KSRM College of Engineering (Autonomous) Kadapa

R 20 I & II Semesters Curriculum and syllabus

DEPARTMENT OF ECE

I Semester

S.No	Course code	Category	Course Name	L	T	P	IM	EM	CR
1.	2021101	BSC	Linear Algebra and Calculus	3	0	0	30	70	3
2.	20AP102	BSC	Applied Physics	3	0	0	30	70	3
3.	2024103	HS	Communicative English	3	0	0	30	70	3
4.	2002104	ESC	Fundamentals of Electrical Engineering	3	0	0	30	70	3
5.	2003105	ESC	Engineering Drawing	1	0	2	30	70	2
6.	2003106	ESC	Engineering Drawing Lab	0	0	2	40	60	1
7.	20AP107	BSC	Applied Physics Lab	0	0	3	40	60	1.5
8.	2024108	HS	Communicative English Lab	0	0	3	40	60	1.5
9.	2002109	ESC	Fundamentals of Electrical Engineering Lab	0	0	3	40	60	1.5
									19.5

II Semester

S. No	Course code	Category	Course Name	L	T	P	IM	EM	CR
1.	2021201	BSC	Differential Equations and Vector Calculus	3	0	0	30	70	3
2.	2023202	BSC	Chemistry	3	0	0	30	70	3
3.	2005203	ESC	C-Programming & Data Structures	3	0	0	30	70	3
4.	2004204	ESC	Electronic Devices & Circuits	3	0	0	30	70	3
5.	20EW205	LC	Engineering Workshop	0	0	3	40	60	1.5
6.	2005206	LC	IT Workshop	0	0	3	40	60	1.5
7.	2023207	BSC	Chemistry Lab	0	0	3	40	60	1.5
8.	2005208	ESC	C-Programming & Data Structures Lab	0	0	3	40	60	1.5
9.	2004209	ESC	Electronic Devices & Circuits Lab	0	0	3	40	60	1.5
10.	20MC210	MC	Environmental Science	3	0	0	30	0	0.0
									19.5

Course Title	Linear Algebra & Calculus				B. Tech. I Sem *(Common to All Branches)*		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
2021101	**BSC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					**End Exam Duration: 3Hrs**		

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
CO 2	Utilize mean value theorems to real life problems.
CO 3	Classify **t**he functions of several variables which is useful in optimization techniques.
CO 4	Evaluate multiple integrals.
CO 5	Define Beta and Gamma functions.

Bridge Course: Limits, continuity, Types of matrices

UNIT I

Matrices: (12 Hours)

Rank of a matrix by Echelon form, Normal form. Solving system of homogeneous and non-homogeneous linear equations. Eigen values and Eigen vectors for real matrices – Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley–Hamilton theorem. Diagonalization by orthogonal transformation.

UNIT II

Mean Value Theorems: (08 Hours)

Rolle‟s theorem, Lagrange‟s mean value theorem, Cauchy‟s mean value theorem, Taylor‟s and Maclaurin‟s theorems with remainders (without proof), related problems.

UNIT III

Multivariable Calculus: (10 Hours)

Partial derivatives, total derivative, chain rule, change of variables, Jacobians, Maxima and minima of functions of two variables – Lagrange‟s method of undetermined multipliers.

UNIT IV

Multiple Integrals: **(10 Hours)**

Evaluation of double integrals in Cartesian coordinates and polar coordinates – Change of variables in double integrals – Change the order of integration in double integrals – Evaluation of triple integrals in Cartesian and polar coordinates – Change of variables between cartesian, cylindrical and spherical polar coordinates.

UNIT V

Beta and Gamma functions: **(08 Hours)**

Beta and Gamma functions and their properties, relation between Beta and Gamma functions, evaluation of definite integrals using Beta and Gamma functions.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. Linear Algebra: A Modern Introduction, D Poole, 2nd Edition, Brooks/Cole, 2005.
3. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008

Course Title	Applied Physics				B. Tech. I Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
20AP102	**BSC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					**End Exam Duration: 3Hrs**		

Course Objectives:

- To make a bridge between the physics in school and engineering courses.
- To identify the importance of the optical phenomenon i.e. interference, diffraction related to its Engineering applications.
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, along with engineering applications.
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- To enlighten the concepts of Quantum Mechanics and to provide fundamentals of de-Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory and band theory of solids.
- Evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Define** the different realms of physics and their applications in both scientific and technological systems through physical optics.
CO 2	**Identify** the wave properties of light and the interaction of energy with the matter.
CO 3	**Illustrate** the response of magnetic materials to the applied electric and magnetic fields.
CO 4	**Explain** the quantum mechanical picture of subatomic world along with the discrepancies between the classical estimates and laboratory observations of electron transportation phenomena by free electron theory and band theory.
CO 5	**Apply** the physical properties exhibited by materials through the understanding of properties of semiconductors and superconductors.

Unit-I: Wave Optics **10hrs**

Interference- Principle of superposition – Interference of light – Conditions for sustained interference - Interference in thin films (Reflection Geometry) – Colors in thin films – Newton‟s Rings – Determination of wavelength and refractive index.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating spectrum.

Unit-II: Lasers and Fiber optics **8hrs**

Lasers- Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein‟s coefficients – Population inversion – Lasing action – Pumping mechanisms – Nd-YAG laser – He-Ne laser – Semiconductor diode laser- Applications of lasers.

Fiber optics- Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Block diagram of Optical fiber Communication system – Propagation Losses (qualitative) – Applications.

Unit-III: Dielectric and Magnetic Materials **8hrs**

Dielectric Materials- Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic, Ionic and Orientation polarizations (Qualitative) – Lorentz internal field – Clausius-Mossotti equation.

Magnetic Materials- Introduction to magnetic materials (Origin of magnetic moment of an atom and Classification of magnetic materials) –Weiss theory of ferromagnetism-soft ferrites and hard ferrites- Hysteresis – Soft and Hard magnetic materials- Applications magnetic materials.

Unit IV: Quantum Mechanics, Free Electron Theory **10hrs**

Quantum Mechanics- Dual nature of matter – Schrodinger‟s time independent and dependent wave equation – Significance of wave function – Particle in a one-dimensional infinite potential well.

Free Electron Theory- Classical free electron theory (Merits and demerits only) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory – Fermi-Dirac distribution – Density of states – Fermi energy.

Unit – V: Semiconductors and Superconductors **10hrs**

Semiconductors- Introduction – Intrinsic semiconductors – Electrical conductivity – Fermi level – Extrinsic semiconductors –Dependence of Fermi energy on carrier concentration and temperature – Drift and diffusion currents – Einstein‟s equation – Direct and indirect band gap semiconductors – Hall effect – Hall coefficient – Applications of Hall effect.

Superconductors- Introduction – Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory – Josephson effects (AC and DC) –High T_c superconductors – Applications of superconductors.

Text books:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering Physics – B.K. Pandey and S. Chaturvedi, Cengage Learning.

Reference Books:

1. Engineering Physics – Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018
2. Engineering Physics – K. Thyagarajan, McGraw Hill Publishers
3. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
4. Semiconductor physics and devices- Basic principle – Donald A, Neamen, Mc Graw Hill

Course Title	Communicative English				B. Tech. ECE I Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
2024103	HS	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs		

Course Objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers To be able to solve problems related to diode circuits, and amplifier circuits.
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information.
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
CO 2	Apply grammatical structures to formulate sentences and correct word forms.
CO 3	Analyze discourse markers to speak clearly on a specific topic in informal discussions.
CO 4	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
CO 5	Create a coherent paragraph interpreting a figure/graph/chart/table.

Unit 1

Lesson: On the Conduct of Life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others. **Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information. **Writing :**Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Grammar and Vocabulary: Parts of Speech; Word formation, synonyms and antonyms; Idioms and Phrases; phrasal verbs.

Unit 2
Lesson: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts. **Speaking:** Discussion in pairs/small groups on specific topics followed by short structured talks. **Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together. **Writing:** Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.
Grammar and Vocabulary: Sentence structure; articles; Tenses; Prepositions.

Unit 3
Lesson: A City Night Peace - Oliver Goldsmith
Listening: Listening for global comprehension and summarizing what is listened to. **Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed **Reading:** Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.**Writing:** Summarizing, Paragraph Writing
Grammar and Vocabulary: Voice; Reported Speech; Degrees of Comparison, Subject with agreement.

Unit4
Lesson: Being Rich, Being Good - Chetan Bhagat
Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video. **Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. **Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data. **Writing:** Letter Writing: Official Letters/Report Writing
Grammar and Vocabulary: Information Transfer; Simple, Compound and Complex sentences; Question Tags

Unit 5

Lesson: Politics and the English Language: George Orwell
Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides. Reading: Reading for comprehension. **Writing:** Writing structured essays on specific topics using suitable claims and evidences.
Grammar and Vocabulary: Reading Comprehension; Dialogue Writing; Common Errors.

Prescribed Text:

1. Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan

Reference Books

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Raymond Murphy‟s English Grammar in Use Fourth Edition (2012) E-book
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
5. Oxford Learners Dictionary, 12th Edition, 2011
6. Norman Lewis Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary (2014)
7. Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words by David Butler

Web links

www.englishclub.com
www.easyworldofenglish.com
www.languageguide.org/english/
www.bbc.co.uk/learningenglish
www.eslpod.com/index.html
www.myenglishpages.com

Course Title	Fundamentals of Electrical Engineering				B. Tech. I Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
2002104	ESC	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	30	70	100
Mid Exam Duration : 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to determine active, reactive, apparent power for single phase and three phase AC circuits, Principle and operation of transformers and performance characteristics of DC and AC machines, verification of Kirchhoff‟s laws and network theorems for DC and AC excitation.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Understand the basic fundamentals of DC & AC circuits, network reduction techniques, network theorems, principle of DC and AC machines.
CO 2	Determine the currents, voltages using mesh and nodal analysis, Average and RMS values for different waveforms.
CO 3	Evaluate the active and reactive powers, voltage and currents for balanced and unbalanced networks.
CO 4	Obtain the EMF equation and characteristics of dc machines, Induction motor and synchronous machine.
CO 5	Evaluate the equivalent circuit and to calculate losses of single phase transformer.

UNIT I

DC Circuits: Ohm's Law and Kirchhoff‟s Laws, Analysis of series, parallel and series-parallel circuits excited by independent voltage sources; Power and energy; simple numerical problems. Faradays Laws, Lenz's Law, Fleming's Rules, Statically and dynamically induced EMF; Concepts of self-inductance, mutual inductance and coefficient of coupling; Energy stored in magnetic fields, simple numerical problems.

Unit II

AC Circuits: Definition of average value, root mean square value, form factor and peak factor of sinusoidal voltage and current and phasor representation of alternating quantities; Analysis with phasor diagrams of R, L,C, RL, RC and RLC circuits; Real power, reactive power, apparent power and power factor, simple numerical problems.

Three Phase Systems: Definition of Phase sequence, balanced supply and balanced load, Relationship between line and phase values of balanced star and delta connections, Power in balanced three phase circuits, simple numerical problems.

Unit III

Network Theorems: Superposition and Reciprocity Theorems, Thevenin‟s, Norton‟s, Maximum Power Transfer, Millman‟s Theorems, Compensation Theorem.

Transformers: Principle of operation and construction of single phase transformers (core and shell types). EMF equation, losses, efficiency and voltage regulation, OC and SC Tests.

UNIT IV

DC Generators: Constructional Features, E.M.F Equation, Types of Generators, OCC, Internal & External Characteristics of Generators, Applications.

D.C Motors: Back E.M.F, Torque Equation, Characteristics and Applications, Speed Control (Shunt Motor)– field and armature. Three Point Starter, Losses, Calculation of Efficiency, Swinburne‟s Test.

UNIT V

Three phase Induction motor: Revolving magnetic field theory, Principle of operation, Torque equation, and Torque –speed characteristics.

Three phase Synchronous Machines: Principle and Constructional Features of Salient Pole and Round Rotor Machines, E.M.F Equation, Voltage Regulation by Synchronous Impedance Method, Theory of Operation of Synchronous Motor.

Text Books:

1. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.

References:

2. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
3. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
4. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.
5. V.K. Mehta, Rohit Mehta, “Principles of Electrical Engineering”,S.Chand, 2005.
6. http://www.nptelvideos.in/2012/11/basic-electrical-technology.html

Course Title	Engineering Drawing				B. Tech. I Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
2003105	**ESC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		1	0	2	2	30	70	100
Mid Exam Duration: 2Hrs					**End Exam Duration: 3Hrs**			

Course Objectives:

- Bring awareness that Engineering Drawing is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Draw various curves applied in engineering..
CO 2	Show projections of solids and sections graphically.
CO 3	Draw the development of surfaces of solids.
Co4	Know draw orthographic and isometric projections
CO5	Evaluate different methods of perspective view.

Unit: I

Introduction to Engineering Drawing: Principles of Engineering Drawing and its Significance-Conventions in drawing-lettering - BIS conventions.

a) Conic sections including the rectangular hyperbola- general method only,

b) Cycloid, epicycloids and hypocycloid c) Involutes

Unit: II

Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.

Unit: III

Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Unit: IV

Orthographic Projections: Systems of projections, conventions and application to orthographic projections - simple objects.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

Unit: V : perspective projection –applications of perspective view –terminology of perspective view- methods of drawing perspective view-simple problems.

Text Books:

1. K L. Narayana & P. Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2. N. D. Bhatt, Engineering Drawing, 53/e, Charotar Publishers,2016.

Reference Books:

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right,2009
2. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers,2000
3. Shah and Rana, Engineering Drawing, 2/e, Pearson Education,2009
4. K.C.John, Engineering Graphics, 2/e, PHI,2013
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Additional Sources

1. Youtube: http-sewor, Carleton. cag,kardos/88403/drawings.html conic sections-online, red woods.edu

Course Title	Engineering Drawing Lab				B. Tech. I Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
2003106	**ESC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		0	0	2	1	40	60	100
						End Exam Duration: 3Hrs		

Course Objectives:

- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.
- Bring awareness that Engineering Drawing is the Language of Engineers.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Use computers as a drafting tool
CO 2	Draw isometric drawings using CAD packages.
CO 3	Analyze orthographic drawings using CAD packages

- Instruct the utility of drafting & modeling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3Dmodeling.
- Instruct graphical representation of machine components.

Computer Aided Drafting:

Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets,arrays,dimensions.

Dimensioning principles and conventional representations.

Orthographic Projections: Systems of projections, conventions and application to orthographic projections - simple objects.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

Text Books:

1. K. Venugopal, V.Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.
2. Kulkarni D.M, AP Rastogi and AK Sarkar, Engineering Graphics with Auto Cad, PHI Learning, Eastern Economy editions.

Reference Books:

1. T. Jayapoovan, Engineering Graphics using Auto Cad, Vikas Publishing House
2. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
3. Linkan Sagar, BPB Publications, Auto Cad 2018 Training Guide.
4. K.C.John, Engineering Graphics, 2/e, PHI,2013
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Additional Sources

1. Youtube: http-sewor,Carleton.cag, kardos/88403/drawings.html conic sections-online, red woods.edu

Course Title	Applied Physics Lab				B. Tech. I Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
20AP107	**BSC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		0	0	3	1.5	40	60	100
						End Exam Duration: 3Hrs		

Course Objectives:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Operate** various optical instruments.
CO 2	**Estimate** wavelength of laser and particles size using laser and the susceptibility and related magnetic parameters of magnetic materials.
CO 3	**Evaluate** the acceptance angle of an optical fiber and numerical aperture
CO 4	**plot** the intensity of the magnetic field of circular coil carrying current with distance
CO 5	**Determine** magnetic susceptibility of the material and its losses by B-H curve (L3) **apply** the concepts of ultrasonics by acoustic grating.

Note: In the following list, out of 12 experiments, any 10 experiments (minimum 8) must be performed in a semester

List of Applied Physics Experiments

1. Determine the thickness of the wire using wedge shape method
   Experimental outcomes:
   Operates optical instrument like travelling microscope. (L2)
   Estimate the thickness of the wire using wedge shape method (L2)

Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)

2. Determination of the radius of curvature of the lens by Newton‟s ring method

Experimental outcomes:
Operates optical instrument like travelling microscope. (L2)
Estimate the radius of curvature of the lens (L2)
Identifies the formation of interference fringes due to reflected light from non-uniform thin film. (L2)
Plots the square of the diameter of a ring with no. of rings (L3)

3. Determination of wavelength by plane diffraction grating method

Experimental outcomes:
Operates optical instrument like spectrometer. (L2)
Estimate the wavelength of the given source (L2)
Identifies the formation of grating spectrum due diffraction. (L2)

4. Determination of dispersive power of prism.

Experimental outcomes:
Operates optical instrument like spectrometer. (L2)
Estimate the refractive index and dispersive power of the given prism (L2)
Identifies the formation of spectrum due to dispersion. (L2)

5. Determination of wavelength of LASER light using diffraction grating.

Experimental outcomes:
Operates various instrument (L2)
Estimate the wavelength of laser source (L2)
Identifies the formation of grating spectrum due diffraction. (L2)

6. Determination of particle size using LASER.

Experimental outcomes:
Operates various instrument (L2)
Estimate the Particles size using laser (L2)
Identifies the application of laser (L2)

7. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle

Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the numerical aperture and acceptance angle of a given optical fiber. (L2)
Identifies the significance of numerical aperture and acceptance angle of an optical fiber in various engineering applications. (L2)

8. Determination of dielectric constant by charging and discharging method.

Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the dielectric constant of the given substance. (L2)
Identifies the significance of dielectric constant in various devices. (L2)

9. Magnetic field along the axis of a circular coil carrying current –Stewart Gee‟s method.

Experimental outcomes:
Operates various instruments and connect them as per the circuit. (L2)
Estimate the magnetic field along the axis of a circular coil carrying current. (L2)

Plots the intensity of the magnetic field of circular coil carrying current with distance (L3)

10. Study the variation of B versus H by magnetizing the magnetic material (B-H curve)

Experimental outcomes:

Operates various instruments and connect them as per the circuit. (L2)
Estimate the hysteresis loss, coactivity and retentivity of the ferromagnetic material. (L2)
Classifies the soft and hard magnetic material based on B-H curve. (L2)
Plots the magnetic field H and flux density B (L3)

11. To determine the resistivity of semiconductor by Four probe method

Experimental outcomes:

Operates various instruments and connect them as per the circuit. (L2)
Estimate the resistivity of a semiconductor. (L2)
Identifies the importance of four probe method in finding the resistivity of semiconductor. (L3)

12. To determine the energy gap of a semiconductor

Experimental outcomes:

Operates various instruments and connect them as per the circuit. (L2)
Estimate the energy gap of a semiconductor. (L2)
Illustrates the engineering applications of energy gap. (L3)
Plots 1/T with log R (L3)

Course Title	Communicative English Lab				B. Tech. I Semester		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2024108	HS	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		0	0	3	1.5	40	60	100
						End Exam Duration : 3Hrs		

Course Objectives:

- Students will be exposed to a variety of self instructional, learner friendly modes of language learning.
- Students will learn better pronunciation through stress, intonation and rhythm.
- Students will be trained to use language effectively to face interviews, group discussions, public speaking.
- Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Listen and repeat the sounds of English Language.
CO 2	Understand the different aspects of the English language proficiency with emphasis on LSRW skills
CO 3	Apply communication skills through various language learning activities
CO 4	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO 5	Evaluate and exhibit acceptable etiquette essential in social and professional
CO 6	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English

Unit 1

- Listening Skills
- Phonetics

- Introducing oneself

Unit 2

- Describing objects
- JAM / Interpretation of Hypothetical Situations
- Role play

Unit 3

- Hypothetical situations (If…..... were)
- Elocution
- TED talks videos

Unit4

- Visual Description
- Situational conversations

Unit 5

- Oral Presentations
- PowerPoint presentations

Suggested Software

- Orell
- Walden Infotech
- Young India Films
- K-Van solutions

Reference Books

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
5. A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

Web Links

www.esl-lab.com

www.englishmedialab.com

www.englishinteractive.net

Course Title	Fundamentals of Electrical Engineering Lab				B. Tech. I Semester (ECE)		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2002109	ESC	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		0	0	2	1.5	40	60	100
						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn basics of DC and AC circuits, Electrical Machines, Transformers.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the Kirchhoff‟s laws, network theorem theoretically and practically for any given circuit.
CO 2	Evaluate the characteristics and efficiency of Induction Motor.
CO 3	Determine the speed, torque and efficiency of electrical machines..
CO 4	Determine the regulation of alternator.
CO 5	Obtain the efficiency and regulation for single phase transformer

List of Experiments (Any 10 experiments 5 from each stream)

Electric Circuits:

1. Verification of Kirchhoff‟s laws
2. Verification of Superposition Theorem
3. Verification of Thevenin‟s Theorem
4. Verification of Norton‟s Theorems
5. Verification of Maximum Power Transfer Theorem
6. Verification of Compensation Theorem

Electrical Machines:

1. Magnetization characteristics of a separately excited DC generator
2. Load characteristics of DC shunt generator
3. Swinburne‟s test
4. Brake test on 3-phase Induction motor
5. OC & SC tests on a 1-ϕ transformer
6. Predetermination of regulation of alternator by Synchronous impedance method

Course Title	Differential Equations and Vector Calculus					B. Tech. II Sem *(Common to All Branches)*		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
2021201	**BSC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs						**End Exam Duration: 3Hrs**		

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Classify second and higher order liner differential equations with constant coefficients.
CO 2	Solve partial differential equations.
CO 3	Analyze the applications of partial differential equations.
CO 4	Understand vector differentiation concepts.

UNIT I

Linear differential equations of higher order (constant coefficients) : (10 Hours)
Definitions, homogeneous and non- homogeneous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters.

UNIT II

Partial Differential Equations: (10 Hours)
Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order equations using Lagrange‟s method.

UNIT III

Applications of Partial Differential Equations: (10 Hours)

Classification of PDE, method of separation of variables for second order equations.
Applications of Partial Differential Equations: One dimensional Wave equation.

UNIT IV

Vector differentiation: (08 Hours)

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT V

Vector integration: (08 Hours)

Line integral-circulation-work done, surface integral-flux, Green‟s theorem in the plane (without proof), Stoke‟s theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-43 edition 2014.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Publications, 9th edition-2013
3. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, Pearson, 9th Edition, Reprint, 2002.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd, New Delhi, 11th Edition, Reprint 2010.
2. A Text Book of Engineering Mathematics, N.P. Bali and Manish Goyal, Lakshmi Publications, Reprint 2008.
3. Differential Equations and Vector Calculus, Dr. B.Rama Bhupal Reddy, G.Sreedhar, Dr. V.Ramachandra Reddy, Research India Publications, Delhi, 2020

Course Title	CHEMISTRY					B. Tech. (II Sem)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2023202	BSC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			

Course Objectives:

- To familiarize engineering chemistry and its applications.
- To train the students on the principles and applications of electrochemistry and polymers.
- To introduce instrumental methods, molecular machines and switches.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Compare** the materials of construction for battery and electrochemical sensors.
CO 2	**Explain** the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers.
CO 3	**Understand** the principles of spectrometry, slc in separation of solid and liquid mixtures.
CO 4	Explain the principles of spectrometry, slc in separation of solid and liquid mixtures
CO 5	**Analyze** the principles and different application of analytical instruments.

Unit 1: Structure and Bonding Models: (10 hrs)

Planck's quantum theory, dual nature of matter, Schrodinger equation, significance of Ψ and Ψ^2, applications to hydrogen, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O2 , NO and CO, etc., calculation of bond order.

Unit 2: Modern Engineering materials: **(10 hrs)**

i).Understanding of materials: Crystal field theory – salient features – splitting in octahedral, tetrahedral and square planar geometry. Properties of coordination compounds-Oxidation state, coordination, magnetic properties and colour.

ii). Semiconductor materials, super conductors- basic concept, band diagrams for conductors, semiconductors and insulators, Effect of doping on band structures.

iii). Nanochemistry: Introduction, classification of nanometerials, properties and applications of Fullerenes, carbonnano tubes and Graphines nanoparticles.

Unit 3: Electrochemistry and Applications: (10 hrs)

Introduction to Electrodes – concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode); Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, Potentiometry- Potentiometry titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations), pH metric concepts.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad),and lithium ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen, methanol fuel cells – working of the cells.

Unit 4: Polymer Chemistry: (10 hrs)

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation.

Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylenes,– mechanism of conduction and applications.

Unit 5: Instrumental Methods and Applications (10 hrs)

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert‟s law. Regions of Electromagnetic radiation. UV-Visible**,** IR Spectroscopes‟- (selection rules, principles and applications). Solid-Liquid Chromatography–TLC, retardation factor.

Text Books:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins‟ Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. G.V.Subba Reddy, K.N.Jayaveera and C. Ramachandraiah, Engineering Chemistry, Mc Graw Hill, 2020.
2. D. Lee, Concise Inorganic Chemistry, 5/e, Oxford University Press, 2008.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. J.M.Lehn, Supra Molecular Chemistry, VCH Publications.

Course Title	C Programming & Data Structures					B.Tech II Sem (ECE)		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
2005203	**ESC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours						**End Exam Duration: 3Hrs**		

Course Objectives:

- The course aims to provide exposure to problem-solving through programming
- It aims to train the student to the basic concepts of the C programming language
- Gain knowledge of data structures and their applications

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Formulate simple algorithms for arithmetic and logical problems and to translate the algorithms to programs (in C Language).
CO 2	Choose the loops and decision-making statements to solve the problem
CO 3	Implement different Operations on arrays
CO 4	Use functions to solve the given problem
CO 5	Understand structures, unions and pointers
CO 6	Understand need of data structures in real time situations

UNIT I:

Introduction to C programming: - C language elements, variable declarations and data types, operators and expressions, decision statements - If and switch statements, loop control statements - while, for, do-while statements. **Jumping statements:** break, continue and goto statements

UNIT II:

Arrays: Introduction, Declaration and initialization of 1D and 2D arrays, **Functions:** Introduction, Category of functions, parameter passing methods, Storage Classes, Recursive functions. **Strings:** String I/O functions, string handling functions, array of strings

UNIT III:

Pointers: Introduction to pointers, declaring and initialization of pointer variable, accessing the address of variables, accessing a variable through its pointer, chain of pointers. **Structures and unions:** Introduction, defining a structure, declaring structure variable, structure initialization, accessing members of structure, copying and comparing structure variables, structures within structures, array of structures, and introduction of union.

UNIT IV:

Data Structures: Overview on data structures, stack,basic operations on stack, Applications of stacks; Queues -various classification of queues,basic operations on queues.**Searching and sorting:** linear search, binary search, bubble sort, selection sort, insertion sort.

UNIT V:

Linked Lists – Single linked list, Operations on Single Linked List: insertion, deletion and searching operations, doubly linked lists and its operations, circular linked lists and its operations. **Trees -** Tree terminology, representation, Binary trees, representation, binary tree traversals. Binary tree operations.

TEXT BOOKS

1. E. Balagurusamy, C Programming and Data structures,Fourth Edition, McGrawHill.
2. Rema Theraja, Programming in C, second edition,Oxford.
3. Fundamentals of Data Structures in C, Ellis Horowitz, SartajSahni, Susan Anderson-Freed, Computer Science Press.
4. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education

REFERENCE TEXT BOOKS

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2. R.G. Dromey, How to solve it by Computer,Pearson.
3. YashavantKanetkar, Let us C, 15th edition, BPBPublications.
4. Dr. P. ChennaReddy, Computer Fundamentals and C Programming, SecondEdition.

Course Title	Electronic Devices and Circuits				B. Tech. ECE II Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
2004204	**ESC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					**End Exam Duration: 3Hrs**			

Course Objectives:

- To understand the basic principles of all semiconductor devices.
- To be able to solve problems related to diode circuits, and amplifier circuits.
- To analyze diode circuits, various biasing and small signal equivalent circuits of amplifiers.
- To be able to compare the performance of BJTs and MOSFETs
- To design rectifier circuits and various amplifier circuits using BJTs and MOSFETs.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand principle of operation, characteristics and applications of Semiconductor diodes, Bipolar Junction Transistor and MOSFETs.
CO 2	Applying the basic principles solving the problems related to Semiconductor diodes, BJTs, and MOSFETs.
CO 3	Analyze diode circuits for different applications such as rectifiers, clippers and clampers also analyze biasing circuits of BJTs, and MOSFETs.
CO 4	Design of diode circuits and amplifiers using BJTs, and MOSFETs.
CO 5	Compare the performance of various semiconductor devices.

Unit – 1

Review of Semiconductors: Intrinsic semiconductors, Doped Semiconductors, Current Flow in Semiconductors, PN Junction with Open Circuit, PN Junction with Applied Voltage, Capacitive Effects in PN Junction.

Diodes: Introduction, The Ideal Diode – current voltage characteristic, rectifier, diode logic gates, Terminal Characteristics of Junction Diodes– forward bias, reverse bias, and breakdown regions, Modeling the Diode Forward Characteristics- exponential model, graphical analysis and Iterative analysis using the exponential model, constant voltage drop model, the small signal model.

Unit – 2

Zener Diodes– Zener diode Characteristics, Voltage shunt regulator, Temperature Effects, Rectifier Circuits– half-wave, full-wave and bridge rectifier circuits, rectifier with a filter capacitor, C-L-C filter, Clipping and Clamping Circuits– limiter circuit, the clamped capacitor, voltage doubler, Special Diode Types– UJT, Schottky barrier diode, Varactor diode, photo diode, light emitting diode(LED), Problem Solving.

Bipolar Junction Transistors(BJTs): Physical Operation - simplified structure and modes of operation, Operation of the npn, and pnp transistors: cutoff, active, and saturation modes, V-I Characteristics- of different configurations - graphical representation of transistor characteristics, dependence of collector current on collector voltage, the Early Effect.

Unit- 3

BJT circuits at DC, Applying the BJT in Amplifier Design- Voltage Amplifier, Voltage Transfer Characteristic (VTC), Small-Signal Voltage Gain, determining the VTC by Graphical Analysis, Q-point, Small-signal operation and models- the transconductance, input resistance at the base, input resistance at the emitter, Voltage gain, separating the Signal and the DC Quantities, The Hybrid-π Model, the T Model, Basic BJT Amplifier Configurations - Common-Emitter (CE) amplifier without and with emitter resistance, Common-Base (CB) amplifier, Common-Collector (CC) amplifier or Emitter Follower, Biasing in BJT Amplifier Circuits- Fixed bias, Self bias, voltage divider bias circuits, biasing using a Constant-Current Source, CE amplifier – Small signal analysis and design, Transistor breakdown and Temperature Effects, Problem solving.

Unit – 4

MOS Field-Effect Transistors (MOSFETs): Introduction, Device Structure and Physical Operation – device structure, operation with zero gate voltage, creating a channel for current flow, operation for different drain to source voltages, the P-channel MOSFET,CMOS, V-I characteristics–i_D - v_{DS} characteristics, i_D – v_{GS} characteristics, finite output resistance in saturation, characteristics of the p-Channel MOSFET, MOSFET Circuits at DC, Applying the MOSFET in Amplifier Design – voltage transfer characteristics, biasing the MOSFET to obtain linear amplification, the small signal voltage gain, graphical analysis, the Q-point. Problem solving.

Unit – 5

MOSFET Small Signal Operation Models– the dc bias, separating the DC analysis and the signal analysis, Small signal equivalent circuit models, the transconductance, the T equivalent circuit model, Basic MOSFET Amplifier Configurations– three basic configurations, characterizing amplifiers, common source(CS) amplifier without and with source resistance, common gate (CG) amplifier, source follower, the amplifier frequency response, Biasing in MOSFET Amplifier Circuits– biasing by fixing V_{GS} with and without source resistance, biasing using drain to gate feedback resistor, biasing using constant current source, Common Source Amplifier using MOSFETs – Small signal analysis and design, Body Effect, Problem Solving.

Text Books:

1. Adel S. Sedra and KennethC. Smith, "Microelectronic Circuits – Theory and Applications", 6th Edition, Oxford Press, 2013.
2. Donald A Neamen, "Electronic Circuits – analysis and design", 3rdEdition, McGraw Hill (India), 2019.

References:

1. J. Milliman and C Halkias, “Integrated electronics”, 2nd Edition, Tata McGraw Hill, 1991.
2. Behzad Razavi, “Microelectronics”, Second edition, Wiley, 2013.
3. R.L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuits,” 9th Edition, Pearson, 2006.
1. Jimmie J Cathey, “Electronic Devices and Circuits,” Schaum‟s outlines series, 3rd edition, McGraw-Hill (India), 2010.

Course Title	Engineering Workshop				B.Tech. II sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
20EW205	**LC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		0	0	3	1.5	40	60	100
Mid Exam Duration: 2Hrs					**End Exam Duration: 3Hrs**		

Course Objectives: To familiarize students with

- sheet metal operations,
- fitting ,
- electrical house wiring skills
- wood working,

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Apply wood working skills in real world applications
CO 2	Build different objects with metal sheets in real world applications
CO 3	Apply fitting operations in various applications.
CO 4	Apply different types of basic electric circuit connections
CO5	Use soldering and brazing techniques

Wood Working:

Familiarity with different types of woods and tools used in wood working and make following joints

Half – Lapjoint

Mortise and Tenonjoint

Corner Dovetail joint or Bridlejoint

Sheet Metal Working:

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

a)Taperedtray b)Conicalfunnel

c)Elbowpipe d)Brazing

Fitting:

Familiarity with different types of tools used in fitting and do the following fitting exercises

a) V-fitb)Dovetailfit c) Semi-circularfit

d) square fitting

Electrical Wiring:

Familiarities with different types of basic electrical circuits and make the following connections

a) Parallelandseries b) Twowayswitch c)Godownlighting d) Tubelight

e) Threephasemotor f) Soldering ofwires

Note: In each section a minimum of three exercises are to be carried out.

Course Title	IT WORKSHOP				B.Tech II Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
2005206	**LC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		0	0	3	1.5	40	60	100
					End Exam Duration: 3Hrs			

Course Objectives:

- To make the students know about the internal parts of a computer, assembling and dissembling a computer from the parts, preparing a computer for use by installing the operating system.
- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations and LAteX.
- To learn about Networking of computers and use Internet facility for Browsing and Searching

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
CO 2	Prepare the Documents using Word processors and Prepare spread sheets for calculations .using excel and also the documents using LAteX.
CO 3	Prepare Slide presentations using the presentation tool.
CO 4	Interconnect two or more computers for information sharing.
CO 5	Access the Internet and Browse it to obtain the required information.

Preparing your Computer

Task 1:

Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2:

Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods.

Task 3:

Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot.Students should record the entire installation process.

Task 4:

Operating system features: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5:

Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc. should be done by the student. The entire process has to be documented.

Task 6:

Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email.

They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating email account.

Task 7:

Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8:

Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered,

Image Manipulation tools.

Task 9:

Presentations: creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show.

Task 10:

Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet.

Task 11:

LateX: Introduction to Latex and its installation and different IDEs. Creating first document using Latex, using content into sections using article and book class of LaTeX. Styling Pages: reviewing and customizing different paper sizes and formats. Formatting text (styles, size, alignment, colors and adding bullets and numbered items, inserting mathematical symbols, and images, etc.). Creating basic tables, adding simple and dashed borders, merging rows and columns. Referencing and Indexing: cross-referencing (refer to sections, table, images), bibliography (references).

References:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. MOS study guide for word, Excel, PowerPoint & Outlook Exams, Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs, Bigelows, TMH
6. Lamport L. LATEX: a document preparation system: user's guide and reference manual. Addison-wesley; 1994.

Course Title	CHEMISTRY LAB				B. Tech. (II Sem)			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2023207	BSC	L	T	P	C	Continuous Internal Assessment	End lab Exams	Total
		0	0	3	1.5	40	60	100
						End Exam Duration: 3Hrs		

Course Objectives:

- To verify the fundamental concepts with experiments.

Course Outcomes: At the end of the course, the students will be able to

CO 1	**Determine** the cell constant and conductance of solutions.
CO 2	**Synthesis** of advanced polymer Bakelite.
CO 3	**Calculate** the strength of an acid present in secondary batteries.
CO 4	**Illustrate** the IR of some organic compounds
CO 5	**Explain** acid-base titrations using pH metry.

List of Experiments:

1. Conductometric titration of strong acid vs. strong base.
2. Conductometric titration of weak acid vs. strong base
3. pH metric titration of strong acid vs. strong base.
4. pH metric titration of weak acid vs. strong base
5. Determination of cell constant and conductance of solutions
6. Potentiometry - determination of redox potentials and emfs
7. Determination of Strength of an acid in Pb-Acid battery
8. Preparation of Bakelite.
9. Verify Lambert-Beer‟s law
10. Thin layer chromatography
11. Identification of simple organic compounds by IR.
12. Preparation of nanomaterial‟s by precipitation
13. Estimation of Ferrous Iron by Dichrometry.

Course Title	C Programming & Data Structures Lab				B.Tech II Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
2005208	**ESC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		0	0	3	1.5	40	60	100
						End Exam Duration: 3Hrs		

Course Objectives:

- know how to write and debug programs
- know the principles of designing structured programs
- Write basic C programs using, Selection statements, Repetitive statements,
- Functions, Pointers, Arrays, Strings and structures
- To apply suitable data structure to solve real world problems

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Formulate the algorithms for simple problems
CO 2	Translate given algorithms to a working and correct program
CO 3	Correct syntax errors as reported by the compilers
CO 4	Identify and correct logical errors encountered at runtime
CO 5	Write iterative as well as recursive programs
CO 6	Represent data in arrays, strings and structures and manipulate them through a program
C O7	Write programs on data structures like stack, queue, liked list, trees etc

1. Ramesh „s basic salary is input through the keyboard. His dearness allowance is 40% of basic salary and house rent allowance is 20% of basic salary. Write a C program to calculate his grosssalary.
2. Write a program to take input of name, roll no and marks obtained by a student in 5 subjects each have its 100 full marks and display the name, roll no with percentage score secured.
3. a) Write a C program to find out whether a given number is even number or oddnumber.
   b) Write a C program to check whether a given year is leap year ornot.
4. Design and develop an algorithm that takes three coefficients (***a***, ***b***, and ***c***) of a

Quadratic equation ($ax^2+bx+c=0$) as input and compute all possible roots. Implement a C program for the developed algorithm and execute the same to output the possible roots for a given set of coefficients with appropriatemessages.

5. If the ages of the Ramesh, Suresh and Mahesh are input through the keyboard, write a C program to determine youngest of the three.

6. A character is entered through keyboard. Write a C program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if- else and switch case. The following table shows the range of ASCII values for various characters.

Characters	ASCIIvalues
A–Z	65 – 90
a– z	97 – 122
0 – 9	48 – 57
Specialsymbols	0 – 47, 58 – 64, 91 – 96, 123 – 127.

7. Write a C program which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use switchstatement).

8. Design and develop an algorithm to find whether a given number is Armstrong number or not. Implement a C program for the developedalgorithm.

9. Design and develop an algorithm to check whether a given number is palindrome or not. Implement a C program for thesame.

10. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by theuser.

11. Write a C program to generate the first N terms of Fibonacci sequence.

12. Write a C program to find the smallest and largest number in a givenarray.

13. Write a C program to find the frequency of a particular number in a list ofintegers.

14. Write a C program to sort the list of elementsusing

a) BubbleSort b) Selectionsort.

15. Write a C program to search for an element in a list of elementsusing

a) Linear search b) Binary search

16. Write a C program to read two matrices and perform the following operations

a) Addition of two matrices

b) Multiplication of two matrices

17. Partitioning an array

Given a randomly ordered array of n elements, write a C program to partition the elements into two subsets such that elements ≤X are in one subset and elements ≥X

are in another subset.

18. Write a C program to rearrange the elements in an array so that they appear in reverse order.

19. If a string and its reversed string are same then the string is called as palindrome string. Design and develop an algorithm to check whether a given string is a palindrome or not and implement a C program for the same.

20. Write a C program to read two strings and perform the following operations without using built string library functions.

i) String length ii) String reversing

iii) Comparison of two strings iv) Concatenation of two strings

21. Write a C program to count the number of vowels, consonants, digits, blank space sand special characters in a given string.

22. Write a C program to swap the contents of two variables using

a) Call byvalue

b) Call byreference.

23. Write a C program using recursionto

a) Find the factorial of a givennumber

b) Print the Fibonacci series up to a given number.

c) Find the GCD of twointegers.

24. Write a C program to define a structure with the followingmembers.
Roll No., Name, marks in Sub1, Sub2, Sub3. Read the n students records and find the total marks of each student and print the result in the following format.

Roll No	Name	Sub1	Sub2	Sub3	Total marks	result
189Y1A0501	Kavya	80	70	75	225	Distinction

25. Write C programs that implement stack (its operations) using

i) Arrays

ii) Pointers

26. Write C programs that implement Queue (its operations) using

i) Arrays

ii) Pointers

27. Write a C program that uses Stack operations to perform the following:

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

28. Write a C program that uses functions to perform the following operations on single linked list.

i) Creation ii) Insertion iii) Deletion iv) Traversal

29. Write a C program that uses functions to perform the following operations on Double linked list.

i) Creation ii) Insertion iii) Deletion iv) Traversal

30. Write a C program that uses functions to perform the following:

i) Creating a Binary Tree of integers

ii) Traversing the above binary tree in preorder, inorder and postorder.

TEXT BOOKS

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
2. B.A.Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A Structured Programming Approach Using C", Third edition, CENGAGE Learning, 2016.
3. Richard F. Gilberg& Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", Second Edition, CENGAGE Learning, 2011
4. E. Balagurusamy, Programming in ANSI C, Fifth Edition, McGrawHill.

Course Title	Electronic Devices and Circuits Lab				B. Tech. ECE IISem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
2004209	**ESC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		0	0	3	1.5	40	60	100
					End Exam Duration: 3Hrs			

Course Objectives:

- To verify the theoretical concepts practically from all the experiments.
- To analyse the characteristics of Diodes, BJT, MOSFET, UJT.
- To design the amplifier circuits from the given specifications.
- To Model the electronic circuits using tools such as PSPICE/Multisim

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the basic characteristics and applications of basic electronic devices.
CO 2	Observe the characteristics of electronic devices by plotting graphs.
CO 3	Analyze the Characteristics of UJT, BJT, MOSFET
CO 4	Design MOSFET / BJT based amplifiers for the given specifications.
CO 5	Simulate all circuits in PSPICE /Multisim.

LIST OF EXPERIMENTS: (**Execute any 12 experiments**).

Note: All the experiments shall be implemented using both Hardware and Software.

1. Verification of Volt- Ampere characteristics of a PN junction diode and find static, dynamic and reverse resistances of the diode from the graphs obtained.
2. Design a full wave rectifier for the given specifications with and without filters, and verify the given specifications experimentally. Vary the load and find ripple factor. Draw suitable graphs.
3. Verify various clipping and clamper circuits using PN junction diode and draw the suitable graphs.
4. Design a Zener diode-based ***voltage regulator*** against variations of supply and load. Verify the same from the experiment.
5. Study and draw the ***output*** and ***transfer*** characteristics of MOSFET (Enhance mode) in Common Source Configuration experimentally. Find ***Threshold voltage (V_T), g_m, & K*** from the graphs.
6. Study and draw the ***output*** and ***transfer*** characteristics of MOSFET (Depletion mode) or JFET in Common Source Configuration experimentally. Find ***I_{DSS}, g_m, & V_P*** from the graphs.
7. Verification of the input and output characteristics of BJT in **Common Emitter** configuration experimentally and find required ***h – parameters*** from the graphs.
8. Study and draw the input and output characteristics of BJT in **Common Base** configuration experimentally, and determine required ***h – parameters*** from the graphs.

9. Study and draw the Volt Ampere characteristics of UJT and determine η, I_P, I_v, V_P, &Vv from the experiment.
10. Design and analysis of voltage- divider bias/self-bias circuit using BJT.
11. Design and analysis of voltage- divider bias/self-bias circuit using JFET.
12. Design and analysis of self-bias circuit using MOSFET.
13. Design a suitable circuit for switch using CMOSFET/JFET/BJT.
14. Design a small signal amplifier using MOSFET (common source) for the given specifications. Draw the frequency response and find the bandwidth.
15. Design a small signal amplifier using BJT(common emitter) for the given specifications. Draw the frequency response and find the bandwidth.

Tools / Equipment Required: Software Toollike Multisim/ Pspice or Equivalent,
DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices

Course Title	ENVIRONMENTAL SCIENCE					B. Tech. II Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
20MC210	**MC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	0	0	0	30	0	30
Mid Exam Duration: 2Hrs								

Course Objectives:

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life.
- To save earth from the inventions by the engineers.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Explain** multidisciplinary nature of environmental studies and various Renewable and Nonrenewable resources.
CO 2	**Understand** Energy flow, bio-geo chemical cycles and ecological pyramids
CO 3	**Illustrate** various causes of pollution and related preventive measures.
CO 4	**Summarize** Solid waste management, Social issues related to environment and their protection acts.
CO 5	**Evaluate** Causes of population explosion, value education and welfare programmes.

UNIT – I

Multidisciplinary Nature Of Environmental Studies: –Scope and Importance – Need for Public Awareness.
Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems
Forest resources: deforestation, case studies – Mining, dams and other effects on forest and tribal people
Water resources: Use and over utilization of surface and ground water conflicts over water.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Renewable &Non-Renewable.

UNIT – II

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Food chains, food web-

Ecological succession and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Desert ecosystem
c. Aquatic ecosystems (lakes, rivers and oceans)

Biodiversity And Its Conservation : Introduction, Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III

Environmental Pollution: Definition, Cause, effects and control measures of:

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV

Social Issues And The Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents.

Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act.

UNIT – V

Human Population And The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

TEXT BOOKS:

1. Text book of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
2. Palaniswamy, "Environmental Studies", Pearson education
3. S.Azeem Unnisa, "Environmental Studies" Academic Publishing Company
4. K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", Scitech Publications (India), Pvt. Ltd.