Bachelor of Technology

(Electronics & Communication Engineering)

BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY)
COLLEGE OF ENGINEERING, PUNE
B. Tech. (Electronics and Communication): Semester I (2023 COURSE)

Sr. No	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	PR	OR	Total	Th	Tw/Pr/Or	Tut	Total
1.	BSC		Engineering Mathematics-I	3	-	1	60	40	-	-	-	100	3	0	1	4
2.	BSC		Engineering Chemistry	3	2	-	60	40	50	-	-	150	3	1	0	4
3.	ESC		Electrical Technology	4	2	-	60	40	25	-	-	125	4	1	0	5
4.	ESC		Computer Programming -I	3	2	-	60	40	25	-	-	125	3	1	0	4
5.	PCC		Electronic Component and Devices	4	2	-	60	40	50	-	-	150	4	1	0	5
6.	HSMC		Communication Skills	-	2	-	-	-	50	-	-	50	0	1	0	1
7.	SBC-I		Basics of PCB Soldering and Assembly	-	4	-	-	-	25	-	25	50	-	2	0	2
			Total	**17**	**14**	**1**	**300**	**200**	**225**	**0**	**25**	**750**	**17**	**7**	**1**	**25**

B. Tech. (Electronics and Communication): Semester II (2023 COURSE)

Sr. No	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	PR	OR	Total	Th	TW/Pr/Or	Tut	Total
1.	BSC		Engineering Mathematics- II	3	-	1	60	40	-	-	-	100	3	0	1	4
2.	BSC		Engineering Physics	3	2	-	60	40	50	-	-	150	3	1	0	4
3.	ESC		Computer Aided Engineering Graphics	4	2	-	60	40	25	-	-	125	4	1	0	5
4.	ESC		Computer Programming -II	3	2	-	60	40	25	-	-	125	3	1	0	4
5.	PCC		Introduction to Electronic Communication	4	2	-	60	40	50	-	-	150	4	1	0	5
6.	HSMC		Universal Human Values	-	2	-	-	-	50	-	-	50	0	1	0	1
7.	SBC-II		Electronic Circuits and Simulation	-	4	-	-	-	25	-	25	50	-	2	0	2
			Total	**17**	**14**	**1**	**300**	**200**	**225**	**0**	**25**	**750**	**17**	**7**	**1**	**25**
8	**VAC-I			**-**	**2**	-	-	**40**	-	-	-	**-**	**0**	**1**	**0**	**1**

**** indicate this is mandatory but the credits will not be considered in SGPA/CGPA**

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B. Tech. Sem-I Electronics & Communication Engineering

Engineering Mathematics-I (Common for all Branches)

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Theory: 03 Hrs/Week	End Semester Examination: 60 Marks	Credits: 03
Practical: 00	Continuous Assessment: 0 Marks	
Tutorial:01 Hr/Week	TW: 00 Marks	Credit: 01
	Total:100 Marks	Total Credits:04

Course Pre-requisites:

The student should have

1. Algebra of matrices and its Determinants, Maxima and Minima of single variable functions.

Course Objectives:

1. Fundamental theorems, concepts in Matrices, Demoivr's theorem and its applications in engineering.
2. Various techniques in Calculus, Explanation of functions and Infinite series.
3. Partial differentiation, maxima, minima and its applications in engineering

Course Outcomes: After learning this course students will be able to

1	Understand rank of matrix and apply it to solve system of linear equations
2	Understand the DeMoiver's theorem, hyperbolic functions and apply it in engineering problems.
3	Understand the Leibnitz's rule and apply it to find nth derivative of a function.
4	Understand fundamental concepts of convergence, divergence of infinite series and its tests.
5	Understand the concept of partial differentiation and apply it to find total derivative.
6	Evaluate the maxima and minima of any two variables functions.

UNIT – I	Matrices	(06 Hours)
	Rank, Normal form, System of Linear Equations, Linear Dependence and Independence, Linear and Orthogonal Transformations, Eigen values, Eigen Vectors, Cayley – Hamilton Theorem.	

UNIT – II	**Complex Numbers and Applications**	**(06 Hours)**
	Definition, Cartesian, Polar and Exponential Forms, Argand's Diagram, De'Moivre's theorem and its application to find roots	

	of algebraic equations., Hyperbolic Functions, Logarithm of Complex Numbers, Separation into Real and Imaginary parts, Application to problems in Engineering.	
UNIT - III	**Differential Calculus**	**(06 Hours)**
	Successive Differentiation, nth Derivatives of Standard Functions, Leibnitz's Theorem,. Expansion of Functions: Taylor's Series and Maclaurin's Series	
UNIT -IV	**Differential Calculus**	**(06 Hours)**
	Indeterminate Forms, L' Hospital's Rule, Evaluation of Limits. Infinite Series: Infinite Sequences, Infinite Series, Alternating Series, Tests for Convergence, Absolute and Conditional Convergence, Power series, Range of Convergence	
UNIT -V	**Partial Differentiation and Applications**	**(06 Hours)**
	Partial Derivatives, Euler's Theorem on Homogeneous Functions, Implicit functions, Total Derivatives, Change of Independent Variables, Errors and Approximations.	
UNIT -VI	**Jacobian**	**(06 Hours)**
	Jacobians and their applications, Chain Rule, Functional Dependence. Maxima and Minima: Maxima and Minima of Functions of two variables, Lagrange's method of undetermined multipliers.	

PBL: Project Base Learning (Topics): The Students are expected to perform project (in a group) based on the course and prepare a report for the same. The report should be as per standard guidelines. Following are the PBL topics but not restricted to:
1. Echelonform
2. Normalform
3. Linear and orthogonal transformation
4. Eigen values and eigen vectors
5. Argand diagram
6. De Movre's theorem
7. Hyperbolic and logarithmic functions
8. Leibnitz theorem
9. Taylor's theorem
10. L'Hospital rule
11. Tests for convergence
12. Euler theorem for homogeneous functions
13. Total derivative
14. Maxima and minima for two variable function
15. Langrage undetermined multipliers
Textbooks:
1. Applied Mathematics (Volumes I and II) by P. N. Wartikar & J. N. Wartikar (Pune

Vidyarthi Griha Prakashan, Pune),7th Edition, 1988, Reprint 2010

Reference Books:

1. Higher Engineering Mathematics by B.S. Grewal (Khanna Publication, Delhi), 42th Edition, 2012
2. Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill), Edition, 2008
3. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.), 8th Edition, 1999, Reprint 2010
4. Advanced Engineering Mathematics, 7e, by Peter V.O'Neil (Thomson Learning), Edition 2007
5. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education), 2nd, Edition, 2002

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B. Tech. Sem-I Electronics& Communication Engineering

Engineering Chemistry (Common for all Branches)

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Theory: 03 Hrs/Week	End Semester Examination: 60 Marks	Credits: 03
Practical: 02 Hrs/Week	Continuous Assessment: 40 Marks	
	TW: 50 Marks	Credit: 01
	Total:-150 Marks	Total Credits: 04

Course Pre-requisites:

The student should have

1. Basic knowledge of chemistry.
2. Basic knowledge of electrochemistry and chemistry of materials
3. Introductory knowledge of polymers.

Course Objectives:

1. To develop the interest among the students regarding chemistry and their applications in engineering.
2. To develop confidence among students about chemistry, how the knowledge of chemistry is applied in technological field.
3. The student should understand the concepts of chemistry to lay the groundwork for subsequent studies in the Engineering field

Course Outcomes: After learning this course students will be able to

1	Understand the different methods of analysis of water, different environmental pollutants and importance of green chemistry
2	Understand the importance of fuels and apply it for various engineering applications.
3	Explain the drawbacks of corrosion and different methods of elimination of corrosion
4	Apply the concept of polymer to study advanced materials.
5	Apply the basic concept of chemistry to explain the chemical properties and processes of materials of nanoscale
6	Understand the instrumental analysis helpful for various engineering applications

UNIT – I	Water Technology & Green Chemistry	(06 Hours)
	Introduction, sources and impurities in water, Hardness of water, types, and determination of hardness using EDTA titration, softening of hard water by ion- exchange process. Numerical problems on hardness of water. Major environmental pollutants, Basic principles of green chemistry. Atom economy, Synthesis of adipic acid, Industrial applications of green chemistry, Numerical problems on Atom economy.	

UNIT – II	**Electrochemical energy and solar energy**	**(06 Hours)**
	Fuels: Introduction, Definition, importance of fuels, calorific value, types, fluidized bed catalytic cracking, knocking (Petrol engine), mechanism and its ill effects, biodiesel, power alcohol, octane and cetane number. Solar Energy: Introduction, construction, working and applications of photovoltaic cell.	
UNIT - III	**Corrosion technology and it's control**	**(06 Hours)**
	Introduction, Electrochemical theory of corrosion, Types of corrosion, Differential metal and differential aeration (pitting and water line) caustic embrittlement. Factors affecting the rate of corrosion, Corrosion control: Cathodic protection, sacrificial anode and impressed current methods, Metal coatings, Galvanization and tinning, Anodizing, Anodizing of aluminium, Organic coatings: Paint and varnishes. Metal finishing: Introduction, Technological importance. Principles of electroplating. Electroplating of chromium. Electro less plating: Introduction, electro less plating of nickel & copper on PCB with applications	
UNIT -IV	**Engineering Materials and Technology**	**(06 Hours)**
	Polymers: Introduction, classification, Synthesis and applications of Polyurethane, polycarbonates, Conducting Polymers: Synthesis & Mechanism of conduction in poly aniline. Composites: Introduction, constitution, classification. Types: fiber glass, hybrid and reinforced Composites with applications.	
UNIT -V	**Nano materials**	**(06 Hours)**
	Introduction, size dependent properties (Surface area, Electrical, Optical, Catalytic and Thermal properties). Synthesis of nano materials: Top down and bottom up approaches, Synthesis by Sol-gel, precipitation and chemical vapour deposition, Nano scale materials: Fullerenes, Carbon nano tubes and graphenes – properties and applications.	
UNIT -VI	**Instrumental methods of analysis**	**(06 Hours)**
	Introduction, Theory, Instrumentation and applications of colorimetry, pHmetry, conductometry Introduction to spectroscopy, principles and applications of UV/Vis. Spectroscopy	
Term Work:		
The term work shall consist of record of minimum eight experiments.		
1. Determination of Hardness of water sample by EDTA method		
2. To determine strength of acid by pH – metric Titration		

3. To measure the strength of acid by conductometric titration
4. Measurement of Surface tension of a given liquid by Stalgmometer.
5. To determine alkalinity water sample. 6. Estimation of the given amount of copper in the given solution by colorimetry
7. Synthesis of conducting polyaniline from aniline by oxidative polymerization
8. Determination of iron content in the given solution by Mohr's method
9. To determine the strength of given acid solution by titrating it against base solution using indicator
10. Determination of reaction rate, order and molecularity of hydrolysis of ethyl acetate
11. Verification of Beer-Lambert's Law.
12. Determination of Viscosity of Liquids by Ostwald's Viscometer
13. Determination Of Chloride Content of Water by Argentometry
14. Estimation of copper from brass by iodometry
15. To study set up of Daniel cell.
Project Base Learning (Topics): The Students are expected to perform project (in a group) based on the course and prepare a report for the same. The report should be as per standard guidelines.Following are the PBL topics but not restricted to:
1. Comparison of Hardness, Alkalinity, Dissolved oxygen, Chlorides and COD of water from two different sources
2. Removal of industrial pollutants from wastewater by adsorption on activated charcoal
3. Preparation of biofuels from two natural sources
4. Two synthetic approaches for the production of H2 as a clean fuel
5. Prevention of corrosion by metal coupling
6. Construction of bio sensor in engineering applications
7. Design and simulation of automatic solar - photo voltaic panels as renewable energy source.
8. Synthesis of Conjugated Polymers and Molecules Using Sugar Reagents and Solventless Reactions. OR Composite materials and it properties, applications and types
9. To study mechanism of lubrication
10. Electroplating- study on how different metals can be used and the practical applications
11. Prepare Ag- nanoparticles by using sol-gel method
12. Preparation of Ag nanoparticle from two natural sources
13. With the help of green chemistry principles, prepare any organic dye by using Traditional and Green pathway.
14. Prepare epoxy resins by using suitable method
15. Measurement and effect of waste disposal from laboratories in the college
Text Books:
1. Engineering Chemistry, Jain P.C & Jain Monica,Dhanpat Rai & Sons, Delhi (1992)
2. Engineering Chemistry, O. G. Palanna, Tata McGraw-Hill Publication, New Delhi, 2e,2017
3. A textbook of Engineering Chemistry, S. S. Dara, McGraw-Hill Publication, New Delhi
Reference Books:
1. Engineering Chemistry- Fundamentals and applications, Shikha Agarwal,Cambridge

Publishers (2015)
2. Polymer Science and technology (2nd Edition), P. Ghosh, Tata McGRAW Hill, (2008)
3. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler,Stanley R. Crouch,Cengage learning (2017)
4. Polymers: Chemistry & Physics of Modern Materials (2nd edition) J.M.G.Cowie, Blackie, Academic & Professional (1994)
5. Integrated design and operation of water treatment facilities, Kawamura, Susumu. John Wiley & Sons (2000)

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B. Tech. Sem-I Electronics & Communication Engineering

Electrical Technology

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 04 Hrs / Week	**End Semester Examination:** 60 Marks	**Credits :**04
Practical: 02 Hrs / Week	**Internal Assessment:** 40 Marks	
	TW: 25 Marks	**Credit**:01
	Total:125 Marks	**Total Credits :**05

Course Pre-requisites:

The students should have basic knowledge of

1.	Mathematics, Physics and Chemistry.

Course Objectives:

	The course introduces fundamental concepts of DC and AC circuits, electromagnetism, transformer, electrical wiring, illumination and Tariff system.

Course Outcomes: After learning this course the students will be able to

1.	Apply knowledge of basic concepts of work, power, energy for energy conversion and calculate current in electrical network using Kirchoff's laws.
2.	Analyze response of electrical DC circuit using network theorems.
3.	Define and understand basic terms of single phase A.C. circuit and supply systems.
4.	Define and understand basic terms of three phase A.C. circuit and measurement of three phase power.
5.	Discuss and apply fundamental concepts of magnetic circuit and electro-mechanics for operation of single phase transformer.
6.	Explain layout of distribution system, illumination, types of wiring, earthing system and Tariff system.

UNIT - I	**Introduction**	**(08 Hours)**
	Concept of EMF, Potential difference, voltage, current, resistance. Fundamental	

	linear, passive and active elements, voltage sources and current sources, ideal and practical sources, concept of dependent and independent sources, Kirchhoff-s laws and applications to network solutions using mesh and nodal analysis, Batteries: Principle, types, construction and working.	
UNIT - II	**DC Circuits**	**(08 Hours)**
	Current-voltage relations of the electric network by mathematical equations to analyze the network (Superposition theorem, Thevenin's theorem, Norton's Theorem, Maximum Power Transfer theorem), Simplifications of networks using series-parallel, Star/Delta transformation.	
UNIT - III	**Single phase AC Circuit**	**(08 Hours)**
	Sinusoidal AC waveform definitions, form factor, peak factor, study of R-L, R-C,RLC series circuit, R-L-C parallel circuit, resonance, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive and apparent power, power factor. (simple numerical problems).	
UNIT - IV	**Three phase AC circuit**	**(08 Hours)**
	Three phase system-its necessity and advantages, meaning of phase sequence, line and phase voltage/current relations, star and delta connections, balanced supply and balanced load, three phase power and its measurement (simple numerical problems).	
UNIT - V	**Electro-Mechanics**	**(08 Hours)**
	Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Magnetic circuit, Magnetic material and B-H Curve, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, kVA rating, losses in transformer, efficiency and regulation, Determination of efficiency & regulation by direct load test.	
UNIT - VI	**Electrical Wiring and Components**	**(08 Hours)**
	Basic layout of the distribution system, Types of wiring system & wiring accessories, Types of lamps (Incandescent, Fluorescent, Sodium Vapour, LED),Necessity of earthing, Types of earthing, Tariff –introduction and types.	
Term Work:		
The term work shall consist of record of minimum eight experiments.		
1. Familiarization of electrical Elements, sources, measuring devices related to electrical circuits.		

2. Study of residential electricity bill.
3. Verification of Superposition theorem
4. Verification of Thevenin's theorem
5. Verification of Norton's theorem
6. Verification of Kirchoff's laws
7. Verification of Maximum power transfer theorem
8. Study of R-L, R-C series and parallel circuit.
9. Study of R-L-C series circuits for $X_L > X_C$, $X_L < X_C$ & $X_L = X_C$
10. Verification of relation in between voltage and current in three phase balanced star and delta connected loads.
11. Demonstration of measurement of electrical quantities in DC and AC systems.
12. Determination of efficiency & regulation of single-phase transformer by direct load test.
Project based learning: The Students are expected to perform project (in a group) based on the course and prepare a report for the same. The report should be as per standard guidelines.Following are the PBL topics but not restricted to:
1. Demonstration of conversion of energy.
2. Study and understand practical specifications of transformer
3. Study and understand practical specifications of battery and demonstrate its application.
4. Demonstration of phenomenon of electromagnetic induction.
5. Demonstration of electromagnetism, electro mechanics and their applications by using professional software tool.
6. Development of practical kits for understanding different theorems related to electrical circuits. (Thevenin's theorem, Norton's Theorem, Maximum Power Transfer theorem, Superposition theorem etc.)
7. Demonstration of illumination system.
8. Demonstration of distribution system.
9. Study and understand safety practices in electrical system
10. Study and understand electrical earthing system.
11. Study and understand electrical wiring.
Text Books:

1. Electric Machinery,(Sixth Edition) A.E. Fitzgerald, KingselyJr Charles, D. Umans Stephen, Tata McGraw Hill.

2. A Textbook of Electrical Technology,(vol. I& II),B. L. Theraja, Chand and Company Ltd., New Delhi.

3. Basic Electrical Engineering, V. K. Mehta, S. Chand and Company Ltd., New Delhi.

4. Theory and problems of Basic Electrical Engineering, (SecondEdition), J. Nagrath and Kothari, Prentice Hall of India Pvt. Ltd.

Reference Books:

1. Basic of Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press.

2. Introduction to Electrodynamics, D. J. Griffiths, (Fourth Edition), Cambridge University Press.

3. Engineering Circuit Analysis, William H. Hayt& Jack E. Kemmerly, McGraw-Hill Book Company Inc.

4. Fundamentals of Electrical and Electronics Engineering,Smarjith Ghosh, Prentice Hall (India) Pvt. Ltd.

5. Edward Hughes – "Electrical Technology"- Seventh Edition, Pearson Education Publication

6. H. Cotton – "Elements of Electrical Technology", C.B.S. Publications
7. John Omalley Shawn – "Basic circuits analysis" McGraw Hill Publications

8. Vincent Del Toro – "Principles of Electrical Engineering", PHI Publications

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B. Tech. Sem. I Electronics & Communication Engineering
COMPUTER PROGRAMMING -I

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 03 Hrs / Week	**End Semester Examination**: 60Marks	**Credits:** 03
Practical:02 Hrs /Week	**Internal Assessment:** 40 Marks	
	TW: 25 Marks	**Credit:** 01
	Total Marks:125 Marks	**Total Credits**:04

Course Pre-requisites:

1	Students must possess knowledge about basic fundamentals of computer and professional Microsoft office development tools.

Course Objectives:

The students should have knowledge of

1	This course will introduce the concepts of C language software development and compiling tool. By the end of the course, student will be familiar with various fundamentals of C- language.

CourseOutcomes: After learning this course students will be ableto

1	Understand the basic concept of C programming**.**
2	Write basic programs using conditional statement.
3	Use Array in programming.
4	Use Functions in programming.
5	Write basic programs using Pointers.
6	Write basic programs using structures.

UNIT – I	**Introduction:**	**(06Hours)**
	Basic of C**:** Structure of a C program, identifiers, basic data types and sizes. Constants, variables, arithmetic, relational and logicaloperatorsManaginginputandoutputoperations,Sample programs.	
UNIT – II	**Conditional Statements and Loops:**	**(06Hours)**
	Decision making within a program, conditions, if statement, if-else statement, loops: while loop, do while, for loop.Nested loops, infinite loops, switch statement, sample programs.	

UNIT -III	**Arrays & Strings**	**(06 Hours)**
	Arrays - concepts, declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Array applications: Matrix Operations.	
UNIT -IV	**Functions**	**(06 Hours)**
	Basics, parameter passing, storage classes- extern, auto, register, static, scope rules, user defined functions, recursive functions, Recursive solutions for Fibonacci series, example c programs. Passing arrays & strings to functions.	
UNIT -V	**Pointers**	**(06 Hours)**
	concepts, initialization of pointer variables, pointers and function arguments, passing by address, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays.	
UNIT -VI	**Structures and Linked list**	**(06 Hours)**
	Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef, bit-fields, program applications. Concept of linked lists, Types & Advantages linked list, creating a linked list, Insertingand Deleting linked list, Applications of linked list	

Term Work:
The term work shall consist of record of minimum eight experiments.
1. Write a C program to take user Input and print it on the screen. a. Perform a C program to perform various mathematical and logical operations. b. Perform a C program to find whether the entered input number is Odd or Even.
2. Perform a C program to find out Prime numbers.
3. Write and perform C program to find out Fibonacci series.
4. Perform and write a C program to find out Armstrong number.
5. Perform a C programs to print different patterns.
6. Perform and write a C program to do factorial using recursion.
7. Perform a C program to sort the given array in Ascending & Descending order.
8. Perform C programs to perform various operations on 2-D arrays

9. Perform a C program to perform different operations on strings.
10. Use of Pointers a. Write a C program to swap numbers using pointers b. Write a C program to show the use of pointers in arrays. c. Write a C program to use functions using pointers.
11. Perform a C program to show the use of structure and linked list
12. Perform a C program to create student mark sheet using structures and linked list.
Project Based Learning (Topics): Students are expected to perform project (in a group) based on the course and prepare a report for the same. The report should be as per standard guidelines. Following are the PBL topics but not restricted to:
1. Bank Management System
2. Diary management System
3. Calendar using C
4. Contact Management System
5. Library Management System
6. Snake Game
7. Bus Reservation system
8. Customer Billing system
9. Hospital Management system
10. Cyber management
11. Cricket score display
12. Employee management system
13. Pacman Game
14. Quiz game
15. Phone-book application
16. Election System
17. Flight ticket booking
18. Tourism Management system
19. Simple Result system
20. Stock Management system
Text Books:
1. E Balagurusamy' Programming in ANSIC,8thEdition-TMH 2018
2. The C Programming Language- Brian W Kernighan, Dennis Ritchie , 2nd Edition 1988
3. C Programming: A Modern Approach, K N King, Publisher: W. W. Norton & Company 2nd Edition 2008
Reference Books:
1. Let Us C 'Authentic guide to C programming language , Yashavant Kanetkar ,BPB

Publication,18th Edition, 2021
2. C Programming Absolute Beginner's Guide' Third Edition by By Greg Perry and Dean Miller, 3rd edition 2013
3. Yashwant Kanitkar , Let Us C",BPB, 2nd Edition, 2016

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B. Tech. Sem. I Electronics & Communication Engineering

Electronic Components and Devices

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 04 Hrs / Week	**End Semester Examination**: 60 Marks	**Credits**: 04
Practical:02 Hrs/Week	**Internal Assessment**: 40 Marks	
	TW: 50 Marks	**Credit**: 01
	Total Marks:150 Marks	**Total Credits**:05

Course Pre-requisites: s

The students should have knowledge of Class XII level Physics & Mathematics.

Course Objectives:

1. To make the students gain the knowledgeof basic electronic passive components**.**
2. To provide detailed description of PN junction behavior at the circuit level and its role in the operation of diodes as rectifiers, clippers and clampers.
3. To provide a comprehensive study of bipolar junction transistor.
4. To learn to analyze transistor biasing circuits.
5. To observe characteristics and working of FET and MOSFET.
6. To get familiarized with various optoelectronic devices.

Course Outcomes: After learning this course students will be able to

1	Identify various Passive components.
2	Demonstrate knowledge of working of diode with applications such as rectifier, clipper and clamper.
3	Analyze the characteristics of BJTs in various configurations (CB,CE,and CC).
4	Design the biasing circuits like fixed bias and voltage divider bias.
5	Describe the operation of FET and MOSFET.
6	Demonstrate knowledge of working of optoelectronic devices.

UNIT – I	**Passive Components**	**(08 Hours)**
	Introduction to the concept of active and passive electronic components, Resistors: types of resistors, construction and applications, Capacitor: types of capacitors, construction and applications, Inductor: types of inductors, construction and applications.	
UNIT – II	**Diode and applications**	**(08 Hours)**
	Classification of material based on band gap theory, types of	

	semiconductors (p-type and n-type), PN junction Diode: basic structure and operating principle, current-voltage characteristic, Zener breakdown, Avalanche breakdown. Diode Applications: Rectifier circuits: Half-wave and full-wave rectifiers. Full wave Rectifier with capacitor filter. Diode as clipper: series and parallel forms of clipper circuits, biased clipper, Diode as a clamper.	
UNIT - III	**Bipolar Junction Transistor**	**(08 Hours)**
	Introduction to Bipolar Junction Transistors, it's construction and working mechanism, configuration of BJT in Common Base, Common Emitter and Common Collector configuration. Input–output characteristics in all three configurations with relevant V-I expressions and definitions of DC gains.	
UNIT -IV	**Transistor Biasing and Applications**	**(08 Hours)**
	Need of biasing, DC load line analysis, operating point, Thermal runaway. Requirements of a biasing circuit, Different biasing circuits: fixed bias, collector to base bias & voltage divider bias. Stability factor, General expression for stability factor, stability factor for biasing circuits, Transistor as an amplifier.	
UNIT -V	**Field Effect Transistor**	**(08 Hours)**
	Introduction to FET, Types of FET, JFET Structure, Construction and working mechanism of JFET: N-channel & P- Channel, V-I characteristics and transfer characteristics of N-channel & P-Channel JFET, Parameters of JFET.	
UNIT -VI	**MOSFET**	**(08 Hours)**
	Introduction, Types of MOSFET, MOSFET Structure, Working of Depletion and Enhancement type MOSFETs, Drain and Transfer Characteristics of D-MOS and E-MOS. Introduction to Photoelectronic devices: LED, LDR, Photodiode, Phototransistor, Optocoupler.	

Term Work:
The term work shall consist of record of minimum eight experiments.
1. To plot V-I characteristics of PN junction diode
2. To plot V-I characteristics of half wave rectifier
3. To plot V-I characteristics of Full wave rectifier using Capacitor filter.
4. To plot input-output characteristics of CE configuration of BJT.
5. To analyze biasing techniques of BJT: Fixed bias and voltage divider bias
6. To plot frequency response of single stage CE amplifier and find its bandwidth
7. To plot frequency response of single stage FET amplifier and find its bandwidth

8.To plot optical characteristics of LED and LDR
9.To plot optical characteristics of Photodiode and phototransistor
10.To plot transfer characteristics of Optocoupler
Project Based Learning (Topics): Students are expected to perform project (in a group) based on the course and prepare a report for the same. The report should be as per standard guidelines.
1. PN junction diode in forward and reverse biasing mode.
2. Conversion of AC to pulsating DC using half wave rectifier.
3. AC to DC converter using Full wave rectifier (Center tap Transformer)
4. AC to DC converter using Bridge Rectifier with capacitor filter
5. BJT in CE configuration.
6. Check stability of operating point using fixed bias method.
7. Check stability of operating point using Voltage divider bias method.
8. BJT Amplifier circuit.
9. FET Amplifier Circuit.
10. Optical characteristics of LED and LDR.
11. Optical characteristics of Photodiode and Phototransistor.
12. Characteristics of optocoupler.
13. Zener diode in forward and reverse biasing mode.
14. BJTs as a digital switch
15. Automatic Street Light controller
Text Books:
1. Robert Boylestad, Electronic Devices and Circuit Theory, Pearson Publication, Eleventh Edition, 2013.
2. V.K.Mehta, Principles of Electronics, S Chand & Company Ltd. New Delhi, Seventh Edition, 2014.
3. Millman, Halkies, Electronic Devices and Circuits, TMH publication, Fourth Edition 2015.
Reference Books:
1. Thomas L. Floyd, Electronic Devices, Prentice Hall, Ninth Edition, 2012.
2. Streetman,Banerjee, Solid State Electronic Devices, Pearson Publication, 7th Edition, 2014.
3. Albert Malvino, Electronic Principle, Mc Graw Hill, Eighth Edition, 2015.
4. Sedra & Smith, Microelectronics Engineering, Oxford University Press, Eighth Edition, 2015.

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B. Tech. Sem. I Electronics & Communication Engineering

Communication Skills (Common for all Branches)

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 00	**End Semester Examination**: 00Marks	
Practical: 02 Hrs / Week	**Continuous Assessment**: 00 Marks	
	TW: 50 Marks	**Credit**: 01
	Total:-50 Marks	**Total Credits**: 01

Course Pre-requisites:

The student should have knowledge of

1. Basic English grammar
2. Basic information of sound system of English language.

Course Objectives:

The course objective of Communication Skills puts the following class teaching objectives, considering English Language skills as a wheel rolling aspects in today's world, the focus is on honing the skills such as LSRW and presentation skills. It also puts emphasis on technical and professional writing skills. Honing the presentation skills among students through appropriate activities, this will help them in their business ventures.

Course Outcomes: After learning this course students will be able to

1	Understand and construct the error free sentences of English language and do implementation of it in the spoken and written business communication
2	Understand and apply the sounds of English language for correct pronunciation
3	Understand and develop the ability to enhance sound vocabulary for effective communication
4	Understand communication process and principles to do applications in business communication
5	Understand the techniques of writing skills and apply them in appropriate context and domain
6	Create effective business presentation and do effective implementation of it through activities

UNIT – I	**English grammar**	**(04 Hours)**
	Application of Basic Grammar: Articles, Prepositions, Tenses, Subject-verb agreement, Use of phrases & Clauses in sentences,	

	Common errors	
UNIT – II	**Phonetics/study of sounds in English**	**(04 Hours)**
	Introduction to phonetics, study of speech organs, study of phonetic script, transcriptions of words, articulation of different sound in English, reducing MTI, stress and intonation	
UNIT - III	**Vocabulary Enrichment**	**(04 Hours)**
	Ways of word formation, Foreign phrases, One word substitutions, Synonyms & antonyms, Words often confused, Indian English words, Usage of idioms & phrases.GRAS-PT formula	
UNIT -IV	**Communication Skills**	**(04 Hours)**
	Introduction, forms and function of communication process, non-verbal codes in communication, Importance of listening skills, Listening V/s hearing, Types of listening, Barriers to communication and listening, Importance of LSRW skills in communication	
UNIT -V	**Technical Writing Skills**	**(04 Hours)**
	The mechanics and principles of written communication, Technical Communication, Need and Importance, technical report writing;, email writing, , notice, agenda, minutes of meeting writing. Use of technology in technical writing	
UNIT -VI	**Presentation skills**	**(04 Hours)**
	Designing effective presentation, understanding theme, developing content and layout of presentation, use of tone and language, technological tools for effective presentation	

Term Work:

The term work shall consist of record of minimum eight experiments.

1. Determination of radius of planoconvex lens/wavelength of light/Flatness testing by Newton's rings
2. Determination of wavelength of light using diffraction grating
3. Determination of frequency of ac voltage by CRO.
4. Determination of refractive index for O-ray and E-ray
5. Determination of divergence of a laser beam
6. Particle size by semiconductor laser
7. Determination of wavelength of laser by diffraction grating
8. To study Hall effect and determine the Hall voltage
9. Calculation of conductivity by four probe method
10. Study of solar cell characteristics and calculation of fill factor
11. Determination of band gap of semiconductor
12. Synthesis of metal oxide nanoparticles (ZnO/ZnS/silver/Gold)

13. Measurement of average SPL across spherical wavefront and behaviour with the distance
14. Determination of velocity of sound in liquid by ultrasonic interferometer
15. Study of B-H curve of a sample.
16. Determination of Plank's constant.
Reference Books:
1. Business Communication by Meenakshi Raman, Prakash Singh published by Oxford University press, second edition
2. Spoken English- A manual of Speech and Phoonetics by R. K. Bansal, J. B. Harrison published by Orient Blackswan
3. Technical Communication by Meenakshi Raman, Sangeeta Sharma published by Oxford University press
4. Developing Communication Skills by Krishna Mohan, Meera Banerji published by Macmillan India Pvt Ltd
Recommended web-links for enhancing English language and business communication
1. http://www.bbc.co.uk/worldservice/learningenglish
2. http://www.englishlearner.com/tests/test.html
3. http://www.hodu.com/default.html
4. http://www.communicationskills.co.in/index.html

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B. Tech. Sem-I Electronics & Communication Engineering

Skill Based Course-I: Basics of PCB Soldering and Assembly

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 00	**End Semester Examination**: 00 Marks	
Practical:04 Hrs /Week	**Internal Assessment**: 00 Marks	
	TW: 25 Marks	**Credit**: 01
	ORAL:25 Marks	**Credit**: 01
	Total:-50 Marks	**Total Credits**: 02

Course Pre-requisites:

The student should have

1. Knowledge of Physics

Course Objectives:

1. This course provides hand-on experience in PCB Circuit design using software and to familiarize with PCB Fabrication process and to provide hands on experience in assembly and testing of electronic circuit.

Course Outcomes: After learning this course students will be able to

1	Identify the electronic components and use basic electronic instruments.
2	Work on different types of boards used for mounting of the electronic components
3	Apply the skills in soldering & desoldering of electronic components..
4	Design PCB using appropriate software.
5	Fabricate, assemble & test electronic circuit.

Term Work:

The term work shall comprise record of all the practicals performed in the semester.

1. Hands on training on electronic instruments: CRO, multimeter, power supply, function generator.
2. Identification of Active and passive components and their package types.
3. Types of PWBs, PCB, material used and bread-boards.
4. Soldering and de-soldering of electronic components on PWBs.
5. Introduction to development tools (any one OrCAD, Proteus, Tinapro, KiCAD, Ultiboard, Eagle etc) for PCB design.
6. PCB Design-I: Schematic entry / drawing, netlisting, layering, component foot print library selection & designing, design rules for single sided PCB.
7. PCB Design-II: Component placing: Manual & automatic, Track routing: automatic & manual, rules: track length, angle, joint & size, Autorouter setup. IPC standards for

schematic, designing, material and documentation.
8. Soldering and de-soldering of the electronic components as per design.
9. Testing and troubleshooting the electronic circuit.
10. Introduction to lamination materials and various casings.

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B. Tech. Sem-II Electronics & Communication Engineering

Engineering Mathematics-II (Common for all Branches)

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Theory:03 Hrs / Week	**End Semester Examination**: 60 Marks	**Credits** : 03
	Internal Assessment: 40 Marks	
Tutorial:01 Hr/ Week		**Credits**:01
	Total:100 Marks	**Total Credits :** 04

Course Pre-requisites:

The student should have

1. Differential calculus

Course Objectives:

1. Fundamental theorems, concepts in Matrices, Demoivre's
2. Various techniques in Calculus, Explanation of functions and Infinite series.
3. Partial differentiation, maxima, minima and its applications in Engineering

Course Outcomes: After learning this course students will be able to

1	Solve differential equations by different methods.
2	Apply different laws to solve Simple Harmonic Motion, One–Dimensional Conduction of Heat.
3	Solve integral calculus and Fourier series.
4	Solve integral calculus with error functions.
5	Determine position in solid geometry
6	Solve multiple integration problems.

UNIT – I	**Differential Equation of First Order and First Degree**	**(06 Hours)**
	Definition, Order and Degree of DE, Formation of DE, Solutions of Variable Separable DE, Exact DE, Linear DE and reducible to these types	
UNIT – II	**Applications of Differential Equations**	**(06 Hours)**
	Applications of DE to Orthogonal Trajectories, Newton's Law of Cooling, Kirchoff‟s Law of Electrical Circuits, Motion under Gravity, Rectilinear Motion, Simple Harmonic Motion, One–Dimensional Conduction of Heat	
UNIT - III	**Fourier Series**	**(06 Hours)**
	Definition, Dirichlet's conditions, Fourier Series and Half Range	

	Fourier Series, Harmonic Analysis	
UNIT -IV	**Integral Calculus**	**(06 Hours)**
	Reduction formulae, Beta and Gamma functions, Differentiation under the Integral Sign, Error functions	
UNIT -V	**Solid Geometry**	**(06 Hours)**
	Cartesian, Spherical Polar and Cylindrical Coordinate Systems, Sphere, Cone and Cylinder	
UNIT -VI	**Multiple Integrals and their Application**	**(06 Hours)**
	Double and Triple integrations, Applications to Area, Volume, Mean and Root Mean Square Values	

PBL: Project Base Learning (Topics)

1. Formation of differential equation
2. Exact differential Equation
3. Linear differential equation
4. Newton's law of cooling
5. Newton's second law of motion
6. Fourier's law
7. Kirchhoff's voltage law
8. Fourier series
9. Harmonic analysis
10. Gamma and beta function
11. Reduction formulae
12. Locating position in three-dimensional space
13. Multiple integrals applications
14. Error function
15. Differentiation under integral sign

Textbooks:

1. Applied Mathematics (Volumes I and II) by P. N. Wartikar & J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune),7th Edition, 1988, Reprint 2010

Reference Books:

1. Higher Engineering Mathematics by B.S. Grewal (Khanna Publication, Delhi), 42th Edition, 2012
2. Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill), Edition, 2008
3. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.), 8th Edition, 1999, Reprint 2010
4. Advanced Engineering Mathematics, 7e, by Peter V.O'Neil (Thomson Learning), Edition 2007
5. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education), 2nd, Edition, 2002

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B. Tech. Sem-II Electronics& Communication Engineering

Engineering Physics (Common for all Branches)

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Theory: 03 Hrs/Week	**End Semester Examination**: 60 Marks	**Credits**: 03
Practical:02 Hrs/week	**Continuous Assessment**: 40 Marks	
	TW: 50 Marks	**Credit**: 01
	Total:150 Marks	**Total Credits**: 04

Course Pre-requisites:

The student should have knowledge of

1. Students are expected to have a basic understanding of physics and calculus.

Course Objectives:

1. To impart knowledge of basic concepts in physics relevant to engineering applications in a broader sense with a view to lay foundation for the engineers.

Course Outcomes: After learning this course students will be able to

1	Analyze the properties of charged particles to develop modern instruments such as electron microscopy.
2	Understand the problems associated with architectural acoustics and give their remedies and use ultrasonic as a tool in industry for nondestructive testing.
3	Apply quantum physics problems to micro level phenomena and solid-state physics.
4	Understand the wave nature of light and apply it to measure stress, pressure and dimension etc.
5	Apply the principles of lasers and fiber optics for applications in the field of engineering.
6	Remember properties of solid matter and connect to applications in the field of engineering.

UNIT – I	**Modern Physics**	**(06 Hours)**
	Motion of a charged particle in electric and magnetic fields, Electrostatic and Magnetostatic focusing, Electron microscopy, interaction of electron beam with the material, Wavelength and resolution, transmission electron microscope (TEM), scanning electron microscope (SEM), Separation of isotopes by Bainbridge mass spectrograph, cathode ray tube (CRT), CRT in cathode ray oscilloscope (CRO).	
UNIT – II	**Architectural Acoustics**	**(06 Hours)**
	Elementary acoustics, Reverberation and reverberation time, Sabine's formula (without Derivation), Intensity level, Sound	

	intensity level, Loudness, Sound absorption, Sound absorption coefficient, different types of noise and their remedies, basic requirement for acoustically good hall, factors affecting the architectural acoustics and their remedies, introduction to ultrasonics, Production of ultrasonics by magnetostriction and piezoelectric methods, applications (thickness measurement, flaw detection).	
UNIT - III	**Quantum mechanics**	**(06 Hours)**
	Dual nature of matter, concept of wave packet, group and phase velocity and relation between them, physical significance of wave function, Schrodinger's time dependent and time independent wave equation, Application of Schrodinger's time independent wave equation to the problems of Particle in a rigid box, concept of tunnelling at potential barrier (no derivation-only conceptual discussion).	
UNIT -IV	**Optics – I (Interference and Diffraction)**	**(06 Hours)**
	INTERFERENCE: Interference due to thin film of uniform thickness and nonuniform thickness, engineering applications of interference (optical flatness, non-reflecting coatings). DIFFRACTION: Diffraction at a single slit (Geometrical method), Conditions for maximum and minimum, Diffraction at a circular aperture (Result only), Plane diffraction grating, Conditions for principal maxima and minima.	
UNIT -V	**Optics – II (Polarisation and Lasers)**	**(06 Hours)**
	POLARISATION: Introduction, Double refraction and Huygen's theory, Positive and negative crystals, Nicol prism. LASERS: Laser introduction, Characteristics of Lasers, Working principle and components of He-Ne Laser, Nd -YAG Laser, Semiconductor diode Laser, Applications in the field optical fiber (Principle, Acceptance angle and acceptance cone, Numerical aperture, Types of optical fibers, Fiber optic communication).	
UNIT -VI	**Solid State Physics**	**(06 Hours)**
	Origin of band gap, Energy bands in solids, Fermi-Dirac probability function and position of Fermi level in intrinsic semi-conductors (with derivation) and in extrinsic semi-conductors, Formation and band structure of p-n junction, Hall effect and Hall coefficient. Introductions of nanoparticles, properties of nanoparticles (Optical, electrical, Magnetic, structural, mechanical), synthesis of nanoparticles (Physical and chemical), quantum dots – wide band semiconductors, direct/indirect band gap semiconductors.	

Term Work:
The term work shall consist of record of minimum eight experiments.
1. Determination of radius of planoconvex lens/wavelength of light/Flatness testing by Newton's rings
2. Determination of wavelength of light using diffraction grating
3. Determination of frequency of ac voltage by CRO.
4. Determination of refractive index for O-ray and E-ray
5. Determination of divergence of a laser beam
6. Particle size by semiconductor laser
7. Determination of wavelength of laser by diffraction grating
8. To study Hall effect and determine the Hall voltage
9. Calculation of conductivity by four probe method
10. Study of solar cell characteristics and calculation of fill factor
11. Determination of band gap of semiconductor
12. Synthesis of metal oxide nanoparticles (ZnO/ZnS/silver/Gold)
13. Measurement of average SPL across spherical wavefront and behaviour with the distance
14. Determination of velocity of sound in liquid by ultrasonic interferometer
15. Study of B-H curve of a sample.
16. Determination of Plank's constant.
Project Based Learning (Topics): The Students are expected to perform project (in a group) based on the course and prepare a report for the same. The report should be as per standard guidelines. Following are the PBL topics but not restricted to:
1. Tesla Coil
2. Thin film interference in soap film-formation of colors
3. LiFi- wireless data transfer system using light
4. Need of medium for propagation of sound wave
5. Possible effects of electromagnetic fields (emf) on human health
6. Design and simulation of automatic solar powered time regulated water pumping
7. Solar technology: an alternative source of energy for national development
8. Measurement and effect of environmental noise in the college
9. Electronic eye (Laser Security) as auto-switch/security system
10. Electronic eye (Laser Security) as auto-switch/security system
11. Electric power generation by road
12. Design and construction of distance measuring instrument using LASER
13. Design and construction of remote-control devices – electronic bell, Fan etc
14. Absorption coefficient of sound absorbing materials
15. Velocity determination of O-ray and E-ray in double refracting materials
16. The design and construction of the hearing aid device
17. Study of Quantum confinement effect
18. Wind turbines - a source of electricity
19. Measurement of gravitational constant 'g'
Text Books:
1. A Textbook of Engineering Physics, M N Avadhanulu, P G Kshirsagar and TVS Arun Murthy, S. Chand Publishing (2018)

2. Engineering Physics, R K Gaur and S L Gupta, Dhanpat Rai Publishing Co Pvt Ltd (2015)
3. Concepts of Modern Physics, Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, McGraw Hill Education (2017)

Reference Books:

1. Fundamentals of Physics, Jearl Walker, David Halliday and Robert Resnick, John Wiley and Sons (2013)
2. Optics, Francis Jenkins and Harvey White, Tata Mcgraw Hill (2017)
3. Principles of Physics, John W. Jewett, Cengage publishing (2013)
4. Introduction to Solid State Physics, C. Kittel, Wiley and Sons (2004)
5. Principles of Solid-State Physics, H. V. Keer, New Age International (1993)
6. Laser and Non-Linear Optics, B. B. Laud, New Age International Private Limited (2011)
7. Nanotechnology: Principles and Practices, Dr. S. K. Kulkarni, Capital Publishing Company (2014)
8. Science of Engineering Materials- C.M. Srivastava and C. Srinivasan, New Age International Pvt. Ltd. (1997)

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B. Tech. Sem-II Electronics & Communication Engineering

Computer Aided Engineering Graphics

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 04 Hrs/Week	**End Semester Examination**: 60 Marks	**Credits**: 04
Practical: 02 Hrs/Week	**Internal Assessment**: 40 Marks	
	TW: 25 Marks	**Credit**: 01
	Total:125 Marks	**Total Credits**: 05

Course Pre-requisites:

The student should have knowledge of

1. Basics of Mathematics at Secondary School Level

Course Objectives:

To provide knowledge about

1. Fundamentals of engineering drawing and curve
2. Isometric views and projection
3. Projections of points, lines, planes & solids
4. Use of CAD tools.

Course Outcomes: After learning this course students will be able to

1	Understand dimensioning methods and drawing of engineering curves.
2	Draw orthographic projections using 1st angle method of projection.
3	Draw Isometric views from given orthographic projections.
4	Draw projection of points, lines and planes.
5	Draw projection of different solids.
6	Draw development of lateral surfaces of solids.

UNIT – I	**Lines and Dimensioning in Engineering Drawing and Engineering Curves**	**(08 Hours)**
	Fundamentals of CAD and Engineering Curves:-Introduction to Engineering Drawing, Types of lines and Dimensioning, Layout and size of drawing sheets, Scales. Engineering Curves-Ellipse drawing by Directrix Focus Method, Arc of Circle Method and Concentric Circle Method, Involutes of a circle, Cycloid, Archimedean Spiral, Helix on cone and Cylinder. Fundamentals of Computer Aided Drafting (CAD) and	

	its applications, Various software's for Computer Aided Graphics/Drafting. AutoCAD initial setting and AutoCAD commands	
UNIT – II	**Orthographic Projections**	**(08 Hours)**
	Basic principles of orthographic projection (First and Third angle method). Orthographic projection of objects by first angle projection method only. Procedure for preparing scaled drawing, sectional views and types of cutting planes and their representation, hatching of sections.	
UNIT - III	**Sectional Orthographic Projections**	**(08 Hours)**
	Types of Sections, Sectional orthographic Projection.	
UNIT -IV	**Isometric Projections**	**(08 Hours)**
	Isometric view, Isometric scale to draw Isometric projection, non-isometric lines, and construction of isometric view from given orthographic views and to construct isometric view.	
UNIT -V	**Projections of Points, Lines, Planes and Solids**	**(08 Hours)**
	Projections of points, projections of lines, lines inclined to one reference plane, lines inclined to both reference planes. (Lines in First Quadrant Only). Projection of prism, pyramid, cone and cylinder by rotation method.	
UNIT -VI	**Development of Lateral Surfaces**	**(08 Hours)**
	Development of the lateral surfaces of solids like prisms, pyramids ,cylinders and cones.	

Term Work:

The term work shall consist of seven A_2 size(594mm×420 mm) sheets by hand and AutoCAD.

1. Types of lines, Dimensioning practice, 1st and 3rd angle methods symbol
2. Engineering Curves
3. Orthographic Projections
4. Isometric views
5. Projections of Lines and planes
6. Projection of Solids
7. Development of Lateral surfaces

Project Based Learning (Topics): The Students are expected to perform project (in a group) based on the course and prepare a report for the same. The report should be as per standard guidelines. Following are the PBL topics but not restricted to:

1. To obtain industrial drawings to identify the types of lines, dimensioning methods and method of projection.
2. To develop the model/charts based on engineering curves.
3. To prepare model/chart for identification of engineering curves in nature for industrial,

societal, etc. application.
4. To demonstrate different methods of orthographic projection.
5. To demonstrate projection of Points.
6. To demonstrate projection of Lines.
7. To demonstrate projection of Planes.
8. To demonstrate projection of Solids.
9. To demonstrate developments of surfaces for solids.
10. To demonstrate industrial application of development of surfaces such as steam carrying pipes, Ducts of air conditioning systems, etc.
11. To demonstrate Isometric projection method through model of a cube.
Text Books:/Reference Books:
1. “Elementary Engineering Drawing”,N.D. Bhatt,Charotar Publishing house, AnandIndia.
2. “Text Book on Engineering Drawing”,K. L. Narayana &P .Kannaiah,Scitech Publications, Chennai.
3. “Fundamentals of Engineering Drawing”, WarrenJ.Luzzader,Prentice Hall of India, New Delhi
4. “Engineering Drawing and Graphics”, Venugopal K.,New Age International publishers.
5. M.B.Shah and B.C.Rana,"EngineeringDrawing",1st Ed,PearsonEducation,2005.
6. P.S.Gill,"EngineeringDrawing(GeometricalDrawing)",10Edition,S.K.Kataria and Son 7. 2005

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B. Tech. Sem- II Electronics & Communication Engineering

Computer Programming-II

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 03 Hrs/Week	**End Semester Examination**: 60 Marks	**Credits** : 03
Practical:02 Hrs/Week	**Internal Assessment**: 40 Marks	
	TW: 25 Marks	**Credits**: 01
	Total :125 Marks	**Total Credits**:04

Course Pre-requisites:

The students should have knowledge of

1	Students should have basic knowledge of programming.

Course Objectives:

1	This course will introduce the concepts of Python language software development tool. By the end of the course, student will be familiar with various fundamentalsof Python language.

CourseOutcomes: After learning this course students will be ableto

1	Understand the basic concept of Python programming.
2	Write basic programs using control statement.
3	Use exception handling.
4	Learn object oriented programming.
5	Write basic programs using arrays.
6	Use Python for simple applications.

UNIT – I	**Python Basics:**	**(06Hours)**
	Python Introduction, Python Installation, Relational operators, Bitwise operators, Logical operators Python Data Types - Numbers (Integer, Floating Point, Complex Numbers), Strings,Lists, Tuples, Dictionaries, List comprehensions, Python Control Statements	
UNIT –II	**Python Core:**	**(06 Hours)**
	Python Modules & Functions, Lambda, Scope, Python File Handling, Python Regular Expressions, Sequence Types, Input and output, Recursion, Flow Control, Immutable and Mutable Objects	
UNIT -III	**Python Exception Handling:**	**(06 Hours)**

	Meaning of Exception, Exception Hierarchy Diagram, Types of Exception- Checked Exception, Unchecked Exception, Exception Handling -TRY, CATCH, FINALLY, Raising an Exception, User Defined Exceptions	
UNIT -IV	**OOPS, UML & OOAD:**	**(06 Hours)**
	Object Oriented Programming (OOPs) - Class & Object, Abstraction, Inheritance, Polymorphism, Encapsulation, Object Oriented (OO) Modelling, Object Oriented Analysis & Design (OOAD)	
UNIT -V	**Python Multi-Threading:**	**(06Hours)**
	Threads in Python (a) Kernel Threads(b) User Space Threads or User Threads, Advantages of Threading, Thread States: Life Cycle of a Thread, Thread & Threading Modules, Forking & Synchronizing Threads, Networking	
UNIT -VI	**Python Packages and Graphics:**	**(06Hours)**
	Numpy: Introduction, datatypes, arrays, arrays manipulation, plotting, testing and debugging, Sharing Data using Sockets, PyCharm in python ,Simple applications of python	

Term Work:
The term work shall consist of record of minimum eight experiments.
1. Evaluate any given expression involving arithmetic operators
2. Evaluate any given expression involving logical operators
3. Develop python functions to produce given patterns such as diamond, pyramid, triangles.
4. Usage of different functions present in “math” module
5. Write a function that takes two numbers as input parameters and returns their least common multiple.
6. Write a function that takes two numbers as input parameters and returns their Greatest common divisor.
7. Write a function that returns the sum of the digits of a number, passed to it as an argument.
8. Write a program that takes a sentence as an input and displays the numbers of words in the sentence.
9. Program to interchange first and last elements in a list
10. program to print even numbers in a list
11. Ways to sort list of dictionaries by values in Python – Using lambda function
12. Example using “matplotlib” module
13. Example using “NUMPY” module
14. Evaluate any given expression involving arithmetic operators

Project Based Learning (Topics): The Students are expected to perform project (in a group) based on the course and prepare a report for the same. The report should be as per standard guidelines. Following are the PBL topics but not restricted to:
1. Design and development of Mad Libs generator.
2. Design and development of electronic mail system (Read, write, send and delete operations).
3. Design and development of store billing system.
4. Design and development of typing speed check web application.
5. Design and development of windows application for music player.
6. Design and development of windows Quiz Application.
7. Design and development of web application for daily expense tracker.
8. Design and development of student portfolio management & CV generator system.
9. Design and development of windows based to do list or sticky notes.
10. Design and development of assignment plagiarism checker.
Text Books:
1. Sheetal Taneja,Naveen Kumar, “Python Programming, A modular approach”, Pearson publication
Reference Books:
1. Learning Python, Mark Lutz ,5th Edition, Oreilly Publication.
2. Magnus Lie Hetland, “Beginning Python: From Novice to Professional”, Third Edition, Appress Publication
3. Allen Downey , Jeffrey Elkner , Chris Meyers, “Learning with Python”, Dreamtech Publication.
4. Paul Berry , “Head-First Python: A Brain-Friendly Guide” (2nd Edition), O'Reilly Media
5. Magnus LieHetland , “Python Algorithms: Mastering Basic Algorithms in the Python Language”, Apress Pub.

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B. Tech. Sem-II Electronics & Communication Engineering

Introduction to Electronic Communication

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 04 Hrs/Week	**End Semester Examination**: 60 Marks	**Credits**:04
Practical: 02 Hrs/Week	**Internal Assessment: 40 Marks**	
	TW:50 Marks	**Credit**: 01
	Total :150 Marks	**Total Credits**: 05

Course Pre-requisites:

The students should have knowledge of

1.	Electronics Components and Devices
2.	Engineering Mathematics - I

Course Objectives:

1.	To introduce the concepts of Electronic Communication systems.
2.	To study Analog Communication systems.
3.	To study the Modern Communication systems.

Course Outcomes: After learning this course students will be able to

1	Outline the basic concept of communication system, need of modulation, terminologies in communication systems.
2	Explain the amplitude modulation & demodulation techniques.
3	Understand the Frequency modulation & demodulation techniques.
4	Learn the fundamental concepts of Digital Communication.
5	Explain the different modern communication systems.
6	Classify the network devices used in a computer communication system.

UNIT – I	**Introduction to Electronic Communication**	**(08 Hours)**
	Communication systems, Electromagnetic Spectrum, types of Electronics Communication, Gain, Attenuation and Decibels, Tuned circuits, Filters, Noise, types of noise, sources of Noise, Concept of Modulation and Multiplexing, Bandwidth.	
UNIT– II	**Fundamentals of Amplitude Modulation and Demodulation**	**(08 Hours)**
	Amplitude Modulation (AM): Basic Concepts, Block Diagram of AM systems, Modulation Index and Percentage of Modulation, sideband, and frequency domain, AM power in Double sideband and single	

	sideband Modulation, AM Spectrum, Diode Detector, Advantages and Disadvantages of AM.	
UNIT-III	**Fundamentals of Frequency Modulation and Demodulation**	**(08 Hours)**
	Frequency Modulation (FM): Basic concepts, Block diagram of FM systems, phase modulation, Modulation Index and Sidebands, Frequency Modulation versus amplitude modulation, FM Spectrum, FM Detector, Advantages and Disadvantages of FM.	
UNIT-IV	**Fundamentals of Digital Communication**	**(08 Hours)**
	Digital Transmission of Data, Parallel and Serial Transmission, Data Conversion, Pulse Modulation, and Basics of Sampling Techniques.	
UNIT -V	**Introduction to Telecommunication Systems**	**(08 Hours)**
	Introduction, Telephone systems, Models for Telecommunication Systems, Cellular Telephone Systems, Cellular Industry overview.	
UNIT-VI	**Fundamentals of Computer Communication**	**(08 Hours)**
	Network Fundamentals, Basic terminologies of Computer communication, LAN Hardware, Ethernet LAN, Advanced Ethernet.	

Term Work:

The term work shall consist of a record of a minimum of eight experiments.

1. Measurement of Gain and Attenuation of filters.
2. Generate AM signals, study its time and frequency domain characteristics, and measure their modulation indices (Under modulation, Perfect modulation & Over modulation)
3. Study of AM Demodulation.
4. Generate and Demonstrate FM Signals.
5. Demonstrate FM Demodulation.
6. Study of Sampling Theorem.
7. Study of Pulse Modulation.
8. Study of different types of Computer Networks.
9. Study of various Computer Network devices.
10. Study of Cellular Technology.

Textbooks:

1. Principles of Electronics Communication Systems (IV Edition): Louis E & Frengel Jr., Mc Graw Hill. 2014.
2. Electronic Communication Systems: Kennedy, Davis, (IV Edition): McGraw Hill, Reprint 2008.

Reference Books:

1. Communication Systems Analog and Digital (IV Edition)): R.P. Singh and S.D Sapre, TMH Publication, 2006.
2. Data Communications and Networking (IV Edition): Behrouz A.Forouzan, McGraw Hill, 2007.

Bharati Vidyapeeth
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B. Tech. Sem.II Electronics& Communication Engineering

Universal Human Values (Common for all Branches)

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 00	End Semester Examination: 00 Marks	**Credits** : 00
Practical: 02 Hrs/Week	Continuous Assessment: 00 Marks	
	TW: 50 Marks	**Credit**: 01
	Total:50 Marks	**Total Credits** : 01

Course Pre-requisites:

The student should have knowledge of

During the Induction Program, students would get an initial exposure to human values through Universal Human Values. This exposure is to be augmented by this compulsory full semester foundation course.

Course Objectives:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence Strengthening of self-reflection.
3. Development of commitment and courage to act

Course Outcomes: After learning this course students will be able to

1	Create more awareness of themselves, and their surroundings (family, society, nature)
2	Understand the Human being is coexisting with self and body and able to recognize its different needs and fulfillment
3	Develop more responsible life with human relationships, while keeping in mind the human nature
4	Understand to imbibe sensitive approach towards society and understand the dimensions of harmony in the society
5	Understand the recycle structure of the nature and able to recognize the participation .
6	Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

UNIT – I	**Introductions, Aspirations and Concerns**	**(04 Hours)**
	Getting to know each other, Self-exploration, Individual academic, career Expectations of family, peers, society, and nation fixing one's goals Basic human aspirations Need for a holistic perspective, Role of UHV	
UNIT – II	**Self-Management, Health**	**(04 Hours)**
	Self-confidence, peer pressure, time management, anger, stress	

	Personality development, Self-improvement Harmony in the human being. Health issues, healthy diet, healthy lifestyle Hostel life Harmony of the self and Body Mental and physical health	
UNIT - III	**Relationships**	**(04 Hours)**
	Home sickness, gratitude towards parents, teachers and others Ragging and interaction Competition and cooperation Peer pressure. Harmony in relationship Feelings of trust, respect, gratitude, glory, love	
UNIT -IV	**Society**	**(04 Hours)**
	Participation in society. Harmony in the society Understanding the harmony in the society (society being an extension offamily): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals .Visualizing a universal harmonious order in society- Undivided Society,Universal Order-from family to world family	
UNIT -V	**Natural Environment**	**(04 Hours)**
	Participation in nature Harmony in nature/existence Understanding the harmony in the Nature Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self regulation in nature	
UNIT -VI	**Self-evaluation Strategy**	**(04 Hours)**
	Strategy for transition from the present state to Universal Human Order: a. Atthe level of individual: as socially and ecologically responsible engineers, technologists and managers. At the level of society: as mutually enriching institutions and organizations review role of education Need for a holistic perspective	

Text Books:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books:

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004. 3. The Story of Stuff (Book).
3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004. 3. The Story of Stuff (Book).
4. Slow is Beautiful - Cecile Andrews
5. Economy of Permanence - J C Kumarappa
6. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi

7. Vivekananda - Romain Rolland (English)
8. Bharat Mein Angreji Raj – Pandit Sunderlal
9. Rediscovering India - by Dharampal
10. India Wins Freedom

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B. Tech. Sem-II Electronics & Communication Engineering

Skill Based Course-II: Electronic Circuits and Simulation

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 00	**End Semester Examination**: 00 Marks	
Practical: 04Hrs/Week	**Internal Assessment**: 00 Marks	
	TW: 25 Marks	**Credit**: 01
	Oral: 25 Marks	**Credits**: 01
	Total: 50 Marks	**Total Credits**: 02

Course Pre-requisites:

The student should have

Knowledge of Semiconductor Physics and basic electronic circuits.

Course Objectives:

This course introduces the simulation techniques used for simulating the electronic circuits for providing good understanding of the operation of electronic circuits.

Course Outcomes: After learning this course students will be able to

1	Implement rectifier circuit and voltage regulator circuit.
2	Classify various wave shaping circuits.
3	Demonstrate the use of Transistor application.
4	Describe applications of FET.

Term Work:

The term work shall comprise record of all the practicals performed in the semester.
Following practicals will be carried out by using Multisim or any other simulation software tool: (Any 6 from 1-9 and any 2 from 10-12)

1. To study the operation of Bridge rectifier and find its ripple factor.
2. To simulate Zener diode as Voltage regulator.
3. To implement diode as a Clipper.
4. To study application of diode as a Clamper.
5. To plot the characteristics of common collector amplifier.
6. To design and simulate an Astable Multivibrator to generate a Square wave of 1 KHz frequency.
7. To implement JFET as an analog switch.
8. To simulate JFET as a chopper and observe its input-output waveforms.
9. To plot V-I characteristics of LED and photodiode.
10. Write a program on the Sampling of signals & implement it using MATLAB.
11. Perform amplitude modulation on simulator or MATLAB to understand it's operation.
12. To understand the operation of PAM, PWM and PPM using simulator.