TEXT BOOKS:

1. P. C. Jain and Monica Jain, ―Engineering Chemistry‖ DhanpatRai Pub, Co., New Delhi 17th edition (2017).
2. Seshi Chawla, Engineering Chemistry**,** DhanpatRai Pub, Co LTD, New Delhi 13th edition, 2013.

REFERENCE BOOKS:

1. Essential of Physical Chemistry by ArunBahl, B. S. Bahl, G. D. Tuli, by ArunBahl.
2. B. S. Bahl, G. D. Tuli, Published by S Chand Publishers, 12th Edition, 2012.
3. Text Book of Engineering Chemistry by C. P. Murthy, C. V. Agarwal, A. Naidu, B. S. Publications, Hyderabad (2006).
4. Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015.

PROBLEM SOLVING USING PROGRAMMING

(Common for all branches except Civil Engineering)

I B. Tech – I Semester (Sub. Code: 20EC104 / CS01)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: Basic Mathematics

COURSE OBJECTIVES: Students will be able to

CO1: Understand basic concepts of C Programming such as: C-tokens, Operators, Input/output, and Arithmetic rules.

CO2: Develop problem-solving skills to translate _English' described problems into programs written using C language.

CO3: Use Conditional Branching, Looping, and Functions.

CO4: Apply pointers for parameter passing, referencing and differencing and linking data structures.

CO5: Manipulate variables and types to change the problem state, including numeric, character, array and pointer types, as well as the use of structures and unions, File.

COURSE OUTCOMES:

After the course the students are expected to be able to

CLO1: Choose the right data representation formats based on the requirements of the problem.

CLO2: Analyze a given problem and develop an algorithm to solve the problem.

CLO3: Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.

CLO4: Write the program on a computer, edit, compile, debug, correct, recompile and run it.

CLO5: Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.

SYLLABUS

UNIT – I

Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing I/O Operations. Decision Making and Branching.

Programming Exercises for Unit I: C-expressions for algebraic expressions, evaluation of arithmetic and Boolean expressions. Syntactic and logical errors in a given program, output of a given program, values of variables at the end of execution of a program fragment, Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers. Computation of discount amount on different types of products with different discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, finding given year is leap year or not, and conversion of lower case character to its upper case. [17 Periods]

UNIT – II

Decision Making and Looping, Arrays, Character Arrays and Strings.

Programming Exercises for Unit II: To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number. To print graphic patterns of symbols and numbers. To find the length of a string, compare strings, reverse a string, copy a

string and to find whether the given string is palindrome or not with and without using String Handling Functions. Transpose of a matrix and sorting of names using arrays. [17 Periods]

UNIT – III

User-defined Functions, Structures and Unions, Pointers

Programming Exercises for Unit - III: Functions - Recursive functions to find factorial & GCD (Greatest Common Divisor), string operations using pointers and pointer arithmetic. Swapping two variable values. Sorting a list of student records on register number using array of pointers [18 Periods]

UNIT – IV

File Management in C, Dynamic Memory Allocation, Preprocessor

Programming Exercises for Unit - IV: Operations on complex numbers, and to read an input file of marks and generate a result file, sorting a list of names using command line arguments. Copy the contents of one file to another file. Allocating memory to variables dynamically. [18 Periods]

TEXT BOOK:

1. Programming in ANSI C by E. Balaguruswamy, Fifth Edition.

REFERENCE BOOKS:

1. Kernighan BW and Dennis Ritchie M, –C programming language‖, 2nded, Prentice Hall.
2. Yashavant P. Kanetkar, –Let us C‖, BPB Publications.
3. Herbert Schildt, C: The Complete Reference‖, 4th edition, Tata Mcgraw - Hill.
4. Ashok N. Kamthane, –Programming in C‖, PEARSON 2nd Edition.

Environmental Studies
I B. Tech – I Semester (Sub. Code: 20EC105 / CE01)

Lectures	3	Tutorial	0	Practical	0	Credits	0
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

COURSE OBJECTIVES: To learn
CO1: To develop an awareness, knowledge, and appreciation for the natural environment.
CO2: To understand different types of ecosystems exist in nature.
CO3: To know our biodiversity.
CO4: To understand different types of pollutants present in Environment.
CO5: To know the global environmental problems.

COURSE OUTCOMES: Students will be able to
CLO 1: Develop an appreciation for the local and natural history of the area.
CLO 2: Hope for the better future of environment in India which is based on many positive factors like Biodiversity, successive use of renewable energy resources and other resources, increasing number of people's movements focusing on environment.
CLO 3: Know how to manage the harmful pollutants.
CLO 4: Gain the knowledge of Environment.
CLO 5: Create awareness among the youth on environmental concerns important in the long-term interest of the society.

SYLLABUS
UNIT – I

Introduction: Definition, Scope and Importance, Need for public awareness. Ecosystems: Definition, Structure and Functions of Ecosystems, types - Forest, Grassland, Desert, Aquatic (Marine, pond and estuaries). [6 periods]
Biodiversity: Definition and levels of Biodiversity; Values of Biodiversity - Consumptive, Productive, Social, Aesthetic, Ethical and Optional; Threats and Conservation of Biodiversity; Hot Spots of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation. Chipko movement case study [6 periods]

UNIT – II

Natural resources: Land: Land as a resource, Causes and effects of land degradation - Soil erosion, Desertification. **Forest**: Use of forests, Causes and effects of deforestation, Afforestation, Mining - benefits and problems. **Water**: Uses, floods and drought, Dams - benefits and problems.
Energy: Importance of energy, Environmental Impacts of Renewable and Non-renewable energy resources. Silent Valley Project and Narmada Bachao Andolan case studies.[8 periods]
Sustainability: Definition, Concept and Equitable use of resources for sustainable development; Rain water harvesting and Watershed management. Fieldwork on Rain water harvesting and Watershed management. [6 periods + 6 periods field work / Demostration]

UNIT – III

Pollution: Definition; Causes, effects and control of air, water and nuclear pollution; Chernobyl Nuclear Disaster case study; Solid Waste: urban, Industrial and hazardous wastes; Integrated waste management - 3R approach, composting and vermin composting. [12 periods]

Environmental acts: Water and air (Prevention and Control of pollution) acts, Environmental protection act, Forest Conservation act. [6 periods]

UNIT – IV

Environmental issues: Green house effect & Global warming, Ozone layer depletion, Acid rains, Green Revolution, Population Growth and environmental quality, Environmental Impact Assessment.Environmental Standards (ISO 14000, etc.) [12 periods]

Case Studies: Bhopal Tragedy, Mathura Refinery and TajMahal, and Ralegan Siddhi (Anna Hazare). [6 periods]

Field work: Visit to a local area to document environmental assets – Pond/Forest/Grassland. Visit to a local polluted site- Urban and industry/ Rural and Agriculture. [6 periods]

TEXT BOOKS:

1. Environmental Studies‖ by Benny Joseph, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Comprehensive environmental studies‖- JP Sharma, Laxmi Publications.
3. Text Book of environmental Studies – Erach Bharucha

REFERENCE BOOKS:

1. Environmental studies, R. Rajagopalan, Oxford University Press.
2. Introduction to Environmental Science, Anjaneyulu Y, B S Publications Environmental Science, 11th Edition – Thomson Series – By Jr. G. Tyler Miller.

ENGINEERINGCHEMISTRY LABORATORY

(Common to all branches)

I B. Tech – I Semester (Sub. Code: 20ECL101 / CYL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

LIST OF EXPERIMENTS

1. **Introduction to Chemistry Lab** (the teachers are expected to teach fundamentals like Calibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. and error, accuracy, precision, theory of indicators, use of volumetric titrations).
2. **Volumetric Analysis:**
   a. Estimation of Washing Soda.
   b. Estimation of Active Chlorine Content in Bleaching Powder
   c. Estimation of Mohr's salt by permanganometry.
   d. Estimation of given salt by using Ion-exchange resin using Dowex-50.
3. **Analysis of Water:**
   a. Determination of Alkalinity of Tap water.
   b. Determination of Total Hardness of ground water sample by EDTA method
   c. Determination of Salinity of water sample
4. **Estimation of properties of oil**:
   a. Estimation of Acid Value
   b. Estimation of Saponification value
5. **Preparations:**
   a. Preparation of Soap
   b. Preparation of Urea-formaldehyde resin
   c. Preparation of Phenyl benzoate
6. **Demonstration Experiments (Any two of the following):**
   a. Determination of p^H of given sample.
   b. Determination of conductivity of given sample by conductometer.
   c. Potentiometric Determination of Iron.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, Etal, B.S. Publicaitons, Hyderabad, 2009.
2. Inorganic quantitative analysis, Vogel, 5th edition, Longman group Ltd. London, 1979.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel.
2. A text book on experiments and calculations - Engineering Chemistry. S. S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

HARDWARE LAB
I B. Tech – I Semester (Sub. Code: 20ECL102)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

LIST OF LAB EXPERIMENTS

1. Identification and testing of various circuit elements.
2. Study of CRO and Function Generator.
3. Study of RPS and Multimeter.
4. Verification of KCL and KVL.
5. Testing of basic gates.
6. Realization of basic gates using discrete components.
7. V-I characteristics of Diode.
8. V-I characteristics of Zener Diode.
9. Verification of Thevenin‘s Theorem.
10. Component testing using CRO.

Problem Solving With Programming Lab
I B. Tech – I Semester (Sub. Code: 20ECL103 / CSL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: None

LIST OF LAB EXPERIMENTS

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if-else statement).

Domestic Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 200	0.50 per unit	
201 – 400	100 plus	0.65 per unit
401 – 600	230 plus	0.80 per unit
601 and above	390 plus	1.00 per unit
Commercial Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 100	0.50 per unit	
101 – 200	50 plus	0.6 per unit
201 – 300	100 plus	0.70 per unit
301 and above	200 plus	1.00 per unit

2. Write a C program to evaluate the following (using loops):
   a) $1 + x^2/2! + x^4 / 4!+ \ldots$upto ten terms
   b) $x + x^3/3! + x^5/5!+ \ldots$ upto ten terms
3. Write a C program to check whether the given number is
   a) Prime or not.
   b) Perfect or Abundant or Deficient.
4. Write a C program to display statistical parameters (using one – dimensional array).
   a) Mean
   b) Mode
   c) Median
   d) Variance.
5. WriteaCprogramtoreadalistofnumbersandperformthefollowingoperations
   a) Print the list.
   b) Delete duplicates from the list.
   c) Reverse the list.
6. Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message "Element not found in the List".

7. Write a C program to read two matrices and compute their sum and product.

8. Write a C program to read list of student names and perform the following operations
   a) To print the list of names.
   b) To sort them in ascending order.
   c) To print the list after sorting.

9. Write a C program that consists of recursive functions to

   a) Find factorial of a given number
   b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.

10. A Bookshop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author, and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed, if it is, then the system displays the book details and request for the number of copies required ,if the requested copies are available the total cost of the requested copies is displayed otherwise the message “required copies not in stock” is displayed. Write a program for the above in structures with suitable functions.

11. Write a C program to read a data file of students’ records with fields(Reg.no, Name, M1, M2, M3, M4, M5) and write the successful students data (percentage > 40%) to a data file.

12. Write a C program to read a file as command line argument and count the given word frequency in a file.

Numerical Methods and Advanced Calculus
I B. Tech – II Semester (Sub. Code: 20EC201 / MA02)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30		Semester End Examination (3 Hours)		:	70

Prerequisites: None

COURSE OBJECTIVES:

CO1: To learn about some advanced numerical techniques e.g. solving a nonlinear equation, linear system of equations, Interpolation and Approximation techniques.
CO2: To learn about evaluation of double and triple integrals and their applications.
CO3: To learn some basic properties of scalar and vector point functions and their applications to line, surface and volume integrals.

COURSE OUTCOMES: Students will be able to

CLO-1: Solve non-linear equations in one variable and system of linear equations using iteration methods.
CLO-2: Choose appropriate interpolation formulae based on the given data.
CLO-3: Compute the value of a definite integral using numerical integration techniques.
CLO-4: Predict the numerical solution of the derivative at a point from the given initial value problem using appropriate numerical method.
CLO-5: Evaluate the double and triple integrals using change of variables.
CLO-6: Transformline integrals to surface and surface to volume integrals and evaluate them.

SYLLABUS

UNIT – I

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton - Raphson method; Useful deductions from the Newton - Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss elimination method, Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi‘s iterative method, Gauss-Seidel iterative method.

[Sections: 28.1; 28.2; 28.3; 28.5; 28.6; 28.7.1; 28.7.2]. [12 Hours]

UNIT – II

Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton‘s interpolation formulae: Newton‘s forward interpolation formula, Newton‘s backward interpolation formula; Interpolation with unequal intervals; Lagrange‘s interpolation formula; Divided differences; Newton‘s divided difference formula; Numerical integration; Trapezoidal rule; Simpson‘s one-third rule; Simpson‘s three-eighth rule; Numerical solution of ODE‘s: Introduction; Picard‘s method; Euler‘s method; Runge - Kutta method.

[Sections:29.1; 29.1-1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1; 32.2; 32.4; 32.7]. [12 Hours]

UNIT – III

Multiple Integrals: Double integrals; Change of order of integration; Double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integrals, Change of variables.

[Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2]. [12 Hours]

UNIT – IV

Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green's theorem in the plane (without proof); Stokes theorem (without proof); Gauss divergence theorem (without proof).

[Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12; 8.13; 8.14; 8.16] [12 Hours]

TEXT BOOK:

1. B. S. Grewal, Higher Engineering Mathematics‖, 44th edition, Khanna publishers, 2017.

REFERENCE BOOKS:

1. Erwin Kreyszig, –Advanced Engineering Mathematics‖, 9th edition, John Wiley & Sons.
2. N. P. Bali and M. Goyal, ―A Text book of Engineering Mathematics‖ Laxmi Publications, 2010.

BASIC INSTRUMENTATION
I B. Tech – II Semester (Sub. Code: 20EC202)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

COURSE OBJECTIVES: To learn
CO1: To learn Basic concepts of measurement and Instrumentation.
CO2: To study working of various bridges and their applications.
CO3: To study the uses of CRO in measurements.
CO4: Describe the different types of transducers and data acquisition systems.

COURSE OUTCOMES: Students will be able to
CLO-1: Recognize the evolution and history of units and standards in Measurements.
CLO-2: Identify the various parameters that are measurable in electronic instrumentation.
CLO-3: To have a deep understanding about instrumentation concepts used for different applications.
CLO-4: Identify the suitable Sensors and Transducers for different applications.

SYLLABUS
UNIT – I
Measurement and Error
Definitions: Measurement, Standard, Instrument, Calibration, Instrumentation Accuracy, Precision, Significant figures, Sensitivity, Resolution, Threshold, and Linearity. Types of errors. **Limiting Errors:** Definition, Combination of Limiting errors, Statistical analysis, Probability of errors.
Electromechanical Indicating Instruments
Permanent Magnet Moving Coil Mechanism, DC Ammeters, DC Voltmeters, Voltmeter Sensitivity, Series type Ohmmeter, Shunt type Ohmmeter.

UNIT – II
Bridge Measurements
Introduction, Wheatstone Bridge, Kelvin Bridge, Kelvin's Double Bridge, **AC Bridges:** Maxwell Bridge, Hay Bridge, Schering Bridge, Wein Bridge.
Electronic Instruments for measuring Basic Parameters
AC voltmeter using rectifiers, True RMS-Responding voltmeter, **Q Meter:** Basic Q-meter circuit, Measurement methods, Sources of error**.**

UNIT – III
Oscilloscopes
Introduction, Block diagram and working of CRO and Cathode Ray Tube (CRT), **Oscilloscope Techniques:** Frequency determination, Phase angle and Time delay measurement, **Special Oscilloscopes**: Working of Storage Oscilloscope, Sampling Oscilloscope, and Digital Storage Oscilloscope.

UNIT – IV

Transducers as Input Elements to Instrumentation Systems

Classification of Transducers, Selection criteria of Transducer, **Strain gauges:** Principle of Strain gauge, Derivation for gauge factor of a strain gauge, **Displacement Transducers:** Resistive potentiometers, LVDT, Capacitive transducers (i) Variable gap type (ii) Variable area type (iii) Variable dielectric type. **Temperature Measurements:** Principle and operation of RTD, Thermistor, Thermocouples

Analog and Digital Data Acquisition Systems

Introduction to Instrumentation systems, Block diagram and working of Digital data acquisition system

TEXT BOOK:

1. Modern Electronic Instrumentation and Measurement Techniques by W. D Cooper & A. D Helfrick PHI, 2008.

REFERENCE BOOKS:

1. A Course in Electrical and Electronics Measurements and Instrumentation by Sawhney. A.K**,** 18th Edition, DhanpatRai & Company Private Limited, 2007.
2. Electronic Instrumentation by H S Kalsi, Tata McGraw-Hill Education, 1995.

Communicative English
I B. Tech – II Semester (Sub. Code: 20EC203 / EL01)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

SYLLABUS

UNIT – I

Vocabulary Development: Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes
Essential Grammar: Prepositions, Conjunctions, Articles
Basic Writing Skills: Punctuation in writing
Writing Practices: Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT – II

Vocabulary Development: Synonyms and Antonyms
Essential Grammar: Concord, Modal Verbs, Common Errors
Basic Writing Skills: Using Phrases and clauses
Writing Practices: Hint Development, Essay Writing

UNIT – III

Vocabulary Development: One word Substitutes
Essential Grammar: Tenses, Voices
Basic Writing Skills: Sentence structures (Simple, Complex, Compound)
Writing Practices: Note Making

UNIT – IV

Vocabulary Development: Words often confused
Essential Grammar: Reported speech, Common Errors
Basic Writing Skills: Coherence in Writing: Jumbled Sentences
Writing Practices: Paraphrasing & Summarising

REFERENCE BOOKS:

1. Communication Skills, Sanjay Kumar & PushpaLatha. Oxford University Press:2011.
2. Practical English Usage, Michael Swan. Oxford University Press:1995.
3. Remedial English Grammar, F. T. Wood. Macmillan:2007.
4. Study Writing, Liz Hamplyons & Ben Heasley. Cambridge University Press:2006

PROGRAMMING WITH C++
I B. Tech – II Semester (Sub. Code: 20EC204 / CS02)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30		Semester End Examination (3 Hours)		:	70

Prerequisites: None

COURSE OBJECTIVES: To learn

CO1: Develop a greater understanding of the issues involved in programming language design and implementation.

CO2: Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.

CO3: Implement several programs in languages other than the one emphasized in the core curriculum (C++).

CO4: Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.

COURSE OUTCOMES: Students will be able to

CLO-1: Understand the features of C++ supporting object oriented programming.

CLO-2: Understand the relative merits of C++ as an object oriented programming language

CLO-3: Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism.

CLO-4: Understand advanced features of C++ specifically stream I/O, templates and operator overloading.

SYLLABUS

UNIT – I

Introduction: Basic concepts of OOP, benefits and applications of OOP, what is C++, applications of C++, C++ statements, structure of a C++ program, creating the source file, compiling and linking. C++ tokens, keywords, identifiers and constants, data types in C++, operators in C++,symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables, scope resolution operator, member dereferencing operator, memory management operator, type cast operator, expressions and their types, special assignment expressions, implicit conversions, operator overloading, operator precedence, control structures. C++ streams and stream classes, unformatted I/O operations, formatted I/O operations, managing output with manipulators

UNIT – II

Functions in C++: main function, function prototyping, call by reference, return by reference, inline functions, default arguments, const arguments, function overloading, friend and virtual functions. **Classes and objects**: specifying a class, defining member functions, nesting member functions, private member functions, static data members and member functions, arrays of objects, objects as function arguments, returning objects, local classes.

UNIT – III

Constructors and Destructors: constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, copy constructor, dynamic constructor, const objects, destructors. Defining Operator overloading, overloading unary and binary operators, overloading binary operators using friends, rules for operator overloading, manipulation of strings using operators.

UNIT – IV

Pointers, pointers to objects, this pointer, pointers to derived classes, pure virtual functions. Inheritance: single inheritance, making a private member inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, abstract classes.

TEXT BOOK:

1. Object oriented programming with C++, Balagurusamy, 4th edition, Tata McGraw-Hill publications, 2008.

REFERENCE BOOKS

1. Object oriented programming with ANSI and turbo C++, Ashok N. Kamthane, Pearson Education, 2005.
2. C++ programming language by Bjarne Stroustup, 3rd edition, Pearson education, 2009.

CIRCUIT THEORY
I B. Tech – II Semester (Sub. Code: 20EC205)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

COURSE OBJECTIVES: To learn
CO1: Basics of circuit analysis-KVL, KCL, Mesh analysis and Nodal analysis.
CO2: Analysis of dc/ac electric circuits and important theorems of circuit analysis.
CO3: To expose the students to the concept of resonance and its applications.
CO4: To familiarize the students to the Laplace transform concept for applying it to obtain transient response for DC & AC inputs.

COURSE OUTCOMES: Students will be able to
CLO-1: Identify the main circuit elements and apply Kirchhoff‘s Laws to calculate currents, voltages and powers in typical linear electric circuits using a variety of analytical methods.
CLO-2: Reduce more complicated circuits into the Thevenin‘s and Norton‘s equivalent circuits.
CLO-3: Obtain the transient responses of RC, RL and RLC circuits. CLO-4: know the application of Laplace transform to circuit analysis.

SYLLABUS

UNIT – I
Voltage and current Laws: Introduction, nodes, paths, loops and branches, Kirchhoff’s current and voltage laws, series and parallel connected sources, resistors in series and parallel, voltage and current division**. [CHAPTER-3]**

UNIT – II
Basic Nodal and Mesh Analysis: Nodal analysis, the super node, Mesh analysis, and The super mesh, Nodal vs. Mesh analysis: A comparison. **[CHAPTER-4]**

UNIT – III
Useful circuit analysis techniques: Linearity and superposition, source transformations, Thevenin and Norton equivalent circuits, maximum power transfer Theorem, Reciprocity Theorem, and delta-wye conversion. **[CHAPTER-5]**

UNIT – IV
Basic RL and RC Circuits: The source free RL circuit, properties of the exponential response, the source free RC circuit, driven RL circuits, natural and forced response, driven RC circuits. **[CHAPTER-8]**

TEXT BOOK:
1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, 8th Edition, Tata McGraw Hill, 2016.

REFERENCE BOOKS:

1. Circuits & Networks: Analysis and Synthesis, A.Sudhakar and ShyammohanS.Pilli, Tata McGraw Hill, 2007.
2. Network Analysis, M. E. Vanvalkenburg, 3rd Edition, PHI, 2003.

Fundamentals of Digital Electronics
I B. Tech – II Semester (Sub. Code: 20EC206)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30		Semester End Examination (3 Hours)		:	70

Prerequisites: None

COURSE OBJECTIVES:

CO1: To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronic circuits.

CO2: To impart how to design Digital Circuits.

COURSE OUTCOMES: Students will be able to

CLO1: Perform binary arithmetic operations and Conversion of numbers from one base to another base.

CLO2: Simplify logical functions using K-map method and Tabulation method.

CLO3: Design various combinational logic circuits and realize using logic gates.

CLO4: Design combinational logic circuits using MSI circuits.

SYLLABUS

UNIT – I

Number Systems and Codes: Decimal, Binary, Octal and Hexadecimal number systems and their conversion. Number systems arithmetic; Complements: The r's Complement, The (r-1)'s Complement, Subtraction using method of complements. Sign-magnitude representation, 1's & 2's complement representations, Codes: Introduction, Classification of Binary codes; BCD code, Excess-3 code, Gray code, Error detection and Correction codes.

UNIT – II

Boolean Algebra and Logic gates: Boolean Postulates & theorems, Digital Logic gates, Simplification of Boolean expressions, Implementation of Boolean expressions using logic gates, Canonical and Standard forms.

Minimization of Switching Functions: Simplification of logical functions using Karnaugh map method (Up to five variables), Don't-Care conditions, Quine-McCluskey minimization technique.

UNIT – III

Combinational Logic Design: General design Procedure, Design of: Half-Adder, Full-Adder, Half - Subtractor, Full – Subtractor. Design of Code converters, Ex-OR and Ex-NOR circuits, NAND and NOR implementation of Boolean functions.

UNIT – IV

Combinational Logic Design Using MSI Circuits: Multiplexer, Combinational logic design using multiplexers, Demultiplexers / Decoders and their use in combinational logic design, Design of BCD to 7 segment decoder, Magnitude comparator, Encoders.

TEXT BOOK:

1. M.Morris Mano, "Digital Logic and Computer Design", PHI 2003.

REFERENCE BOOKS:

1. A.Anand Kumar, "Fundamentals of Digital Circuits", PHI 2006.
2. R P Jain "Modern Digital Electronics", IVth ed., TMH.

Physics Laboratory

(COMMON TO ALL BRANCHES)

I B. Tech – II Semester (Sub. Code: 20ECL201 / PHL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee's apparatus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Determination of radius of curvature of a Plano convex lens by forming Newton's rings.
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. Determination of dispersive power of a given material of prism using prism minimum deviation method.
7. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
8. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using sonometer.
10. Determine the rigidity modulus of the given material of the wire using Torsional pendulum.
11. Draw the load characteristic curves of a solar cell.
12. Determination of Hall coefficient of a semiconductor.
13. Determination of voltage and frequency of an A.C. signal using C.R.O.
14. Determination of Forbidden energy gap of Si &Ge.
15. Determination of wavelength of laser source using Diode laser.

Any three experiments are virtual

TEXT BOOK:

1. Engineering physics laboratory manual, P. Srinivasarao & K. Muralidhar, Himalaya publications.

ENGLISH COMMUNICATION SKILLS LABORATORY
I B. Tech – II Semester (Sub. Code: 20ECL202 / ELL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30		Semester End Examination (3 Hours)		:	70

Prerequisites: None

UNIT-I

Listening Skills; Importance – Purpose- Process- Types
Barriers to Listening
Strategies for Effective Listening

UNIT-II

Phonetics; Introduction to Consonant, Vowel and Diphthong sounds
Stress
Rhythm
Intonation

UNIT-III

Formal and Informal Situations
Expressions used in different situations
Introducing Yourself & Others-Greeting & Parting-Congratulating-Giving Suggestions & Advices-Expressing Opinions-Inviting People-Requesting-Seeking Permission-Giving Information- Giving Directions- Sympathizing- Convincing People- Complaining & Apologizing-Thanking Others- Shopping- Travelling- Conversational Gambits

UNIT-IV

JAM Session
Debates
Extempore

REFERENCE BOOKS:

1. Communication Skills, Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
2. Better English Pronunciation, J.D. O‘ Connor. Cambridge University Press: 1984.
3. New Interchange (4rth Edition), Jack C Richards. Cambridge University Press: 2015.
4. English Conversation Practice, Grant Taylor. McGraw Hill: 2001.

SOFTWARE:

1. Buzzers for conversations, New Interchange series.
2. English in Mind series, Telephoning in English.
3. Speech Solutions, A Course in Listening and Speaking.

PROGRAMMING WITH C++ LAB
I B. Tech – II Semester (Sub. Code: 20ECL203 / CSL02)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30		Semester End Examination (3 Hours)		:	70

Prerequisites: None

LIST OF LAB PROGRAMS

Write C++ programs to illustrate the concept of the following:

1. Arrays
2. Structures
3. Pointers
4. Objects and Classes
5. Console I/O operations
6. Scope resolution and memory management operators
7. Inheritance
8. Polymorphism
9. Virtual Functions
10. Friend Functions
11. Operator overloading
12. Function overloading
13. Constructors and Destructors
14. *this*pointer
15. File I/O operations

Note: A minimum of ten programs are to be executed and recorded to attain eligibility for University Practical examination.