BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY)
COLLEGE OF ENGINEERING, PUNE
B. Tech. (E & Tc): Semester –I (NEP 2020 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 Physics	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		Elementary Electronics	4	2	-	60	40	50	-		150	4	1	0	5
6.	HSMC		Universal Human Values	-	2	-	-	-	50	-	-	50	0	1	0	1
7.	SBC		Skill-based Course-I Fundamentals of MATLAB Programming	-	4	-	-	-	25	-	25	50	0	2	0	2
			Total	**17**	**14**	**1**	**300**	**200**	**225**	**0**	**25**	**750**	**17**	**7**	**1**	**25**

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

B. Tech. (E & Tc): Semester – II (NEP 2020 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 Chemistry	3	2	-	60	40	50	-	-	150	3	1	0	4
3.	ESC		Computer Programming-II	3	2	-	60	40	25	-	-	125	3	1	0	4
4.	ESC		Computer-AidedEngineering Graphics	4	2	-	60	40	50	-	-	150	4	1	0	5
5.	PCC		Digital Electronics	4	2	-	60	40	25	-	-	125	4	1	0	5
6.	HSMC		Communication Skills	-	2	-	-	-	50	-	-	50	0	1	0	1
7.	SBC		Skill-based Course - IIElectronics Workshop	-	4	-	-	-	25	-	25	50	0	2	0	2
			Total	**17**	**14**	**1**	**300**	**200**	**225**	**0**	**25**	**750**	**17**	**7**	**1**	**25**

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

Bharati Vidyapeeth
(Deemed to be University)
College of Engineering, Pune

B. Tech. Sem. I: Electronics & Telecommunication Engineering **SUBJECT: - Engineering Mathematics-I**			
Designation of Course	**Engineering Mathematics-I(Common for all Branches)**		
Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**
Theory:- 03 Hours/ Week	End Semester Examination	60 Marks	Theory: 03 Tutorial: 01 Practical: 00
Practical :- 00 Hours/ Week	Internal Assessment	40 Marks	
Tutorial :- 01 Hours/ Week	Term Work	00 Marks	
	Oral/Practical Examination	00 Marks	
	Total	100 Marks	04

Course Prerequisites:-	The students should have knowledge of Algebra of matrices and its Determinants, Maxima and Minima of single variable functions.
Course Objective	On completion of the course – 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 completion of the 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 Hrs)**
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 Hrs)**
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 Hrs)
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 Hrs)
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 Hrs)
Partial Derivatives, Euler's Theoremon Homogeneous Functions, Implicit functions, Total Derivatives, Change of Independent Variables, Errors and Approximations.

Unit VI: Jacobian: (06 Hrs)
Jacobians and their applications, Chain Rule, Functional Dependence.
Maxima and Minima: Maxima and Minima of Functions of two variables, Lagrange's method ofundeterminedmultipliers.

PBL: Project Base Learning (Topics)

1	Echelonform
2	Normalform
3	Linearandorthogonaltransformation
4	Eigenvaluesandeigenvectors
5	Arganddiagram
6	De Movre'stheorem
7	Hyperbolicandlogarithmicfunctions
8	Leibnitztheorem
9	Taylor'stheorem
10	L'Hospitalrule
11	Testsforconvergence
12	Eulertheoremforhomogeneousfunctions
13	Totalderivative
14	Maximaandminimafortwovariablefunction
15	Langrageundeterminedmultipliers

Textbooks

1. Applied Mathematics (Volumes I and II) by P. N. Wartikar& J. N. Wartikar (Pune Vidyarthi GrihaPrakashan, 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

Unit Test –

Unit Test - I	**Unit I, II, III**
Unit Test - II	**Unit IV, V, VI**

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B. Tech. Sem. I: Electronics & Telecommunication Engineering **SUBJECT: - Engineering Physics**			
Designation of Course	**Engineering Physics (Common for all Branches)**		
Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**
Theory:- 03 Hours/ Week	End Semester Examination	60 Marks	Theory: 03 Tutorial: 00 Practical: 01
Practical :- 02 Hours/ Week	Internal Assessment	40 Marks	
Tutorial :- 00 Hours/ Week	Term Work	50 Marks	
	Oral/Practical Examination	00 Marks	
	Total	150 Marks	04

Course Prerequisites:-	Students are expected to have a basic understanding of physics and calculus.
Course Objective	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 completion of the 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 non destructive 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. Rememberproperties of solid matter and connect to applications in the field of engineering.

Unit I:Modern Physics (6 Hrs)

Motion of a charged particle in electric and magnetic fields, Electrostatic and Magnetostatic focussing, 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 (6Hrs)

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 (6hrs)

Dual nature of matter, concept of wave packet, group and phase velocity and relation between them, physical significance of wave function, Schrodinger's time dependant 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) (6 Hrs)

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) (6 Hrs)

POLARISATION: Introduction, Double refraction and Huygen's theory, Positive and negative crystals, Nicol prism.
LASERS: Lasers 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 (6Hrs)

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.

PBL : Project Based Learning (topics)

Sr. No.	Topic
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
1.	Electronic eye (Laser Security) as auto-switch/security system
2.	Electric power generation by road
3.	Design and construction of distance measuring instrument using LASER
4.	Design and construction of remote control devices – electronic bell, Fan etc
5.	Absorption coefficient of sound absorbing materials
6.	Velocity determination of O-ray and E-ray in double refracting materials
7.	Velocity determination of O-ray and E-ray in double refracting materials
8.	The design and construction of the hearing aid device
9.	Study of Quantum confinement effect
10.	Wind turbines - a source of electricity
11.	Measurement of gravitational constant ‘g’

Practical (Any Eight of the Following)

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.

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)

Unit Test –

Unit Test - I	**Unit I, II, III**
Unit Test - II	**Unit IV, V, VI**

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B. Tech. Sem. I: Electronics & Telecommunication Engineering **SUBJECT: - Electrical Technology**		
TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 04 Hrs / Week	**End Semester Examination:** 60 Marks	**Theory:**04 Credits
Practical: 02 Hrs / Week	**Continuous Assessment:** 40 Marks	**Practical:**01 credit
	TW: 25Marks	**Total:**05 Credits

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

UNIT - I	**Introduction**	**(08 Hrs)**
	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 Hrs)**
	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-phaseAC Circuit**	**(08 Hrs)**
	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 Hrs)**
	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 Hrs)**
	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 Hrs)**
	The 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 a record of a minimum of eight experiments.		
1. Familiarization with electrical Elements, sources, and measuring devices related to electrical circuits. 2. Study of residential electricity bills. 3. Verification of the Superposition theorem 4. Verification of Thevenin's theorem 5. Verification of Norton's theorem 6. Verification of Kirchhoff's laws		

7. Verification of Maximum power transfer theorem
8. Study of R-L, R-C series, and parallel circuits.
9. Study of R-L-C series circuits for $X_L > X_C$, $X_L < X_C$ & $X_L = X_C$
10. Verification of the relation 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.

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

Syllabus for Unit Test:	
Unit Test -1	UNIT – I, UNIT – II, UNIT - III
Unit Test -2	UNIT – IV, UNIT – V, UNIT - VI

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B. Tech. Sem. I: Electronics & Telecommunication Engineering
SUBJECT: - COMPUTERPROGRAMMING - I

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 03	End Semester Examination: 60 Marks	Theory Credits: 03
Practical: 02	Continuous Assessment: 40 Marks	Practical Credits: 01
Tutorial: 00	TW: 25 Marks	Total Credits: -04

Course Pre-requisites:

The students should have knowledge of

1.	Flowchart

Course Objectives:

- A student will gain a thorough understanding of the fundamentals of C programming.
- A student will be able to code, compile, and test C programs.
- A Student will be able to solve problems using C language

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

1	Apply the basic concepts of programming using C language.
2	Write basic programs using conditional statements.
3	Use 2 D Array in programming
4	Create functions and Pass parameters.
5	Construct structures using Pointers.
6	Apply basic concepts of graphics using C language.

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

UNIT - III	**Arrays & Strings**	**(07 Hours)**
	Arrays - concepts, declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1-D arrays, 2-D arrays, string manipulations.	
UNIT -IV	**Functions & Pointers**	**(05 Hours)**
	Basics, parameter passing, storage classes- extern, auto, register, static, scope rules, user-defined functions, recursive functions, example c programs. Passing arrays & strings to functions.	
UNIT -V	**Pointers and Structures**	**(07 Hours)**
	Derived types- structures- declaration, definition, and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures.	
UNIT -VI	**Basic of Graphics**	**(05 Hours)**
	Introduction, what is computer Graphics? Area of Computer Graphics. Graphics programming, C Graphical functions, simple programs.	

Term Work: Any 8 of the below-given list

1.
- Write a C program to take user input and print it on the screen.
- Write a C program to perform the addition or subtraction of two numbers.
- Write a C program to find whether the number is Odd or Even.
- Write a C program to find out Prime numbers.
- Write a C program to find out the Fibonacci series.

2.
- Write C programs to print different patterns.
- Write a C program to do factorial using recursion.
- Write a C program to find out Armstrong's number

3.
- Write a C program to sort the array in Ascending & Descending order.
- Write C programs to perform operations on 2-D arrays.
- Write a C program to perform different operations on strings.

4.

- Use of Pointers
- Write a C program to swap numbers using pointers.

5. Write a C program to show the use of pointers in arrays.

6. Write a C program to use functions using pointers.

7. Write a C program to create a student mark sheet using structures.

8. Write a C program to show the use of structure using pointers.

9. Write a program showing functions of Graphics programming

10. Mini Project.

Textbooks:

1. Programming in ANSI C – E Balagurusamy (5th Edition-TMH)

2. C Graphics & Projects – By B M Havaldar

Reference Books:

1. Let Us C- Yashwant Kanitkar

2. Computer Graphics – By Hearn & Baker

3. The C Programming Language. 2nd Edition By Brian Kernighan and Dennis Ritchie

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B. Tech. Sem. I: Electronics & Telecommunication Engineering **SUBJECT: - Elementary Electronics**		
TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 04	End Semester Examination: 60 Marks	Credits: 04
Practical: 02	Internal Assessment: 40 Marks	
	TW : 50 Marks	Credits: 01
		Total Credit: 05

Course Pre-requisites: Physics, Chemistry, Mathematics (Higher Secondary Level)

Course Objectives:

1.	To introduce the construction, working, ratings and application of passive devices.
2.	To introduce types of Voltage and current sources.
3.	To introduce the construction, working and ratings of PN junction diode and diode circuits.
4.	To introduce the methods of analysis of BJT biasing circuits.
5.	To introduce methods to analyze JFET & MOSFET circuits.
6.	To introduce the construction, working and ratings of optoelectronic devices like LDR, LED, phototransistor and photovoltaic cell.

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

1	Identify and analyze circuits using passive devices.
2	Analyze the voltage sources and current sources.
3	Analyze the diode circuits.
4	Analyze the BJT biasing circuits.
5	Analyze the JFET & MOSFET circuits.
6	Identify and use optoelectronic devices based on their types and ratings and plot their characteristic curves.

UNIT – I	**Passive Electronic Components.**	**(08 Hours)**
	Introduction to the concept of active and passive electronic devices, Types of resistors, construction, ratings and typical applications, Types of capacitors, construction, ratings and typical applications, Types of inductors, construction, ratings and typical	

	applications, Types of transformers, construction, ratings and typical applications, Construction of relays, types and ratings, Analysis of series and parallel resistors and capacitor circuits	
UNIT – II	**Sources**	**(08 Hours)**
	Types of voltage and current sources (AC and DC), Concept of ideal and non-ideal voltage source, Concept of ideal and non-ideal current source, Series and parallel combinations of sources, Loading effect, Dependent voltage and current sources, Electrochemical cells and batteries, Types and characteristics, Regulation concept (Line regulation, load regulation, temperature stability factor)	
UNIT - III	**PN junction diode and diode circuits**	**(08 Hours)**
	Classification of material based on band gap theory, Types of semiconductors (p-type and n-type),pn junction diode and its characteristics, Concept of DC and AC load line and ratings of pn junction diode. Analysis of Rectifier circuits (HWR, FWR, Bridge, Dual Complementary), Clippers, Clampers, Voltage Multipliers, Special diodes (zener diodes, Schottky diodes, Gold-diffused diodes).	
UNIT - IV	**BJT and BJT biasing**	**(08 Hours)**
	Introduction to BJT (npn and pnp) and its construction and working mechanism, BJT configurations (CE,CC,CB) and their input and output characteristics, Types and ratings of BJT Need of biasing circuits, Analysis of BJT biasing circuits like fixed bias, collector to base bias, voltage divider bias, Concept of DC load line.	
UNIT -V	**FET and MOSFET**	**(08 Hours)**
	Construction and working mechanism of FET ,Input and output characteristics of FET, Construction and working of DMOSFET and EMOSFET, Characteristics of DMOSFET and EMOSFET, Configurations (CS, CD, CG) EMOSFET biasing (negotiated bias/Voltage divide bias, drain feedback biasing), DC load line, MOSFET as switch.	

UNIT - VI	**Opto-Electronics**	**(08 Hours)**
	Construction and working of LDR and its characteristics, simple application , Construction and working of LED and its characteristics and ratings, Photo-transistor and its characteristics , Introduction to the concept of electrical isolation and its importance , Construction of opto-isolator(opto-coupler) and its ratings , Construction and working of photovoltaic cell and its characteristics and ratings	

List of Experiments: (Any 8 Experiments from following list)

1. Study of resistors, capacitors, inductors and relays.
2. Plot V-I Characteristics of PN Junction Diode
3. Plot V-I Characteristics of Zener Diode
4. To study different types of Diode Clipper circuits and diode Clamper circuits
5. Plot Input and Output Characteristics of BJT in CE Configuration.
6. Plot Transfer and output characteristics of FET
7. Plot Transfer and output characteristics of MOSFET
8. Plot characteristics and response of LDR
9. Plot characteristics of Opto-isolator

Textbooks/Reference Books

1. Passive Components for Circuit Design, Ian Sinclair,1st Edition 2000, ISBN: 9780750649339, Newnes
2. Grob's Basic Electronics, Mitchel Schultz,11th Edition,2010, ISBN-13: 978-0-07-351085-9, McGraw Hill
3. Fundamentals of Electronic Devices and Circuits, David A. Bell, 5th Edition,2008, ISBN:0195425235, 9780195425239, Oxford University Press.
4. Microelectronics Circuits, Adel S. Sedra & Kenneth C. Smith,7th Edition, 2015, ISBN 978–0–19–933913–6, Oxford University Press

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B. Tech. Sem. I: Electronics & Telecommunication Engineering **SUBJECT: - Universal Human Values**			
Designation of Course	**Universal Human Values (Common for all Branches)**		
Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**
Theory:- 00 Hours/ Week	End Semester Examination	00	Theory: 00 Tutorial: 00 Practical: 01
Practical :- 02 Hours/ Week	Internal Assessment	00	
Tutorial :- 00 Hours/ Week	Term Work	50 Marks	
	Oral/Practical Examination	00 Marks	
	Total	50 Marks	01

Course Prerequisites:-	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 Objective	Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence Strengthening of self-reflection. Development of commitment and courage to act
Course Outcomes:-	After completion of the 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 (4Hrs)
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 **(4Hrs)**

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 **(4Hrs)**

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 **(4 Hrs)**

Participation in society. Harmony in the society Understanding the harmony in the society (society being an extension of family): 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 **(4 Hrs)**

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 **(4 Hrs)**

Strategy for transition from the present state to Universal Human Order: a. At the 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 Book

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. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi 5. Small is Beautiful - E. F Schumacher.
4. Slow is Beautiful - Cecile Andrews
5. Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj - PanditSunderlal 9. Rediscovering India - by Dharampal
6. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi 11. India Wins Freedom - Maulana Abdul Kalam Azad
7. Vivekananda - Romain Rolland (English)

Bharati Vidyapeeth
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College of Engineering, Pune

B. Tech. Sem. I: Electronics & Telecommunication Engineering
SUBJECT: -Fundamentals of MATLAB Programming

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 00	End Semester Examination: 00	Credits: 00
Practical: 04	Internal Assessment: 00	
Tutorial: 00	TW: 25 Marks	Credit: 02
	OR: 25 Marks	Total Credit: 02

Course Pre-requisites:

	Mathematics (Class XII) and Linear Algebra and Calculus

Course Objectives:

1.	To teach the basics of MATLAB software and programming.
2.	To teach the students Vectors, Arrays and Strings in programming
3.	To introduce Conditional Statements, Loops and Functions
4.	To teach the students to perform different operations on Matrices in programming.
5.	To introduce MATLAB Simulink.
6.	To introduce MATLAB GUI.

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

1	Use MATLAB for basic programming.
2	Use Vectors, Arrays and Stringsin programming.
3	Apply knowledge of conditional statements, loops, and functions in programming.
4	Use different operations of Matrices in programming.
5	Design different models using MATLAB Simulink.
6	Design GUI for different applications.

List of experiments:

1. To study the Basics of MATLAB.
2. Write a program to perform arithmetic and logical operations on scalar data.

3. Write a program to display sine and cos wave of particular amplitude and frequency.
4. Write a program to find addition, subtraction, multiplication, transpose, and magnitude of given vector.
5. Write a program to find mean, standard deviation, and variance of given vector.
6. Write a program to show use of if-then-else statement and while loop.
7. Write a program to import and export data from .csv file.
8. Write a program to display data using string.
9. Write a program to compare two given arrays or array elements.
10. Write a program to find transpose, determinant, concatenation, and inverse of given matrix.
11. Write a program to solve given linear equation.
12. To study basics of Simulink.
13. Develop a model to find square and square root of any number using Simulink.
14. Develop a model to differentiate and integrate sine wave using Simulink.
15. To study basics of GUI.
16. To design GUI for any one of the programs mentioned above.
Text Books:
1. MATLAB for Beginners-A Gentle Approach, Peter I. Kattan, 2010, ResearchGate publication
2. Getting started with MATLAB, RudraPratap, 2010, Oxford university press.
Reference Books:
1. A Guide to MATLAB, Brian R. Hunt, Ronald L. Lipsman, Jonathan M. Rosenberg, 3rd Edition, Cambridge University Press.
2. Introduction to MATLAB for Engineers,WilliamJ.Palm, 3rd Edition, McGraw-Hill Education.

Sem-II

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B. Tech. Sem. II: Electronics & Telecommunication Engineering **SUBJECT: - Engineering Mathematics-II**			
Designation of Course	**Engineering Mathematics-II(Common for all Branches)**		
Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**
Theory:- 03 Hours/ Week	End Semester Examination	60Marks	Theory: 03 Tutorial: 01 Practical: 00
Practical :- 00 Hours/ Week	Internal Assessment	40Marks	
Tutorial :- 01 Hours/ Week	Term Work	00 Marks	
	Oral/Practical Examination	00 Marks	
	Total	100 Marks	04

Course Prerequisites:-	The students should have knowledge of differential calculus
Course Objective	On completion of the course – 1. Fundamental theorems, concepts in Matrices, Demoivre'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 completion of the course students will be able to 1. Solve differential equations by different methods. 2. Apply different laws to solve Simple Harmonic Motion, One–DimensionalConductionof Heat. 3. Solve integralcalculusandFourierseries. 4. Solve integralcalculuswitherrorfunctions. 5. Determinepositioninsolidgeometry 6. Solve multiple integration problems.

Unit I:DifferentialEquation of First Order and First Degree:(06 Hrs)
Definition, Order and Degree of DE, Formation of DE, Solutions ofVariable Separable DE, Exact DE, Linear DE and reducible to these types

Unit II:Applications of Differential Equations: (06 Hrs)
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 Hrs)
Definition, Dirichlet's conditions, Fourier Series and Half Range Fourier Series, Harmonic Analysis

Unit IV: Integral Calculus:(06 Hrs)
Reduction formulae, Beta and Gamma functions, Differentiation under the Integral Sign, Error functions

Unit V. Solid Geometry:(06 Hrs)
Cartesian, Spherical Polar and Cylindrical Coordinate Systems, Sphere, Cone and Cylinder

Unit VI:Multiple Integrals and their Application:(06 Hrs)
Double and Triple integrations, Applications to Area, Volume, Mean and Root Mean Square Values

PBL: Project Base Learning (Topics)

1	Formationofdifferentialequation
2	ExactdifferentialEquation
3	Lineardifferentialequation
4	Newton'slawofcooling
5	Newton'ssecondlawofmotion
6	Fourier'slaw
7	Kirchhoff'svoltagelaw
8	Fourierseries
9	Harmonicanalysis
10	Gammaandbetafunction
11	Reduction formulae
12	Locatingpositioninthreedimensionalspace
13	Multipleintegralsapplications
14	Errorfunction
15	Differentiationunderintegralsign

Textbooks

1. Applied Mathematics (Volumes I and II) by P. N. Wartikar& J. N. Wartikar (Pune Vidyarthi GrihaPrakashan, 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

Unit Test –

Unit Test - I	**Unit I, II, III**
Unit Test - II	**Unit IV, V, VI**

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B. Tech. Sem. II: Electronics & Telecommunication Engineering **SUBJECT: - Engineering Chemistry**			
Designation of Course	**Engineering Chemistry (Common for all Branches)**		
Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**
Theory:-03Hours/ Week	End Semester Examination	60 Marks	Theory: 03 Tutorial: 00 Practical: 01
Practical:-02Hours/week	Internal Assessment	40 Marks	
Tutorial:-00 Hours/week	Term Work	50 Marks	
	Oral/Practical Examination	00 Marks	
	Total	150 Marks	04

Course Prerequisites:-	The student should have Basic knowledge of chemistry. Basic knowledge of electrochemistry and chemistry of materials Introductory knowledge of polymers.
Course Objective	The student should acquire the knowledge of 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 completion of the course students will be able to 1. Understand the different methods of analysis of water,different environmental pollutants and importance of green chemistry 2. Understandthe importance of fuelsand apply itfor 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 (6Hrs)

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 ofadipic acid, Industrial applications of green chemistry, Numerical problems on Atom economy.

Unit II: Electrochemical energy and solar energy (6Hrs)

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 (6hrs)

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, Anodizingof 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 (6 Hrs)

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 (6Hrs)

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 (6Hrs)

Introduction, Theory, Instrumentation and applications of colorimetry, pHmetry, conductometry Introduction to spectroscopy, principles and applications of UV/Vis.Spectroscopy

PBL: Project Base Learning (Topics)

Sr. No	Topics
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 H_2 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 voltaicpanels as renewable energysource.
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 metho
15	Measurement and effect of waste disposal from laboratories in the college

Practical (Any Eight of the Following)

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.

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
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)

Unit Test –

Unit Test - I	**Unit I, II, III**
Unit Test - II	**Unit IV, V, VI**

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B. Tech. Sem. II: Electronics & Telecommunication Engineering
SUBJECT: - COMPUTER PROGRAMING- II

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: 03	End Semester Examination: 60 Marks	Credits: 03
Practical: 02	Continuous Assessment: 40 Marks	Credits: 01
Tutorial: 00	TW: 25 Marks	Credits: -04

Course Pre-requisites:

The students should have knowledge of

1.	Basic programming.

Course Objectives:

- This course will introduce the concepts of Python language as a software development tool.
- To gain practical experience in Python programming including fundamental concepts, OOPs, Exception handling, and Graphics.

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

1	Apply the basic concepts of Python programming.
2	Write basic programs using control statements.
3	Use exception handling in Python programs.
4	Apply object-oriented programming concepts in Python.
5	Write Python program for simple applications using existing libraries.
6	Write simple graphics programs.

UNIT – I	**Python Basics**	**(06 Hours)**
	Python Introduction, Python Installation, Relational operators, Bit-wise 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 ,Recursion,Flow Control,Immutable and Mutable Objects.	
UNIT - III	**Python Exception Handling**	**(06 Hours)**
	Meaning of Exception, Exception Hierarchy Diagram, 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**	**(06 Hours)**
	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.	
UNIT -VI	**Python Packages and Graphics**	**(06 Hours)**
	Numpy: Introduction, data-types,arrays, arrays manipulation, ploting, testing and debugging,Sharing Data using Sockets,Simple applications of python, Scipy, TKinter	

Term Work: Any 8 of below given list
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 program that takes a sentence as an input and displays the number of words in the sentence.
8. Ways to sort list of dictionaries by values in Python – Using lambda function.
9. Write program using “matplotlib” module.
10. Write program using “NUMPY” module.

11. Write program using “Scipy” module.
12. Write program using “TKinter” module.
Text Books:
1. Sheetal Taneja,Naveen Kumar,Python Programming,A modular approach,Pearson publication
Reference Books:
1. Learning Python 5th Edition, Oreilly Publication
2. Beginning Python: From Novic to professional, by Magnus Lie Hetland, Third Edition, Appress Publication
3. Learning with Python by Allen Downey, Jeffrey Elkner, Chris Meyers, Dreamtech Publication

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B. Tech. Sem. II: Electronics & Telecommunication Engineering **Subject: Computer Aided Engineering Graphics**			
	B. Tech. Chemical, Electronics & Communication, Electronics & Telecommunication, Mechanical, Robotics & Automation Engineering		
Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**
Theory :- 04 Hrs./ Week	End Semester Examination	60 Marks	04
Practical:- 02 Hrs./Week	Unit Test	40 Marks	
	Term Work / ~~Oral~~	50 Marks	01
	Practical Examination	-- Marks	--
	Total	150 Marks	05

Course Prerequisites:-	Basics of Mathematics at Secondary School Level
Course Objectives	To provide knowledge about • Fundamentals of engineering drawing and curves • Isometric views and projection • Projections of points, lines, planes & solids • Use of CAD tools.
Course Outcomes:-	The students must 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.

Course Contents

Unit 1	**LinesandDimensioninginEngineeringDrawing and Engineering Curves**	**(08Hrs.)**

Fundamentals of CAD and Engineering Curves

Introduction to Engineering Drawing, Types of lines and Dimensioning, Layout and size of drawingsheets, Scales.

Engineering Curves-Ellipse drawing by Directrix Focus Method, Arc of Circle Method and ConcentricCircle Method,Involutesofacircle,Cycloid,ArchimedeanSpiral,HelixonconeandCylinder.FundamentalsofComp

uterAidedDrafting(CAD)anditsapplications,VarioussoftwareforComputerAidedGraphics/Drafting.AutoCAD initialsettingandAutoCADcommands		
Unit 2	**OrthographicProjections**	**(08Hrs.)**
Basicprinciplesoforthographicprojection(FirstandThird anglemethod).Orthographicprojectionofobjectsbyfirstangleprojectionmethodonly.Procedureforpreparingscaleddrawing,sectionalviewsandtypesofcuttingplanesandtheirrepresentation,hatchingofsections.		
Unit 3	**Sectional OrthographicProjections**	**(08 Hrs.)**
Types of Sections, Sectional orthographicProjection.		
Unit 4	**IsometricProjections**	**(08Hrs.)**
Isometricview,IsometricscaletodrawIsometricprojection,non-isometriclines,andconstructionofisometricviewfromgivenorthographicviewsandtoconstructisometricview.		
Unit 5	**ProjectionsofPoints, Lines, Planes and Solids**	**(08Hrs.)**
Projectionsofpoints,projectionsoflines,linesinclinedtoonereferenceplane,linesinclinedtoboth referenceplanes. (Lines in FirstQuadrantOnly).Projectionofprism,pyramid,coneandcylinderbyrotationmethod.		
Unit 6	**Development of Lateral Surfaces**	**(08Hrs.)**
Developmentofthelateralsurfacesof solidslikeprisms,pyramids,cylindersandcones.		

Project Based Learning

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.

Assignments: Minimumfive problemsoneachunitinA3sizeDrawingBook
Term Workshallconsistof**seven**A_2size(594mm×420 mm)sheetsby 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. ProjectionsofLinesandplanes
6. ProjectionofSolids
7. Development of Lateral surfaces

Text Books/References

1. “ElementaryEngineeringDrawing”,N.D. Bhatt,CharotarPublishinghouse, AnandIndia.
2. “TextBookonEngineeringDrawing”,K. L. Narayana&P .Kannaiah,Scitech Publications, Chennai.
3. “FundamentalsofEngineeringDrawing”, WarrenJ.Luzzader,PrenticeHallofIndia,NewDelhi
4. “EngineeringDrawingandGraphics”, VenugopalK.,NewAgeInternationalpublishers.
5. M.B.ShahandB.C.Rana,"EngineeringDrawing",1st Ed,PearsonEducation,2005.
6. P.S.Gill,"EngineeringDrawing(GeometricalDrawing)",10Edition,S.K.KatariaandSons,2005.

Syllabus for Unit Tests

Unit Test I: Units I, II, and III
Unit Test II: Units IV, V, and VI

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B. Tech. Sem. II: Electronics & Telecommunication Engineering **SUBJECT: - DIGITAL ELECTRONICS**		
TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Lectures: 04 Hours / Week	End Semester Examination: 60 Marks	Theory:4 Credits
Practical: 02 Hours / Week	Continuous Assessment: 40 Marks	PR/OR: 1 Credit
	Term Work + Practical: 25Marks	Total:5 Credits

Course Objectives:

1.	To present the Digital fundamentals, Boolean algebra, and its applications in digital systems
2.	To familiarize with the design of various combinational digital circuits using logic gates
3.	To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits
4.	To understand the various semiconductor memories and related technology
5.	To introduce the electronic circuits involved in the making of logic gates

Course Outcomes:

	On successful completion of this course, students will be able to:
1.	Demonstrate the knowledge of Boolean algebra including simplification techniques.
2	Characterize Logic families TTL, CMOS, ECL & explain the fundamentals of semiconductor memories.
3	Analyze & design digital combinational circuits such as multiplexers,demultiplexers, encoders, decoders, and arithmetic circuits.
4	Demonstrate the knowledge of operations of basic types of flip-flops, registers, counters & the design of FSM.
5	Understand the characteristics of PLDs, Semiconductor memories and applications.

Unit - I	**Introduction to Digital Systems**: Introduction to Digital Electronics Fundamentals **Number Systems**: Introduction to Number Systems-Decimal, Binary, Octal, Hexadecimal, Conversion of the number system, Representation of Negative Numbers,1's complement and 2's complement. **Binary Arithmetic**: Binary addition, Binary subtraction, Subtraction using 1's complement and 2's complement, Binary multiplication, and division,	**(8hours)**

	Digital Codes: BCD code, Excess-3 code, grey code, Binary to Excess -3 code conversion and vice versa, ASCII code, EBCIDIC code. **Logic Gates**: Logical Operators, Logic Gates-Basic Gates, Active high and Active low concepts, Universal Gates, and realization of other gates using universal gates, Gate Performance Characteristics and Parameters.	
Unit - II	**Boolean Algebra**: Boolean Expressions and Truth Tables, Rules and laws of Boolean algebra, Demorgan's Theorems,and Simplification of Boolean functions by Boolean laws. **Boolean Function minimization Technique**: Introduction:Minterms and sum of minterm form, Maxterm and Product of maxterm form, Reduction technique using Karnaugh maps – 2/3/4/variable K-maps, grouping of variables in K- maps, minimize Boolean expression using K-map and obtain K-map from Boolean expression, Quine Mc Cluskey Method.	**(08hours)**
Unit -III	**Combinational Logic Design:** Introduction to Combinational Circuits, Adders:Half-Adder and Full-Adder, Subtractors- Half and Full Subtractor; Parallel adders: Ripple Carry and Look-Ahead Carry Adders.BCD adder, Parity Checker/Generator, Multiplexer, Demultiplexer, Encoder, Priority Encoder; Decoder, BCD to Seven segment Display, ALU, Code converters, Magnitude comparators	**(08 hours)**
Unit -IV	**Sequential Logic Design**: Introduction to Sequential Circuits: 1 Bit Memory Cell, Latches: SR latch, Gated latch,Flip-Flops: Types of Flip Flops -RS, T, D, JK, Triggering of Flip Flops, Master-Salve JKFlip Flop, excitation table of Flip-flop.	**(08 hours)**
Unit- V	**Shift Registers and Counters**: Data transmission in shift Resister: SISO, SIPO, PISO, PIPO, Bidirectional shift register, universal shift registers. Counters: synchronous counter andasynchronous counter. **Introduction to FSM**: Moore and Mealy State machine, Design of state machines: state table, state assignment, transition/excitation table.	**(08 hours)**

Unit -VI	**Logic Families and Memory Technology:** **Logic Family**: Digital IC specification terminology, Logic families: TTL, CMOS, ECL. **Programmable logic devices**: Study of PROM, PAL, PLAs. Designing combinational circuits using PLDs. **Semiconductor memories:** Classification and characteristics of memory, different types of RAMs, ROMs, and their applications.	**(08 hours)**

List of Experiments:

1.Study of basic gates using TTL, CMOS: 7432, 4011, 4050, 4070,4071,40106
2. Implementation of logic function using Universal gates (NAND, NOR).
3. Implementation of the combinational logic circuit usingthe K map-basedmethod.
4. Design and Implementation of Half and Full Adder, Half and Full Subtractor
5. Design and Implementation of 4-bit parallel Adder / Subtractor using IC 7
6. Design and Implementation of Code Converters (Binary to Gray, Excess 3 to Binary)
7. Design and Implementation of Comparator using IC 7485
8. Implementation of combinational logic using MUX
9. Design Decoder and DEMUX (IC 74138)
10. Design7 segment decoder driver. (IC 7447)
11. Study of Flip Flops (SR FF, D FF, JK FF, T FF)
12. Design Built and test MOD N counter
13. Design Built and test Shift Registers
14. Design and implementation of Johnson Counter
15.Study of Static I/O and TransferCharacteristics of TTL.
16. Study of Static I/O and TransferCharacteristics of CMOS.

Note:
The term work shall be the record of a minimum of eight experiments performed from the above list.

Reference Books:

1.	R.P. Jain, ―Modern digital electronics‖, 3rd edition, 12threprint Tata McGraw Hill Publication
2.	Anand Kumar, ―Fundamentals of digital circuits‖ 1st edition, Prentice Hall of India, 2001.
3	A.P. Malvino, D.P. Leach ‘Digital Principles & Applications’’ –Vith Edition-Tata Mc Graw Hill, Publication.
4	J.F.Wakerly “Digital Design: Principles and Practices”, 3rd edition, 4th reprint, Pearson Education, 2

Bharati Vidyapeeth
(Deemed to be University)
College of Engineering, Pune

B. Tech. Sem. II: Electronics & Telecommunication Engineering **SUBJECT: - Communication Skills**			
Designation of Course	**Communication Skills (Common for all Branches)**		
Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**
Theory:- 00 Hours/ Week	End Semester Examination	00	Theory: 00 Tutorial: 00 Practical: 01
Practical :- 02 Hours/ Week	Internal Assessment	00	
Tutorial :- 00 Hours/ Week	Term Work	50 Marks	
	Oral/Practical Examination	00 Marks	
	Total	50 Marks	01

Course Prerequisites:-	Students should have knowledge of Basic English grammar Students should have basic information of sound system of English language.
Course Objective	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 completion of the 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 **(4 Hrs)**

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 (4 Hrs)
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 (4 Hrs)
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 (4 Hrs)
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 (4 Hrs)
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 (4Hrs)
Designing effective presentation, understanding theme, developing content and layout of presentation, use of tone and language, technological tools for effective presentation

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 Phonetics 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
http://www.bbc.co.uk/worldservice/learningenglish
http://www.englishlearner.com/tests/test.html
http://www.hodu.com/default.html
http://www.communicationskills.co.in/index.html

SBharati Vidyapeeth
(Deemed to be University)
College of Engineering, Pune

B. Tech. Sem. II: Electronics & Telecommunication Engineering
SUBJECT: - SKILL BASE COURSE -I
ELECTRONICS WORKSHOP

TEACHING SCHEME:	**EXAMINATION SCHEME:**	**CREDITS ALLOTTED:**
Theory: --	End Semester Examination --00 Marks	
Practical: 04	Continuous Assessment: --- 00 Marks	
Tutorial: --	TW: 25 Marks	Credit:02
	Oral: 25 Marks	
	Practical: -- 00 Marks	
		Total Credit: 02

Course Pre-requisites:

	Elementary Electronics

Course Objectives:

1	To introduce the basic building blocks for PCB artwork design
2	To train the student to create simple PCB artwork design using a PCB design tool
3	To expose the students to the soldering process and tools
4	To train the students to make reliable solder joints
5	To train the students to de-solder the solder joints
6	To teach the art of inspecting solder joints

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

1	Demonstrate the knowledge of selecting proper PCB primitives (track width, pad size, hole size, clearance between pads and tracks, footprints)
2	Use PCB design software for simple single-sided PCB artwork design
3	Identify and select appropriate soldering tools for the soldering job
4	Use solder iron for soldering through hole components
5	Use solder iron and de-solder pump /wick for de-soldering through hole components
6	Perform electrical (continuity) and visual inspection for solder joints

List of Experiments:

1. Basic Electronic Components and Electronic Soldering
2. Design a simple (only discrete components) single-sided PCB using PCB design software (PCB artwork design flow)

3. Design a single-sided PCB using PCB design software for a circuit with IC components
4. Design a double-sided PCB using PCB design software
5. Study and use tools like solder iron (types and temperature profile), wire strippers, cutters
6. Study of solder alloys, flux and rosin
7. Demonstrate and perform the operation of Etching & drilling
8. Solder basic electronic components like resistors, capacitors, and IC bases (through hole)on general-purpose PCB.
9. Demonstrate and perform the operation of de-soldering on general-purpose PCB.
10. Demonstrate and perform the operation of electrical continuity test and identification of various electronics components using DMM and CRO and visual inspection for a soldered board
Reference Books:
1. Getting Started with Soldering: A Hands-On Guide to Making Electrical and Mechanical Connections, Marc de Vinck, Maker Media, Inc, 2017
2. Soldering in electronics assembly, MIKE JUDD, Keith Brindley, Newnes,1999
3. Printed Circuits Handbook, Clyde F. Coombs, Jr.,McGraw-Hill, 2008
4. User Manual for the selected PCB Design Software
5. Getting Started with Soldering: A Hands-On Guide to Making Electrical and Mechanical Connections, Marc de Vinck, Maker Media, Inc, 2017