

(Sponsored by Sri Vasavi Educational Society) (Approved by AICTE, New Delhi & Permanently affiliated to JNTUK, Kakinada) (Accredited by NAAC with 'A' Grade, Recognized by UGC under section 2(f) & 12(B)) Pedatadepalli, **TADEPALLIGUDEM – 534 101.** W.G.Dist. (A.P)

<u>ANNEXURE - I</u>

Semester	B.Tech I SEM	L	Т	Р	С	COURSE CODE	
Regulation	V20	3	-	-	3	V20MAT01	
MATHEMATICS-I							
Name of the Course	Linear Algebra and Differential Equations						
Branches	Common to All Branches						

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

- **CO1:** apply matrix technique to solve system of linear equations (K3)
- CO2: find Eigenvalues and Eigen vectors (K3)
- **CO3:** solve the ordinary differential equations of first order & first degree (K3)
- **CO4:** solve the linear differential equations of higher order with constant coefficients (K3)
- **CO5:** apply Laplace Transformation to given function. (K3)
- CO6: find maxima and minima of functions of two variables (K3)

UNIT I: System of linear equations:

Rank-Echelon form-Normal form - Solution of linear systems - Gauss elimination - Gauss

Jordon- Gauss Jacobi and Gauss Seidal methods.

UNIT II: Eigenvalues, Eigen vectors and Cayley-Hamilton theorem:

Eigenvalues - Eigen vectors- Properties - Cayley-Hamilton theorem (without proof) -

Inverse and powers of a matrix by using Cayley-Hamilton theorem.

UNIT-III: Differential equations of first order and first degree:

Linear-Bernoulli-Exact-Reducible to exact differential equations -Newton's Law of cooling-Law of natural growth and decay-Orthogonal Trajectories.

UNIT IV: Linear differential equations of higher order:

Linear non homogeneous differential equations of higher order with constant coefficients involving RHS term of the type e ax , sinax, cosax, polynomials in x, e ax V(x), xV(x)-method of variation of parameters.

UNIT V: Laplace Transformation:

Laplace transforms of standard functions, properties(without proof), transforms of tf(t),

f(t)/t, transforms of derivatives and integrals, transforms of unit step function, Dirac delta

function, Inverse Laplace transforms, convolution theorem (without proof)

Application: Solving ordinary differential equations with initial conditions using Laplace transforms.

UNIT VI: Partial differentiation:

Introduction to partial differentiation -Total derivative - Functional dependence - Jacobian.maxima and minima of functions of two variables (without constraints) and Lagrange's method (with constraints).

Text Books:

- 1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
- 2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

- 1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
- 2. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
- 3. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
- 4. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.



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ANNEXURE – II

Semester	B.Tech II SEM	L	Т	Р	С	COURSE CODE
Regulation	V20	3	-	-	3	V20MAT02
Name of the Course	MATHEMATICS-II Numerical Methods and Vector Calculus					
Branches	Common to All Bran	ches				

Course Outcomes: At the end of the Course student will be able to

- **CO1:** compute approximate roots of algebraic and transcendental equations and interpolating polynomial for the given data (K3)
- **CO2:** solve ordinary differential equations with initial conditions using numerical methods (K3)
- **CO3:** find multiple integrals and improper integrals (K3)

CO4: calculate gradient of a scalar function, divergence and curl of a vector function.(K3)

- **CO5:** apply the knowledge of vector integral concepts to find characteristics of vector fields (K3)
- CO6: find Fourier series of a periodic functions (K3)

UNIT I: Solution of Algebraic and Transcendental Equations and Interpolation:

Introduction- Bisection method – Method of false position– Newton-Raphson method (One variable) - finite differences- forward differences, backward differences – simple relations on forward, backward, central, average and shifting operators - Newton's formulae for interpolation - Lagrange's interpolation formula.

UNIT II: Numerical Integration and solution of Ordinary Differential equations:

Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series- Picard's Method - Euler's method- Euler's modified Method – Runge-Kutta method (fourth order).

UNIT III: Multiple Integrals:

Definition of Improper integrals - Double and triple integrals - Change of variables - Change of order of integration.

UNIT IV: Vector Differentiation:

Vector differential operator - Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities.

UNIT V: Vector Integration:

Line integral: Work done – Potential function – Surface and volume integrals - Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.

UNIT VI: Fourier series:

Fourier series -Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half-range sine and cosine series.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.

2. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-

2. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press

3. V.Ravindranath and P.Vijayalakshmi, Mathematical Methods, Himalaya Publishing House. India

- 4. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
- 5. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.

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1 Year – I/II Semester

ENVIRONMENTAL STUDIES (Common to all branches) Subject Code: V20CHT02

Course Outcomes:

At the end of the course, the student should be able to:	(K2)
CO1: Recognise the importance of environment and ecosystem services.	(K2)
CO2: Identify the characteristic features, uses and impact of overutilization of natural resources.	(102)
CO3: Explain biodiversity, biodiversity services and conservation of biodiversity.	(K2)
CO4: Report the causes and impacts of various pollutions.	(K2)
CO5: Illustrate social and global environmental issues; sustainable development practices.	$(\Lambda 2)$

UNIT 1: MULTIDISCIPLINARY NATURE OF ENVIRONMENT & ECOSYSTEM

Definition, Scope and importance of environment, Types of environment, Multidisciplinary nature of Environmental Studies, Components of environment.

Ecosystem - Concept of an Ecosystem, Structure and function of an Ecosystem, Food chain & food web, Ecological Pyramids, Structure and function of Forest, Desert, Pond and Marine ecosystem.

UNIT 2: NATURAL RESOURCES

Forest Resources: Uses, Overexploitation, Deforestation.

Water resources: Aquifers, Dams and benefits, Conflicts over water.

Mineral resources: Uses, Overexploitation, Environmental impact of extraction and use of mineral resources.

Land resources: Degradation, Soil erosion and desertification, Landslides.

Renewable Energy resources: Solar energy, Geo thermal energy, Tidal Energy.

UNIT 3: BIODIVERSITY AND ITS CONSERVATION

Definition, Levels of Biodiversity, Values of Biodiversity, Hotspots of Biodiversity, Threats to Biodiversity, Endangered and Endemic species of India, In-situ and Ex-situ Conservation.

UNIT 4: ENVIRONMENTAL POLLUTION

Definition of pollution, Air pollution- Types of Air pollutants, Effects and control measures; Water pollution- Causes, Effects and control measures; Soil pollution:

Bio inclical waste; Industrial waste- Process of waste management, Sanitary land fill, Incineration, 3R strantegy; E- Waste and its management.

UNIT 5: SOCIAL AND GLOBAL ENVIRONMENTAL ISSUES & ACTS

Women Education, Value education, Role of information technology on environment and human health, Ac id rains, Global warming, Ozone layer depletion. Population growth.

Imponance of environmental legislation, Environmental Protection Act, Air Act (Prevention and control of 100llution), Water Act.

Vision

To be a premier technological institute striving for excellence with global perspective and commitment to the nation. Mission

- To produce Engineering graduates of professional quality and global perspective through learner-centric education.
- · To establish linkages with government, industry and Research laboratories to promote R&D activities and to disseminate invovations.
- To create an eco-system in the institute that leads to holistic development and ability for life-lcng learning.



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SRI VASAVI ENGINEERING COLLEGE (AUTONOMOUS)

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I Year – I/II Semester

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ENGINEERING CHEMISTRY (Common to all branches) Subject Code: V20CHT01

Course Outcomes:

At the end of the course, the student should be able to:	reatment
CO1: Solve boiler troubles originated due to poor water quality and suggest summer	(K3)
methods.	(K3)
CO2: Choose plastics and rubbers for engineering applications.	systems.
CO3: Associate concepts of Electro Chemistry in designing electronic	(K2)
	(K3)
CO4: Assess the quality of fuels.	(K3)
CO5: Apply corrosion principles for protection of metallic structures.	•

UNIT I: WATER TECHNOLOGY

Sources of water; Impurities in water, Hardness of water, Types of Hardness, Units of hardness, Determination of hardness of water, Numerical problems on temporary and permanent hardness. Boiler troubles: Priming and Foaming, Sludge and Scale formation, Boiler corrosion, Caustle embrittlement. Softening of hard water- Zeolite process and Ion exchange process; Water for drinking purpose, BSI standards of drinking water, Disinfection: Chlorination, Break point chlorination. Desalination - Reverse Osmosis and Electro dialysis.

UNIT II: POLYMER TECHNOLOGY

Introduction, Polymerization, Mechanism of Free radical addition polymerization; Plastics as engineering materials; Advantages and limitations, Thermoplastics and Thermosetting plastics, Fabrication of plastics (Compression, Injection, Transfer, and Extrusion Moulding) - Preparation,

properties and applications of Polythene (HDPE and LDPE), PVC, Bakelite. Elastomers: Disadvantages of natural rubber, Vulcanization of rubber, Advantages of vulcanized rubber, Preparation, properties and applications of Buna -S and Buna-N.

UNIT III: ELECTROCHEMISTRY

Galvanic cell, Electrode potential and EMF - Reference electrodes (Calomel and Glass electrodes), Determination of pH of a solution using glass electrode, Conductometric titration (Strong Acid -Strong Base).

Batteries: Types, Primary battery - Li-MnO2 battery, Secondary batteries - Lead acid battery, Lithium ion battery.

Fuel cells: Definition, H2 - O2 fuel cell

UNIT IV: FUEL TECHNOLOGY

Fuels - Characteristics of a good fuel, Classification of fuels, Calorific value (HCV and LCV), Dulong's formula, Numerical problems on HCV and LCV.

Solid fuels: Coal – Proximate and ultimate analysis, Significance of the analyses.

Liquid fuels: Petroleum composition, Classification, Synthetic petrol (Fischer Tropsch and Bergius process), Knocking, Anti knocking agents, Octane and Cetane ratings.

Gaseous fuels - Natural gas, LPG and CNG

Biofuels - Biogas, Biodiesel.

UNIT V: CORROSION AND NANO MATERIALS

Corrosion: Definition, Theories of Corrosion (Chemical & Electrochemical), Pilling-Bedworth Rule, Galvanic corrosion and Pitting corrosion, Factors which influence the rate of corrosion. Protection from corrosion - Design & Selection of metals, Cathodic protection, Protective coatings - Metallic coatings (Anodic and cathodic coatings), Methods of application of coatings on metals (Galvanizing &Tinning).

Nano materials: Introduction, Carbon nanotubes - preparation (Arc discharge, Laser ablation and CVD Method) - Properties and applications of carbon nanotubes.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publications & Co.

2. A Text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd.

Reference Books:

- 1. Engineering Chemistry by Vajiram and others. Wiley India Pvt. Ltd.,
- 2. Engineering Chemistry by Prasanth Rath, Cengage Learning.
- 3. Engineering Chemistry by Shikha Agarwal; Cambridge University Press.
- 4. Engineering Chemistry, by B. Sivasankar, McGraw-Hill.

Vision

- To be a premier technological institute striving for excellence with global perspective and commitment to the nation. Mission
 - To produce Engineering graduates of professional quality and global perspective through learner-centric education.
 - To establish linkages with government, industry and Research laboratories to promote R&D activities and to disseminate innovations.
 - To create an eco-system in the institute that leads to holistic development and ability for life-long learning.

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I Year - I/II Semester

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ENGINEERING CHEMISTRY LABORATORY (Common to all branches) Subject Code: V20CHL01

Course Outcomes:

At the end of the course, the student will be able to:

- CO1: Analyse quantitatively a variety of samples using volumetric methods and instrumental methods.
- CO2: Apply volumetric and instrumental methods for the determination of water quality parameters
- namely Alkalinity, Hardness and pH. CO3: Prepare polymeric materials and analyse the given coal samples.

List of Experiments:

- 1. Introduction to chemistry laboratory Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis etc.,
- 2. Estimation of HCl using standard Na₂CO₃ solution.
- 3. Estimation of KMnO4 using standard oxalic acid solution.
- 4. Determination of alkalinity of a sample of water.
- 5. Determination of total hardness of water using standard EDTA solution.
- 6. Estimation of ferrous iron using standard K2Cr2O7 solution.
- 7. Estimation of copper using standard EDTA solution.
- 8. Estimation of % available chlorine in bleaching powder.
- 9. Estimation of pH of the given sample solution using pH meter.
- 10. Conductometric titration between strong acid and strong base.
- 11. Proximate analysis of coal.
- 12. Preparation of phenol formaldehyde resin.

Text Book:

1. Lab manual prepared by Department of Chemistry, Sri Vasavi Engineering College.

Reference Books:

1. Practical Engineering Chemistry by K. Mukkanti, B.S. Publications.

- 2. Vogel's Quantitative Chemical Analysis 5th Edition, Longman.
- 3. A Text Book on experiments and Calculations Engineering by S.S.Dara, S.Chand& Co Ltd.

Vision

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To be a premier technological institute striving for excellence with global perspective and commitment to the nation, Mission

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SRI VASAVI ENGINEERING COLLEGE: Pedatadepalli, Tadepalligudem (Autonomous)

Syllabus for the Regulation Year 2020-21 (Common to all Branches)

English for Professional Enhancement

I B. Tech I Semester

S.No	Course Code	Course Name	L	Т	Р	С
1	V20ENT01	English for Professional Enhancement	3			3

Course Outcomes

CO-1

Identify the central theme of the text, use cohesive items for coherence in a paragraph, recognize nouns and basic sentence structures. (K2)

CO-2

Restate the central idea of the letter by using appropriate vocabulary. Gain mastery over articles and prepositions. (K2)

CO-3

Find the success formula after reading the text in detail to answer questions. Use appropriate tense and concord, find suitable vocabulary and format to draft letters and e-mails. (K3)

CO-4

Employ reading skills to comprehend the given biography. Interpret visual information .Use quantifiers appropriately and get acquainted with writing for media and statement of purpose. (K3)

CO-5

Appraise the delivered lecture and text, recognize the contextual vocabulary, write error free academic proposals and prepare poster presentations. (K4)

Syllabus

UNIT-I

A DRAWER FULL OF HAPPINESS (From Infotech English, Maruthi Publications).

Vocabulary: Technical vocabulary, GRE Vocabulary, Antonyms and Synonyms.

Grammar: Parts of Speech, Yes/No questions, Wh-questions.

Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Introduce yourself and others. Asking and answering general questions on topics such as home, family, work, studies and interests.

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Writing: Paragraph Writing

Non- Detailed: The Post Office by Rabindranath Tagore (Macmillan India)

<u>UNIT-II</u>

NEHRU'S LETTER TO HIS DAUGHTER INDIRA ON HER BIRTHDAY (From Infotech English, Maruthi Publications).

Vocabulary: Technical Vocabulary, GRE Vocabulary, Antonyms and Synonyms.

Grammar: Articles, Prepositions and Degrees of Comparison.

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts both in speaking and writing.

Speaking: Discussion in pairs/ small groups on specific topics. Functional English: Greeting and Leave Taking.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Identifying the main ideas rephrasing and Summarizing.

Non- Detailed: The Post Office by Rabindranath Tagore (Macmillan India)

<u>UNIT-III</u>

STEPHEN HAWKING - POSITIVITY 'BENCHMARK' (From Infotech English, Maruthi Publications).

Vocabulary: Technical Vocabulary, GRE Vocabulary.

Grammar: Verbs, Tenses, Concord: Subject - Verb Agreement.

Listening: Listening for global comprehension and summarizing what is listened to both in speaking and writing

Speaking: Discuss specific topics in pairs or small groups and report what is discussed.

Functional English: Complaining and Apologizing.

Reading: Reading a text in detail by making basic inferences –recognizing, and interpreting specific context clues; strategies to use text clues for comprehension, critical reading.

Writing: Letter writing- types, format and principles of letter writing, E-mail Etiquette.

Non- Detailed: The Post Office by Rabindranath Tagore (Macmillan India)

UNIT-IV

LIKE A TREE, UNBOWED: WANGARI MAATHAI - BIOGRAPHY (From Infotech English, Maruthi Publications).

Vocabulary: Technical Vocabulary, GRE Vocabulary, Antonyms and Synonyms.

Grammar: Voice

Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - Asking for and Giving Information/Directions. Functional English: Asking for Permissions, Requesting, Inviting.

Reading: Studying the use of graphic elements in text to convey information.

Writing: Interpreting Visual Information.

Non- Detailed: The Post Office by Rabindranath Tagore (Macmillan India)

UNIT-V

STAY HUNGRY; STAY FOOLISH (From Infotech English, Maruthi Publications).

Vocabulary: Technical Vocabulary, GRE Vocabulary, Antonyms and Synonyms.

Grammar: Identifying and Correcting Common Errors in Grammar and Usage (articles, prepositions, tenses, and subject-verb agreement), Reported Speech.

Listening: Identifying key Terms, Understanding Concepts and Interpreting the Concepts both in speaking and writing.

Speaking: Oral Presentation on academic topics.

Functional English: Suggesting/Opinion giving.

Writing: Writing Academic Proposals - Writing Research Articles, Poster Presentation.

Non- Detailed: The Post Office by Rabindranath Tagore (Macmillan India)

Books Prescribed

"Infotech English", Maruthi Publications. (Detailed)

"The post Office" by Rabindranath Tagore, Macmillan India (Non -Detailed)

Reference books:

- 1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
- 2. Chase, Becky Tarver. Pathwasys: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
- 3. Skillful Level 2 Reading and Writing Student's Book Pack (B1) Macmillan Educational.
- 4. The Official Cambridge Guide to IELTS, for Academic and General Training.(2015)
- 5. Practical English Usage, Michael Swan, OUP, 1995.



SRI VASAVI ENGINEERING COLLEGE: Pedatadepalli, Tadepalligudem (Autonomous) Syllabus for the Regulation Year 2020-21 (Common to all Branches) Hone your Communication Skills Lab-I

I B.Tech I Semester

S.No	Course Code	Course Name	L	Т	Р	С
1	V20ENL01	Hone your Communication Skills, Lab-I			3	1.5

Course Outcomes

CO-1

Identify suitable expressions to greet people, say goodbye to them, introduce one another, listen to consonants. (K2)

CO-2

Select suitable words to invite someone, accept or decline invitations, listen to..., identify and

produce vowel sounds. (K2)

CO-3

Choose suitable expressions to seek/refuse permissions, to apologize and listen to word accent.(K3)

CO-4

Find apt expressions to give suggestions, express opinions and identify tone groups. (K3)

CO-5

Use appropriate words to give commands, requests and identify pauses and prominent syllables. (K3)

Syllabus

Unit-1 Hello, I'm

- Greeting people
- Saying goodbye to people
- Introducing yourself to someone/someone to someone else
- Listening and Identifying Consonants

Unit-2 I Would Love to.... but,

- Inviting someone
- Accepting or declining invitations
- Complaining about something
- Listening to, Identifying and Producing Vowel Sounds

Unit-3 With Your Permission I would like to.....

- Seeking Permission
- Granting/refusing permissions
- Apologizing
- Listening to syllables and Word Accent and practise.

Unit-4 Why don't we....?

- Making Suggestions
- Agreeing/disagreeing with a suggestion
- Expressing Opinions
- Using Weak Forms
- Identifying Tone Groups

Unit-5 Could you Please....

- Giving Commands/instructions
- Requesting someone for something
- Identifying pauses and prominent syllables
- Identifying and using different tones

Dialogues

- The norms of dialogues
- Common vocabulary used in dialogues
- Carrying on a dialogue
- Listening to dialogue.

Book Prescribed

Strengthen Your Steps - A multimodal course in communication skills (Maruthi Publications)

Books for Further Reference

1. Better English Pronunciation (J.D.O'Connor), Cambridge University.

2. English Conversation Practice (A Practical Guide to improve Conversational Skills), Sterling Publishers.

3. Exercise in spoken English, Parts-I-III.CIFEL, Hyderabad, Oxford University Press.



SRI VASAVI ENGINEERING COLLEGE : Pedatadepalli, Tadepalligudem (Autonomous)

Syllabus for the V20 Regulation year 2020-2021 (Common to all Branches) Hone your Communication Skills Lab-II I B. Tech II Semester

S.No	Course Code	Course Name	L	Т	Р	С
1	V20ENL02	Hone your Communication Skills, Lab-II			3	1.5

Course Outcomes

CO-1

Collect suitable expressions and vocabulary to participate in JAM. Identify root words (K1)

CO-2

Prepare students to face telephonic ,skype and face to face interviews with appropriate etiquette. (K3) CO-3

Show team spirit and communicative skills in group discussion. (K3)

CO-4

Arrange ideas and prepare to give presentations in a professional manner. (K4)

CO-5

Debate rationally and cogently while putting forth the ideas. (K4)

Syllabus

Unit-1 JAM Session

- Preparation for JAM Session
- Participation in JAM
- Identify root words

Unit-2 Interviews

- Guidelines for facing interviews
- Three R's of interviews
- Practice Activity (Mock Interviews)

Effective Telephone Interviews

- Telephone Etiquette
- Preparing for telephonic interviews
- Acing interviews
- Practice Activity (Mock Interviews)

Unit-3 Group Discussions

- Tips to participate in Group Discussion
- Practice Activity

Unit-4 Presentation and Public Speaking

- Three P's of Presentation
- Do's and Don'ts in a Power-point Presentation
- Oral Presentations
- Introduction to Public Speaking
- Strategies for successful Public Speaking
- Practice Activity

Unit-5 Debate

- Introduction to Debate
- Parts of a Debate
- Guidelines to participate in a Debate
- Practice Activity

Book Prescribed

Strengthen Your Steps - A multimodal course in communication skills (Maruthi Publications)

Books for further reference

1.English Language Communication Skills, Lab Manual cum Workbook (with CD), Cengage Learning.

- 1. The Students Companion –Wilfred D. Best (New Edition) –Harpercollins Publishers, 2012.
- 2. Hewings, Martin. Cambridge Academic English (B2).CUP, 2012.



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Physics Syllabus with effect from Academic year 2020-2021

S.No	Course Code	Course Name			
1.	V20PHT01	ENGINEERING PHYSICS			
		(For all branches)			
2.	V20PHL01	ENGINEERING PHYSICS LAB			
		(For all branches)			

P.Sita Rama Raju (Chairman B.O.S) **Prof.G.Padmaja Rani** (University Nominee) Dr.P.S.VSubba Rao (Subject Expert)

Dr.Ch.V Srinivas (Subject Expert) Prof. S.VS.R.Reddy (Subject Expert)



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ENGINEERING PHYSICS

(For All Branches)

S.No	Course Code	Course Name	L	Т	Р	С
1	V20PHT01	ENGINEERING PHYSICS	3	1	-	4

After successful completion of the course, the student will be able to:

CO1:	Associate the basic principles of structure of materials, crystallography				
	and X-ray diffraction(K2).				
CO: 2	Prepare the students to the basic concepts of Lasers and their				
	applications in optical fiber communication link (K3).				
CO: 3	Indicate the applications of sound waves in various fields.(K2).				
CO: 4	Interpret wave and particle behavior of matter and relate it to electron				
	theory of metals (K3).				
CO: 5	Examine the advanced concepts of engineering materials like				
	Semiconductors, Superconductors and Dielectrics (K3).				

<u>UNIT-I</u>

CRYSTALLOGRAPHY : Introduction – Space lattice – Basis – Unit Cell – Lattice parameters –Crystal systems- Bravais lattices– Structures and packing fractions of SC,BCC and FCC

X-RAY DIFFRACTION: Directions and planes in crystals – Miller indices – Separation between successive [h k l] planes – Bragg's law-Bragg's x-ray spectrometer.

<u>UNIT-II</u>

LASERS: Introduction –Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein's coefficients –Pumping schemes– Population inversion– Ruby laser- Helium Neon laser-Applications of LASER.

FIBER OPTICS: Introduction –Structure of an optical fiber- Principle of Optical Fiber – Acceptance angle and acceptance cone – Numerical aperture- Basic optical communication system-Advantages of optical fibers over conventional transmission lines.

<u>UNIT – III</u>

ACOUSTICS: Introduction - Sound absorption- Absorption coefficient-Reverberation-Reverberation Time – Basic requirements for constructing an acoustically good hall -Sabine's formula- Factors affecting acoustics of buildings and their remedial measures.

ULTRASONICS: Introduction- Production of Ultrasonic Waves Using Piezoelectric Effect and Magnetostriction Method- Non-Destructive Testing - Pulse Echo Technique – Applications of ultrasonics.

<u>UNIT – IV</u>

QUANTUM MECHANICS: Introduction-de-Broglie's concept of matter waves – Schrodinger's Time Independent & time dependent wave equations –Physical significance of the wave function- Particle in a one dimensional potential box.

FREE ELECTRON THEORY: Classical free electron theory (qualitative) – Assumptions and failures-Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory- Density of states (3D) - Fermi energy- Fermi – Dirac distribution.

BAND THEORY OF SOLIDS: Bloch's function (qualitative) – Kronig – Penney model (qualitative)–formation of energy bands in crystalline solids based on Kronig Penny model – E vs K diagram- v vs K diagram- effective mass of an electron- Classification of crystalline solids-concept of hole.

<u>UNIT – V</u>

SEMICONDUCTOR PHYSICS: Introduction - Types of Semiconductors- Intrinsic Semiconductors- Carrier concentration– Expression for Conductivity-Extrinsic semiconductors-Carrier concentrations- Dependence of Fermi energy on carrier concentration and temperature- Drift and diffusion currents- Einstein's Equation- Hall Effect- Hall coefficient- Applications of Hall Effect. **SUPERCONDUCTIVITY:** Introduction- General properties – Meissner effect - Type I and Type II Superconductors- BCS Theory – Josephson effects (AC and DC) - Applications of superconductors.

DIELECTRIC PROPERTIES: Introduction- Types of polarizations- Electronic, Ionic and Orientation polarizations (qualitative) – Internal electric field – Clausius- Mossoti Equation.

Text Books:

- 1. A Text book of Engineering Physics, M.N. Avadhanulu and P.G.Kshirasagar, S.Chand Publications.
- 2. Engineering Physics DK Bhattacharya, Poonam and Tandom Publications.

Reference books:

- 1. Solid state Physics, A.J. Dekker by Mc Millan India Ltd.
- 2. Introduction to Solid state Physics, Charles Kittle, Willey India Pvt. Ltd.
- 3. Solid state Physics, S.O. Pillai by New Academic Science.
- 4. Basic Engineering Physics, Dr.P. Sreenivasa Rao, Himalaya Publishers.
- 5. Engineering Physics, V. Rajendran, Mc Graw Hill.
- 6. Engineering Physics, Sanjay D Jain and Girish G Sahasrabudhe., University Press.
- 7. Engineering Physics, Gaur and Guptha, Dhanpat Rai Publications.
- 8. Engineering Physics, P.K. Palanisamy, Sci Tech Publishers.

P.Sita Rama Raju	Prof.G.Padmaja Rani	Dr. P. S.VSubba Rao
(Chairman B.O.S)	(University Nominee)	(Subject Expert)

Dr.Ch.V Srinivas (Subject Expert) **Prof. S.V.S.R.Reddy** (Subject Expert)



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ENGINEERING PHYSICS LAB

(For All Branches)

S.No	Course Code	Course Name	L	Т	Р	С
1	V20PHL01	ENGINEERING PHYSICS LAB	-	-	3	1.5

After successful completion of the course, the student will be able to:

CO:1	Analyze the physical principle involved in the various instruments; also relate the principle to	
	new application. (K4).	
CO:2	Demonstrate the various experiments in the areas of optics, mechanics and Electronics in all	
	branches of engineering. (K3).	
CO:3	Think innovatively and also apply the creative skills that are essential for engineering. (K4).	

List of Experiments:

(Any eight of the following to be done)

- 1. Determination of Rigidity modulus of a material Torsional Pendulum
- 2. Determination of acceleration due to gravity Compound Pendulum
- 3. Verification of laws of vibrations in stretched strings Sonometer
- 4. Determination of velocity of sound Volume Resonator
- 5. Verification of Magnetic field Induction along the axis of current carrying coil Stewart and Gee's apparatus.
- 6. Determination of Planck's constant using photocell.
- 7. Determination of wave length of laser source using diffraction grating.
- Determination of frequency of electrically driven tuning fork Melde's experiment Transverse and longitudinal modes.
- 9. Study of V/I Characteristics of Zener diode.

10. Draw the frequency responsive curves of L-C-R Series Resonance Circuit.

- 11. Determination of Energy band gap of a Semiconductor p-n junction.
- 12. Characteristics of Thermistor Negative Temperature Coefficient of resistivity.

Virtual labs:

(Any two of the following to be done)

- 1. Crystal Structure.
- 2. Numerical Aperture of an Optical Fiber.
- 3. Photo-Electric Effect.
- 4. Hall Effect.

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