

DEPARTMENT OF

**ELECTRONICS AND
INSTRUMENTATION
ENGINEERING**

VISION OF THE DEPARTMENT

A resource center of academic excellence for imparting quality technical education, meeting the need of students at National and International levels and imbuing strong ethical values, to improve the standards of the society.

MISSION OF THE DEPARTMENT

- To impart quality education in the domain of Electronics and Instrumentation Engineering by Implementing learning centric processes.
- To provide specific best of breed laboratory practices to promote diverse collaborative research for meeting the changing societal needs.

**B.TECH.
(ELECTRONICS AND INSTRUMENTATION
ENGINEERING)**

B.TECH. (EIE)

PROGRAM EDUCATIONAL OBJECTIVES

PEO-I: To provide students with a solid foundation in Mathematics, Sciences, Electronics, and Instrumentation Engineering which prepares students for wide range of career opportunities in Industries, Research, and Academics

PEO-II: To train the students with good engineering breadth to comprehend, analyse, innovate, and design new products in core and multidisciplinary domain, to provide technical solutions and services to the needs of the society.

PEO-III: To provide students with an academic environment of excellence, proactiveness, and lifelong learning for successful professional career.

PEO-IV: To inculcate professional and ethical attitude, effective presentation skills and enhanced ability to work in multidisciplinary teams to pursue complex, open-ended investigations and research.

PEO-V: To motivate students towards becoming entrepreneurs, collaborators, and innovators, leading, or participating in efforts to address social, technical, and business challenges.

B.TECH. (EIE)

PROGRAM OUTCOMES

PO-1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-2: Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO-3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO-4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including

prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

PO-7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities, and norms of the engineering practice

PO-9: Individual and Teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO-11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO-12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning (LLL) in the broadest context of technological change.

B.TECH. (EIE)

PROGRAM SPECIFIC OUTCOMES

PSO-1: Specify, design, prototype and test electronic systems that perform processing as per user requirements using contemporary devices and technology.

PSO-2: Architect and implement instrumentation systems for industrial processes and biomedical applications using appropriate technologies.

PSO-3: Develop hardware and software tools / programs used in industrial and other automation systems.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY HYDERABAD
B.TECH. I YEAR
ELECTRONICS AND INSTRUMENTATION ENGINEERING

I SEMESTER

R22

Course Code	Title of the Course	L	T	P/D	CH	C
22BS1MT101	Matrices and Calculus	3	1	0	4	4
22BS1PH102	Applied Physics	3	0	0	3	3
22HS1EN101	English for Skill Enhancement	2	0	0	2	2
22ES1CS101	Programming for Problem Solving	3	0	0	3	3
22ES1EI101	Introduction to Internet of Things	2	0	0	2	2
22BS2PH102	Applied Physics Laboratory	0	0	2	2	1
22HS2EN101	English Language and Communication Skills Laboratory	0	0	2	2	1
22ES2CS101	Programming for Problem Solving Laboratory	0	0	2	2	1
22ES2ME101	Engineering Workshop	1	0	2	3	2
22SD5EI101	Elements of Electronics and Instrumentation Engineering	0	0	2	2	1
22MN6HS101	Induction Programme	2	0	0	2	0
Total		16	1	10	27	20

II SEMESTER

R22

Course Code	Title of the Course	L	T	P/D	CH	C
22BS1MT102	Ordinary Differential Equations and Vector Calculus	2	1	0	3	3
22BS1CH102	Chemistry for Engineers	3	0	0	3	3
22PC1EI101	Sensors and Transducers	3	0	0	3	3
22ES1EE106	Circuit Theory	3	0	0	3	3
22ES1CS102	Data structures	3	0	0	3	3
22ES3ME102	Engineering Drawing	0	0	4	4	2
22BS2CH101	Engineering Chemistry Laboratory	0	0	2	2	1
22ES2CS102	Data Structures Laboratory	0	0	2	2	1
22PC2EI1021	Sensors and Transducers Laboratory	0	0	2	2	1
22MN6HS102	Environmental Science	2	0	0	2	0
Total		16	1	10	27	20

L – Lecture T – Tutorial P – Practical D – Drawing CH – Contact Hours/Week
C – Credits SE – Sessional Examination CA – Class Assessment ELA – Experiential Learning Assessment
SEE – Semester End Examination D-D – Day to Day Evaluation LR – Lab Record
CP – Course Project PE – Practical Examination

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS1MT101) MATRICES AND CALCULUS

TEACHING SCHEME		
L	T/P	C
3	1	4

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE PRE-REQUISITES: Matrices, Differentiation, Integration

COURSE OBJECTIVES:

- To know the rank of the matrix and its application to consistency of system of linear equations
- To know Eigen values and Eigen vectors
- To know the nature of Quadratic forms
- To know maximum and minimum of a given function with several variables
- To evaluate multiple integrals and their applications

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Compute the rank of a matrix and analyze the solution of a system of linear equations

CO-2: Calculate Eigen values and Eigen vectors

CO-3: Reduce the quadratic form to its canonical form

CO-4: Solve problems involving Maxima and Minima

CO-5: Evaluate multiple integrals and its applications in areas and volumes

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	2	1	-	-	1	1	-	2	1	-	2	-	-
CO-2	3	2	2	1	-	1	1	-	2	1	-	2	-	-
CO-3	3	2	2	-	-	1	1	-	2	1	-	2	-	-
CO-4	3	2	1	1	-	1	1	-	2	1	-	2	-	-
CO-5	3	2	1	-	-	1	1	1	2	1	-	2	-	-

UNIT-I:

Matrices: Types of real matrices, symmetric, skew symmetric and orthogonal matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; Consistency of Homogeneous and Non-Homogeneous equations, LU Decomposition method.

UNIT-II:

Eigen Values and Eigen Vectors: Eigen values and eigenvectors and their properties, Diagonalization of matrices; Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem

UNIT-III:

Complex Matrices and Quadratic Forms: Types of complex matrices; Hermitian; Skew-Hermitian, Unitary Matrices and its properties; Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical form using Linear Transformation and Orthogonal Transformation.

UNIT-IV:

Functions of Several Variables: Definitions of Limits, Continuity. Partial differentiation: partial derivatives of first and second order, Euler's theorem, Total derivative, Jacobian, Functional dependence, Taylor's theorem of two variables (without proof). Maxima and Minima of two variables, Lagrange's method of undetermined Multipliers.

UNIT-V:

Multiple Integrals with Applications: Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form), Change of variables (Cartesian to polar). Evaluation of Triple integrals, Change of variables (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. Higher Engineering Mathematics, B. V. Ramana, Tata McGraw Hill, New Delhi, 11th Reprint, 2010
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Narosa Publications
3. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley India Pvt. Ltd.

REFERENCES:

1. Linear Algebra and its Applications, Gilbert Strang, Cengage Publication
2. Matrices, A. R. Vasishtha and A. K. Vasishtha, Krishna's Educational Publishers
3. Engineering Mathematics, N. P. Bali, 4th Edition, Laxmi Publications (P) Ltd.
4. Calculus and Analytic Geometry, G. B. Thomas and R. L. Finney, 9th Edition, Pearson, 2002
5. Linear Algebra and its Applications, David C. Lay, Pearson Education India, 2003

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS1PH102) APPLIED PHYSICS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE PRE-REQUISITES: 10+2 Physics

COURSE OBJECTIVES:

- To apply the principles of lasers for various laser systems and optical fibers
- To understand the principles of quantum physics and band theory of solids
- To explain various types of semiconductors and semiconductor devices
- To study the fundamental concepts related to the dielectric and magnetic materials
- To identify the importance of energy materials and nanomaterials

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Explain various aspects of lasers, optical fiber and their applications in diverse fields.

CO-2: Apply quantum mechanics to behavior of a particle and classify solids based on band gap

CO-3: Identify the role of semiconductor devices in science and engineering applications.

CO-4: Illustrate applications of dielectric, magnetic materials.

CO-5: Explore the features and applications of energy materials and nanomaterials.

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	1	1	-	1	1	-	1	1	-	1	-	-	-
CO-2	3	2	1	-	1	1	-	-	1	1	-	1	-	-	-
CO-3	3	2	2	1	-	2	-	-	1	1	-	1	-	-	-
CO-4	3	2	1	1	-	1	-	-	1	1	-	1	-	-	-
CO-5	3	2	2	1	1	2	2	-	1	1	-	1	-	-	-

UNIT-I:

Laser and Fiber Optics: Lasers: Laser beam characteristics-Three quantum processes (Absorption, Spontaneous emission & Stimulated emission), Lifetime, Metastable state, Population inversion, Pumping methods- Lasing action -Block diagram of laser-Einstein coefficients and their relations, Ruby laser, He-Ne laser, Applications of laser.

Fiber Optics: Introduction to optical fiber- Advantages of optical fibers - Total internal reflection, Construction of optical fiber - Acceptance angle - Numerical aperture-Classification of optical fibers. fiber optic laser - Applications.

UNIT-II:

Quantum Physics and Band Theory of Solids:

Quantum Physics: Introduction to quantum physics-Planck's law, Wave-particle duality, de-Broglie hypothesis, Matter waves, Davisson and Germer experiment – Heisenberg uncertainty principle and its applications - Born interpretation of the wave function – Time independent Schrodinger wave equation - Particle in one dimensional infinite potential well.

Band Theory Solids: Free electron theory (Drude & Lorentz.)-Electrical Conductivity-Verification of Ohm's law -Bloch's theorem -Kronig-Penney model (qualitative) – E-k diagram, Effective mass of electron -Origin of energy bands- Classification of solids.

UNIT-III:

Semiconductors and Devices:

Semiconductors: Intrinsic Semiconductors-Intrinsic carrier concentration, Extrinsic semiconductors (Qualitative), Fermi level and its temperature dependence, Hall effect-Hall coefficient, Applications of Hall effect.

Semiconductor Devices: Direct and indirect band gap semiconductors-Formation and characteristics of P-N junction diode, construction, working principle, Characteristics and applications of LED, and Solar cell, Construction and working principle of Laser diode.

UNIT-IV:

Dielectric and Magnetic Materials:

Dielectric Materials: Basic definitions- Types of polarizations (qualitative) -Frequency dependence of polarization, Local field, Clausius-Mossotti relation, Ferroelectric, Piezoelectric, and Pyroelectric materials – Applications.

Magnetic Materials: Basic definitions- Types of Magnetic materials, Antiferro and ferri magnetic materials, Weiss-Domain theory of ferromagnetism, Hysteresis - Soft and hard magnetic materials, Multiferroics – Applications.

UNIT-V:

Energy Materials and Nanotechnology:

Energy Materials: Introduction to energy materials, Electrolytes for super capacitors - Rechargeable ion batteries, Solid fuel cells.

Nanotechnology: Introduction, Quantum confinement, Surface to volume ratio, Physical properties, Bottom-up approach: Sol-gel, Top-down approach: Ball milling - Characterization techniques – Average crystallite size using X-ray diffraction pattern, Scanning electron microscopy - Applications of nanomaterials.

TEXT BOOKS:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P. G. Kshirsagar & T. V. S. Arun Murthy, 11th Edition, S. Chand Publications, 2019
2. Engineering Physics, B. K. Pandey and S. Chaturvedi, 2nd Edition, Cengage Learning, 2022
3. Engineering Physics, P. K. Palanisamy, Scitech Publications

REFERENCES:

1. Essentials of Nanoscience & Nanotechnology, K. Narasimha Reddy, 1st Edition, Nano Digest, 2021
2. Fundamentals of Physics, Halliday, Resnick and Walker, 11th Edition, John Wiley & Sons, 2018
3. Introduction to Solid State Physics, A. C. Kittel, Wiley Eastern, 2019
4. Nano Materials, A. K. Bhandhopadhya, 1st Edition, New Age International, 2007
5. Energy Materials A Short Introduction to Functional Materials for Energy Conversion and Storage, A. S. Bandarenka, CRC Press, Taylor & Francis Group Energy Materials, 1st Edition, Taylor & Francis Group, 2022

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22HS1EN101) ENGLISH FOR SKILL ENHANCEMENT

TEACHING SCHEME		
L	T/P	C
2	0	2

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To enhance vocabulary through word formation processes
- To read and comprehend different kinds of texts (tone, tenor, sound, sense, diction, etc. - sub-skills)
- To write clear, concise, and correct sentences and paragraphs to produce appropriate technical prose
- To improve coherence and cohesion in writing and speaking
- To recognize and practice the use of rhetorical elements necessary for the successful practice of scientific and technical communication

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Use vocabulary contextually and effectively

CO-2: Employ reading skills to comprehend different kinds of texts. (tone, tenor, sound, sense, diction, etc.

CO-3: Apply principles of critical thinking and problem-solving for clarity, conciseness and accuracy of expression in academic and professional communication

CO-4: Demonstrate improved competence in Standard Written English, including grammar, sentence and paragraph structure and coherence, and use this knowledge to accurately communicate technical information

CO-5: Employ appropriate rhetorical patterns of discourse in scientific and technical communication

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	1	1	1	1	-	2	1	1	2	3	2	2	-	-
CO-2	2	2	2	2	2	2	2	1	3	3	2	2	-	-
CO-3	2	2	2	2	1	3	2	1	3	3	2	2	-	-
CO-4	1	1	1	1	1	2	2	1	2	3	2	2	-	-
CO-5	1	1	1	1	-	2	1	1	2	2	1	1	-	-

UNIT-I:

1. Reading: On the Conduct of Life by William Hazlitt
2. Grammar: Conjunctions and Prepositions
3. Vocabulary: Word Formation (Affixation, Compounding, Conversion, Blending, Borrowing)
4. Writing: Punctuation, Clauses and Sentences Transitional Devices- Paragraph Writing- Process

UNIT-II:

1. Reading: How I Became a Public Speaker by G.B. Shaw
2. Grammar: Articles, Noun-Pronoun Agreement, Concord
3. Vocabulary: Word Formation- (Prefixes, Suffixes, Root Words)
4. Writing Skills: Principles of Good Writing-Coherence, Cohesion Essay Writing - Descriptive, Argumentative, Expository

UNIT-III:

1. Reading: Muhammad Yunus
2. Grammar: Misplaced Modifiers
3. Vocabulary: Synonyms and Antonyms
4. Writing Skills: Letter Writing- Formal Letters - Letter of Complaint, Letter of Requisition, Email Writing; Email Etiquette

UNIT-IV:

1. Reading: Politics and the English Language by George Orwell
2. Grammar: Cliches, Redundancies
3. Vocabulary: Common Abbreviations
4. Writing Skills: Summary Writing; Job Application; Resume

UNIT-V:**Organizational Patterns for writing**

1. Patterns of Writing: Comparison and Contrast Pattern
2. Patterns of Writing: Cause and Effect Pattern
3. Patterns of Writing: Classification Pattern
4. Patterns of Writing: Problem-Solution Pattern

TEXT BOOKS:

1. Language and Life: A Skills Approach, Orient Black Swan
2. Technical Communication Rebecca E. Burnett, 6th Edition, Cengage Learning

REFERENCES:

1. Communication Skills, Pushplata and Kumar, Sanjay, OU Press, 2015
2. Remedial English Grammar, Wood F. T., Macmillan, 2007
3. Study Writing, Hamp, Liz., Lyons and Heasley, Ben, C U Press, 2006
4. Practical English Usage, Swan, Michael, OU Press, 1995
5. Longman Dictionary of Common Errors, Turton N. D., and Heaton J. B., 1991

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES1CS101) PROGRAMMING FOR PROBLEM SOLVING

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To relate basics of programming language constructs and problem-solving techniques
- To classify and implement control structures and derived data types
- To analyze and develop effective modular programming
- To construct mathematical problems and real time applications using C Language

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Illustrate the flowchart, algorithm, pseudo code for a given problem

CO-2: Execute programs using various data types and operators

CO-3: Implement programs using conditional and iterative statements for a given problem

CO-4: Exercise on programs using arrays, pointers, dynamic memory management, structures and unions

CO-5: Develop solution for a given problem using modular approach and perform file handling

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	2	2	3	1	-	-	-	-	2	2	1	-	-	-
CO-2	2	2	3	2	1	-	-	-	2	2	-	2	-	-
CO-3	2	2	3	2	1	1	-	-	2	2	-	2	-	-
CO-4	1	2	3	1	1	1	-	-	2	2	2	2	-	-
CO-5	1	2	3	1	1	1	-	-	2	2	2	2	-	-

UNIT - I:

Introduction to Programming:

Compilers, compiling and executing a program.

Representation of Algorithm, Flowchart/ Pseudocode with examples, Program design and structure of C programming.

Variables, Data types Operators, expressions and precedence, Expression evaluation, Storage classes, type conversion.

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

Conditional Branching: Branching with if, if-else, nested if-else, else-if ladder, switch-case, goto,

UNIT - II:

Loops, Arrays, Strings:

Loops: Iteration with for, while, do- while loops, break and continue statements.

Arrays: One and two dimensional arrays, creating, accessing and manipulating elements of arrays

Strings: Introduction to strings, handling strings as array of characters, string functions available in C arrays of strings.

UNIT – III:

Searching, Sorting, Functions:

Searching: Basic searching in an array of elements (linear and binary search techniques)

Sorting: Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value. Recursion with examples. Some C standard functions and libraries.

UNIT-IV:

Structures and Pointers:

Structures: Defining structures, initializing structures, unions, Array of structures,

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Passing arrays to functions and structures to functions. Dynamic memory allocation, self-referential structures

UNIT - V:

Preprocessor Directives and File Handling in C:

Preprocessor Directives: Symbolic constants, macro expansion and file inclusion.

User Defined Data Types: enum, typedef

Files: Text and Binary files, file input/output operations, Error Handling in Files, random access of files, command line arguments.

TEXT BOOKS:

1. The C Programming Language , Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall of India
2. C Programming and Data Structures, B. A. Forouzan and R. F. Gilberg, 3rd Edition,
3. Cengage Learning
4. C: The Complete Reference, Herbert Schildt, Mc Graw Hill, 4th Edition

REFERENCES:

1. Problem Solving and Program Design in C, Jeri R. Hanly and Elliot B. Koffman, 7th Edition, Pearson
2. Computer Fundamentals and C, E. Balagurusamy, 2nd Edition, McGraw-Hill
3. Let us C, Yashavant Kanetkar, 18th Edition, BPB
4. How to Solve it by Computer, R. G. Dromey, 16th Impression, Pearson
5. Programming in C, Stephen G. Kochan, 4th Edition, Pearson Education

ONLINE RESOURCES:

1. <https://nptel.ac.in/courses/106105171>
2. https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/307

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES1E1101) INTRODUCTION TO INTERNET OF THINGS

TEACHING SCHEME		
L	T/P	C
2	0	2

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To understand the basics of Internet of Things
- To impart knowledge of components of Internet of Things
- To understand the methodologies for IoT Systems
- To understand skills required to build real-life IoT based projects

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Establish knowledge in a concise manner how the Internet of things work

CO-2: Illustrate various enabling technologies for IoT

CO-3: Identify and interpret design methodology of IoT platform

CO-4: Appreciate the applications of IoT in various domains

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	1	-	1	1	1	1	-	1	-	1	-	1	2	1	2
CO-2	-	-	1	-	1	1	-	1	-	1	-	2	2	1	2
CO-3	1	-	1	1	1	-	-	1	-	1	-	1	2	1	2
CO-4	-	-	1	-	-	1	1	1	-	1	-	1	2	1	2

UNIT – I:

Introduction to Internet of Things (IoT):

IoT definition, Characteristics of IoT, Physical Design of IoT: Things in IoT, IoT Protocols, Logical Design of IoT: IoT Functional Blocks, IoT Communication Models, IoT Communication APIs.

UNIT – II:

IoT Enabling Technologies: Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems. IoT Levels-Level 1 to Level 6

UNIT – III:

IoT Design Methodology: Purpose & Requirements Specification, Process Specification, Domain Model Specification, Information Model Specification, Service Specifications, IoT Level Specification, Functional View Specification, Operational View Specification, Device & Component Integration, Application Development. Case Study on IoT system for Weather monitoring.

UNIT – IV:

Domain Specific IoT Applications - I: Introduction, home automation- Smart Appliances, Smoke/Gas Detectors, Cities – Smart Parking, Smart Lighting, Smart roads,

Environment- Weather Monitoring, Air Pollution Monitoring, Noise Pollution Monitoring,
Energy- Smart Grids, Renewable Energy systems

UNIT – V:

Domain Specific IoT Applications - II: Retail- Inventory Management, Smart payments,
Logistics- Route Generation & Scheduling, Remote vehicle diagnostics, Agriculture-
Smart Irrigation, Industry- Machine Diagnosis & Prognosis, Indoor Air quality monitoring,
Health and Life style- Health & Fitness monitoring, Wearable Electronics

TEXT BOOKS:

1. Internet of Things, A Hands on Approach, Vijay Madiseti, Arshdeep Bahga, University Press
2. Internet of Things with Raspberry Pi and Arduino. Boca Raton, Singh R., Gehlot A., Gupta L., Singh B., Swain M., CRC Press, 2020

REFERENCES:

1. Internet of Things for Architects: Architecting IoT Solutions by Implementing Sensors, Communication Infrastructure, Edge Computing, Analytics, And Security, Perry Lea, Packt Publishing Ltd., 2018
2. The Internet of Things: Enabling Technologies, Platforms, and Use Cases, Pethuru Raj and Anupama C. Raman, CRC Press
3. Getting Started with Arduino, Massimo Banzi, 1st Edition, O'Reilly Media, 2009
4. Exploring Raspberry Pi: Interfacing to the Real World with Embedded Linux, Derek Molloy, Wiley

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS2PH102) APPLIED PHYSICS LABORATORY

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE OBJECTIVES:

- To understand the working principle of lasers and optical fibers
- To analyze the characteristics of semiconductor devices and resonance phenomena
- To measure the time constant of RC circuit and dielectric constant of material
- To study the behavior of magnetic materials and understand least square method
- To compare the experimental results with the classroom learning

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Demonstrate the total internal reflection in optical fiber using lasers

CO-2: Realize importance of optoelectronics and resonance in daily life

CO-3: Illustrate discharging of a capacitor and polarizability of dielectric material

CO-4: Identify the importance of least square fitting and applications of magnetic materials

CO-5: Correlate the experimental results with the classroom learning

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	1	-	-	1	1	-	2	1	-	2	-	-	-
CO-2	3	2	2	1	-	1	1	-	2	1	-	2	-	-	-
CO-3	3	2	2	-	-	1	1	-	2	1	-	2	-	-	-
CO-4	3	2	1	1	-	1	1	-	2	1	-	2	-	-	-
CO-5	3	2	1	-	-	1	1	1	2	1	-	2	-	-	-

LIST OF EXPERIMENTS:

1. Torsional pendulum: understanding the method of least squares
2. Determination of acceptance angle and numerical aperture of an optical fiber
3. Determination of wavelength of given LASER using grating
4. Determine the width of given wire- using LASER
5. Determination of energy gap of a semiconductor
6. V-I characteristics of light emitting diode (LED)
7. V-I Characteristics of solar cell
8. Measurement of dielectric constant
9. Study the B-H curve of magnetic material
10. Determination of time constant of RC circuit
11. Melde's Experiment
12. AC frequency sonometer

TEXT BOOKS:

1. Applied Physics Laboratory Manual/Observation, Physics Faculty of VNRVJIE
2. A textbook of Practical Physics, S. Balasubramanian, M. N. Srinivasan, S. Chand Publishers, 2017

ONLINE RESOURCES:

1. <https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1>
2. <https://vlab.amrita.edu/index.php?sub=1&brch=280&sim=1518&cnt=1>

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22HS2EN101) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE OBJECTIVES:

- To train students to use neutral accent through phonetic sounds, symbols, stress and intonation
- To provide practice in vocabulary usage & grammatical construction
- To provide ample practice in LSRW skills and train the students in oral presentations, public speaking, role play, and situational dialogue
- To provide practice in defining technical terms and describing processes
- To equip students with excellent writing skills and information transfer skills

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Speak fluently with a neutral accent

CO-2: Use contextually apt vocabulary and sentence structures

CO-3: Make Presentations with great confidence

CO-4: Define technical terms and describe processes

CO-5: Write accurately, coherently, and lucidly

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	-	-	-	-	-	-	-	-	2	3	1	1	-	-
CO-2	1	1	1	1	3	1	1	1	2	3	1	1	-	-
CO-3	1	1	-	-	-	2	2	-	3	3	3	1	-	-
CO-4	2	2	2	2	-	2	2	-	2	3	1	1	-	-
CO-5	1	1	1	1	-	2	1	-	2	3	2	1	-	-

LIST OF EXERCISES:

1. Self-Introduction
2. Phonetics- Identifying sounds-Word stress- Intonation
3. Reading Comprehension – Reading for Gist & for Specific Details; Making inferences
4. Story Telling
5. Making Short Oral Presentations
6. Listening Comprehension- Listening for Global meaning & specific details; note taking
7. Learning vocabulary from context
8. Book Review
9. Writing Resume and CV
10. Information Transfer

11. Social Media Skills – Writing a Blog
12. Defining Technical Terms and Describing Processes

TEXT BOOKS:

1. Technical Communication, Rebecca E. Burnett, 6th Edition, Cengage Learning

REFERENCES:

1. Practical English Usage, Swan, Michael, Oxford University Press, 1995
2. Remedial English Grammar, F. T. Wood, Macmillan, 2007
3. Exercises in Spoken English, Parts I-III, CIEFL, Hyderabad, Oxford University Press
4. Fowler's Modern English Usage-Revised, R. W. Burchfield
5. Technical Communication, Raman, Meenakshi and Sharma, Sangeeta, Oxford University Press, 2005

ONLINE RESOURCES:

1. <https://caw.ceu.edu/academic-skills>
2. <https://www.biz-e-training.com/resources-for-learners/academic-writing-online-resources/>

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES2CS101) PROGRAMMING FOR PROBLEM SOLVING LABORATORY

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE OBJECTIVES:

- To gain a working knowledge of C programming to write modular, efficient and readable C programs by Identifying the structural elements and layout of C source code
- To declare and manipulate single and multi-dimensional arrays of the C data types and derived data types like structures, unions
- To use functions from the portable C library and to describe the techniques for creating program modules using functions and recursive functions
- To manipulate character strings in C programs. Utilize pointers to efficiently solve problems

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

CO-1: Use various data types for a specified problem

CO-2: Design, implement, debug a given problem using appropriate language constructs

CO-3: Execute the programs using derived and user defined data types

CO-4: Implement programs using modular approach and file I/O

CO-5: Solve a given problem using C language

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	2	2	3	2	1	-	-	-	2	2	-	2	-	-
CO-2	2	2	3	2	1	1	-	-	2	2	-	2	-	-
CO-3	1	2	3	1	1	1	-	-	2	2	2	2	-	-
CO-4	1	2	3	1	1	1	-	-	2	2	2	2	-	-
CO-5	2	2	2	2	1	1	-	-	2	2	2	2	-	-

LIST OF PROGRAMS:

WEEK 1:

- Programs on input, output statements
- Programs on various operators
- Programs on expression evaluation

WEEK 2:

- Program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

- b. Programs on conditional statements- Simple if, if-else, Nested if-else, Else-if ladder, switch case

WEEK 3:

- a. Programs on simple loops- while, for, do. while
- b. Programs on Nested loops- while, for, do. while
- c. Programs to understand goto, break, continue

WEEK 4:

- a. Programs on 1-D arrays
- b. Programs on linear, binary searching
- c. Programs on bubble, selection and insertion sorting

WEEK 5:

- a. Programs on 1-D strings
- b. Programs using string handling functions

WEEK 6:

- a. Programs on 2-D arrays
- b. Programs on 2-D strings

WEEK 7:

- a. Programs on user defined functions
- b. Programs on passing arrays and strings to functions

WEEK 8: Internal Lab Exam -1

WEEK 9:

- a. Programs on recursion
- b. Programs on structures – simple structure, array of structures, array within structure, nested structure
- c. Programs on Unions

WEEK 10:

Programs on pointers to variables

- a. Programs on pointers to arrays(1-D, 2-D)

WEEK 11:

- a. Program to understand call by value and call by address
- b. Programs on pointers to strings
- c. Programs on pointers to structure
- d. Programs using malloc, calloc , realloc, free

WEEK 12:

- a. Programs on macros, file inclusion, enum , typedef
- b. Programs on sequential file accessing

WEEK 13:

- a. Programs on error handling functions in files
- b. Programs on Random file accessing

c. Programs on command line arguments

WEEK 14: Lab Internal Exam -2

TEXT BOOKS:

1. The C Programming Language, Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall of India
2. C Programming and Data Structures, B. A. Forouzan and R. F. Gilberg, 3rd Edition, Cengage Learning
3. C: The Complete Reference, Herbert Schildt, 4th Edition, McGraw Hill

REFERENCES:

1. Problem Solving and Program Design in C, Jeri R. Hanly and Elliot B. Koffman, 7th Edition, Pearson
2. Computer Fundamentals and C, E. Balagurusamy, 2nd Edition, McGraw-Hill
3. Let us C, Yashavant Kanetkar, 18th Edition, BPB
4. How to Solve it by Computer, R. G. Dromey, Pearson, 16th Impression
5. Programming in C, Stephen G. Kochan, 4th Edition, Pearson Education

ONLINE RESOURCES:

1. <https://nptel.ac.in/courses/106105171>
2. https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/307

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES2ME101) ENGINEERING WORKSHOP

TEACHING SCHEME		
L	T/P	C
1	2	2

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE OBJECTIVES:

- To know the different popular manufacturing process
- To gain a good basic working knowledge required for the production of various engineering products
- To provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field
- To identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances

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

CO-1: Understand various types of manufacturing processes.

CO-2: Fabricate/make components from wood and steels through hands on experience.

CO-3: Understand different machining processes like turning, drilling, tapping, etc.

CO-4: Understand electrical and electronic components and their assembly.

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	2	2	2	2	2	1	2	1	3	2	1	2	3	2
CO-2	2	1	2	2	2	1	2	1	3	2	1	2	3	2
CO-3	2	2	2	2	2	1	2	1	3	2	1	2	3	2
CO-4	2	1	2	2	2	1	2	1	3	2	1	2	3	2

LECTURES & VIDEOS:

1. Manufacturing Methods - Casting, Forming, Machining, Joining, Advanced Manufacturing Methods
2. CNC Machining, Additive Manufacturing
3. Fitting Operations & Power Tools
4. Electrical & Electronics
5. Carpentry
6. Plastic Moulding, Glass Cutting
7. Welding (Arc Welding & Gas Welding), Brazing
8. Power Tools
9. Printed Circuit Boards

LIST OF EXPERIMENTS:

- I. Carpentry**
 - i. Cross lap joint
 - ii. Mortise & tenon joint

- II. Fitting**
 - i. Square fitting
 - ii. L-fitting

- III. Arc Welding**
 - I. Butt joint
 - II. Lap joint

- IV. Smithy**
 - i. Rectangular Tray (Tin smithy)
 - ii. U-hook (Black smithy)

- V. Electrical & Electronics**
 - i. Single lamp connection & Stair case connection
 - ii. Soldering and de-soldering on a PCB.

- VI. Machine Shop**
 - i. Step turning on lathe
 - ii. Drilling & tapping

TEXT BOOKS:

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech, 2015
2. Elements of Workshop Technology Vol.1 & 2, S. K. Hajra Choudhury, A. K. Hajra Choudhury and Nirjhar Roy, 13th Edition, Media Promoters & Publishers Pvt. Ltd., 2010
3. Printed Circuit Boards - Design, Fabrication, Assembly and Testing, R. S. Khandpur, Tata McGraw-Hill Education, 2005

REFERENCES:

1. Manufacturing Engineering and Technology, Serope Kalpakjian, Steven R. Schmid, 4th Edition, Pearson Education India Edition, 2002
2. Manufacturing Technology-I, S. Gowri, P. Hariharan and A. Suresh Babu, Pearson Education, 2008
3. Processes and Materials of Manufacture, Roy A. Lindberg, 4th Edition, Prentice Hall India, 1998
4. Manufacturing Technology Vol-1 & 2, P. N. Rao, Tata McGraw-Hill House, 2017

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22SD5E1101) ELEMENTS OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME						
D-D	PE	LR	CP	VV	SEE	TOTAL
10	10	10	10	10	-	50

COURSE OBJECTIVES:

- To identify various electronic components and modules
- To identify various sensors and transducers
- To know about various software packages and tools used in electronics and instrumentation engineering

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Establish knowledge of electronics components and modules

CO-2: Illustrate various sensors and actuators used for different applications

CO-3: Impart knowledge on industrial, biomedical and analytical instruments

CO-4: To impart knowledge on various hardware and software modules available for instrumentation.

COURSE ARTICULATION MATRIX:

(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial)

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	1	-	-	-	-	-	-	1	1	1	-	1	1	1	1
CO-2	1	-	1	-	-	1	-	1	1	1	-	1	1	1	1
CO-3	1	-	-	-	1	-	-	1	1	1	-	1	1	1	1
CO-4	1	-	-	-	1	1	-	1	1	1	-	1	1	1	1

LIST OF EXPERIMENTS:

1. Identify the different passive and active components and Color code of resistors, finding the types and values of capacitors
2. Measure the voltage and current using voltmeter and ammeter and Multimeter and study the other measurements using Multimeter
3. Study the CRO and measure the frequency and phase of given signal. Draw the various Lissajous figures using CRO
4. Study the function generator for various signal generations. Operate Regulated power supply for different supply voltages
5. Study the various gates module and write down the truth table of them. Identify various Digital and Analog ICs
6. Study various processors boards like Intel, ARM, Arduino, Raspberry Pi.
7. Identify different Sensors and Signal Conditioning modules.
8. Study of Industrial Instrumentation and process control stations.
9. Learn how to use analytical and biomedical Instruments.
10. Know the available Software's for Process control applications (Simatics).
11. Know the available Software's for simulation of circuits and PCB (Multisim, Ultiboard).

12. Know the fundamental tool kits of LabVIEW and MATLAB.
13. Learn how to use MASM and KEIL for Robotics applications.
14. Learn how to use python programming for IoT applications.