



(An Autonomous Institution - AFFILIATED TO ANNA UNIVERSITY, CHENNAI)

S.P.G.Chidambara Nadar - C.Nagammal Campus

S.P.G.C. Nagar, K.Vellakulam – 625 701 (Near VIRUDHUNAGAR).

B.E. / B.TECH. DEGREE PROGRAMMES

FIRST YEAR COURSES

(Regulations 2021 – Autonomous)

SEMESTER I

Sl.No	Course Code	Course Name	Credits			
			L	T	P	C
Theory						
1	SH2101	Technical English	3	0	0	3
2	MA2101	Matrices and Differential Calculus	3	1	0	4
3	PH2101	Engineering Physics	3	0	0	3
4	GE2101	Principles of Engineering	3	0	0	3
5	EM2101	Coding Techniques - I	3	0	0	3
6	CY2101	Engineering Chemistry	3	0	0	3
Practical						
7	MA2102	Mathematics Laboratory	0	0	2	1
8	PH2102	Physics Laboratory	0	0	3	1
9	EM2102	Coding Techniques - I Laboratory	0	0	3	1
Total Credits			18	1	8	22

Course Code	Course Name	L	T	P	C
SH2101	Technical English	3	0	0	3

Category: Foundation Courses (Humanities and Social Sciences including Management Courses)

a. Preamble

This course promotes students to develop vocabulary, reading, writing, listening, speaking skills in English and also induces ability to communicate effectively in oral and in technical writing with the help of vocabulary and grammar.

b. Course Outcomes

After successful completion of the course, the students will be able to

CO.No.	Course Outcome	Knowledge Level
CO1	Write grammatically correct sentences with appropriate words and texts	K3
CO2	Develop skills for effective speaking in real contexts	K3
CO3	Write formal and informal letters, e-mails and short narrations	K3
CO4	Gather information through listening and reading comprehension	K3
CO5	Concentrate on listening lengthy talks and participate in conversations	K3

c. Course Syllabus

Total: 45 Periods

FOCUS ON LANGUAGE – VOCABULARY 9

General Vocabulary–Changing words from one form to another form–Nouns–Compound Nouns–Adjectives–Comparative adjectives–Adverbs–Adverb forms–Prefixes and Suffixes – Spelling and Punctuation – British and American vocabulary – **Technical Vocabulary**- Synonyms – Antonyms.

GRAMMAR 9

Subject - Verb Agreement – Tenses – Present Tense – Past Tense – Future Tense – Active and Passive Voice – Gerunds and Infinitives – Cause and Effect Expressions – ‘If’ conditionals – Correction of Errors.

READING 9

Skimming for gist–Scanning for specific information–Inference–Reading in Context–Technical versus Social Communication – Note Making – Hints Development-Graphical Representation: Table, Pie chart, Bar Chart and Flow Chart – Sequencing of Sentences.

WRITING 9

Sentence Structure - Paragraph Writing – Dialogue Writing – Descriptive writing, Instructions writing, Lab manual preparation, Formal Letter Writing – Letters to the Editor– e- mails – Blogs – Tweets – SMS.

LISTENING AND SPEAKING 9

Listening and transfer of information – Listening and Note-taking — Conversation Techniques, Description of a process\product and Oral Reports – Speaking about the functions of a machine.

d. Activities

Steps to be taken to improve:

- Soft Skills
- Presentation Skills
- Listening and Reading comprehension
- Interview skills
- Group discussion on technical topics
- Understanding from reading articles in magazines and newspapers
- Informal Conversation Skill through effective participation
- Writing of short technical essays and letters

e. Learning Resources

i. TEXT BOOKS

1. Sam Praveen.D& K.N. Shoba, 2020, A Course in Technical English, CUP, Chennai.
2. Raman & Sharma, 2018, Technical Communication, OUP, New Delhi.

ii. REFERENCES

1. Richard Rossner, 2017, *Language Teaching Competences*, OUP.
2. Shoba and Praveen Sam 2018, *Technical English-Workbook*, Cambridge University Press: New Delhi.
3. Sudharshana, NP &Shavitha, C 2018, *English for Engineers*, Cambridge University Press, Chennai.
4. Sharon J. Gerson & Steven M. Gerson, 2014, *Technical Communication: Process and Product*, Pearson Education limited, Essex Eighth Edition
5. Gerald J. Alred, Charles T. Brusaw, & Walter E. Oliu. 2019, *Handbook of Technical Writing*, Macmillan Learning: Tenth Edition.

WEB SOURCES

1. https://owl.purdue.edu/owl/subject_specific_writing/professional_technical_writing/index.html
2. <https://hbr.org/topic/communication>

Course Code	Course Name	L	T	P	C
MA2101	Matrices and Differential Calculus	3	1	0	4

Category: Foundation Courses (Basic Science Courses)

a. Preamble

This course introduces basic concepts and techniques of multivariable calculus, matrices, sequences and series and ordinary differential equations and highlights their applications in various field of engineering such as Design Engineering, Electric Circuit Theory, Graph Theory, Cryptography etc.

b. Course Outcomes

After successful completion of the course, the students will be able to

CO. No.	Course Outcome	Knowledge Level
CO1	Represent the system of equations as matrices, Solve simultaneous equations, Derive Eigen Values and Eigen Vectors.	K3
CO2	Analyze and test the convergence of Infinite Series.	K3
CO3	Compute the partial and total derivatives, Jacobian and Optimality of functions of several variables.	K3
CO4	Apply the concepts of Differential Calculus for solving engineering problems.	K3
CO5	Solve linear differential equations using different methods.	K3

c. Course Syllabus

Total: 60 Periods

MATRICES 12

Solution of simultaneous linear equations – Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values – Problem solving using Cayley-Hamilton theorem – Similarity transformation – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Orthogonal reduction to its canonical form.

INFINITE SERIES 12

Sequences – Convergence of series – Divergence - General properties – Series of positive terms – Tests of convergence (Comparison test, Integral test, Comparison of ratios and D'Alembert's Ratio test) and Divergence – Alternating series – Leibnitz test – Series of positive and negative terms – Absolute and conditional convergence – PowerSeries – Convergence of exponential, logarithmic and Binomial Series.

DIFFERENTIAL CALCULUS 12

Curvature – Cartesian and Parametric Co-ordinates – Centre and Radius of curvature – Circle of curvature – Envelopes – Evolutes.

FUNCTIONS OF SEVERAL VARIABLES 12

Partial derivatives – Euler's theorem for homogeneous functions – Total derivative – Differentiation of implicit functions – Jacobians – Maxima / Minima for functions of two variables – Method of Lagrange's multipliers – Taylor's expansion.

ORDINARY DIFFERENTIAL EQUATIONS 12

Solution of second and higher order linear ODE with constant coefficients – Simultaneous first order linear equations with constant coefficients – Linear equations of second order with variable coefficients – Cauchy's and Legendre's linear equations – Method of variation of parameter – Simple Engineering Applications.

d. Activities: Students shall be exposed to MATLAB programming to solve simple equations and solving differential equations.

e. Learning Resources

i. TEXT BOOKS

1. Grewal, B.S, “Higher Engineering Mathematics”, Forty Third eighth Edition, Khanna Publishers, New Delhi, 2014.
2. Kanti B. Dutta., Mathematical Methods of Science and Engineering – Aided with MATLAB, Cengage Learning, New Delhi, 2013.

ii. REFERENCE BOOKS

1. Venkataraman. M. K., “Engineering Mathematics”, Volume I and II Revised enlarged Fourth Edition, The National Publishing Company, Chennai, 2004.
2. Kreyszig E, Advanced Engineering Mathematics, 12th edition, John Wiley and Sons, New York, 2010.
3. Glyn James., “Advanced Modern Engineering Mathematics”, Third Edition, Pearson Education Ltd, New Delhi, 2004.
4. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.
5. Veerarajan. T., “Engineering Mathematics (for first year)”, Fourth Edition, Tata McGraw– Hill Publishing Company Limited, New Delhi, 2005.
6. Bali N. P and Manish Goyal, “Text book of Engineering Mathematics”, Thirddition, Laxmi Publications (P) Ltd., 2008.

Course Code	Course Name	L	T	P	C
PH2101	Engineering Physics	3	0	0	3

Category: Foundation Courses (Basic Science Courses)

a. Preamble

This course introduces basic concepts and fundamental knowledge in Physics and highlight their applications in various streams of Engineering and Technology.

b. Course Outcomes

After successful completion of the course, the students will be able to

CO No.	Course Outcome	Knowledge level
CO1	Utilize the properties of ultrasonic waves for applying them in various applications.	K3
CO2	Demonstrate the properties of laser and utilize in optical fiber.	K3
CO3	Develop the idea of heat conduction in different media and apply it in the real applications of heat transfer.	K3
CO4	Utilize the quantum concepts in materials.	K3
CO5	Identify the various types of atomic arrangements and imperfections in crystal.	K2

c. Course Syllabus

Total: 45 Periods

ULTRASONICS 9

Generation of Ultrasonic Waves –Magnetostriction Generator – Piezoelectric Generator - Detection of Ultrasonic Waves - Properties – Cavitation - Velocity Measurement – Acoustic Grating - Industrial Applications: SONAR - Non Destructive Testing - A,B and C – Scan Displays.

LASER AND FIBER OPTICS 9

Lasers: Population of Energy Levels, Einstein's A and B Coefficients– Semiconductor Lasers: Homojunction and heterojunction.

Fiber Optics: Principle, Numerical Aperture and Acceptance Angle - Types of Optical Fibre (Material, Refractive index Profile and Number of Modes) – Sensors: Pressure and Displacement, Optical Fiber Communication System, Endoscope.

THERMAL PHYSICS 9

Thermal Conductivity – Forbe's and Lee's Disc Method- Conduction through Compound Media (Series and Parallel) - Thermal Expansion of Solids and Liquids – Thermal Insulation- Applications: Heat Exchangers, Refrigerators, Ovens and Solar Water Heater.

QUANTUM PHYSICS 9

Postulates of Quantum Mechanics - Black body Radiation – Planck's theory (Derivation) - Wave Particle Duality – Electron Diffraction – Degenerate and Non-degenerate States –Physical Significance of Wave function- Schrödinger's Wave Equation – Time Independent and Time Dependent Wave Equations – Particle in a One-Dimensional Box - Scanning Tunneling Microscope.

CRYSTAL PHYSICS 9

Crystalline and Non-Crystalline Solids - Unit Cell, Crystal Systems, Bravais Lattices, Directions and Planes in a Crystal, Miller Indices – Interplanar Distances - Coordination

Number and Packing Factor for SC, BCC, FCC and HCP - Crystal Defects: Point Defect and Line Defect - Role of Imperfections in Plastic Deformation - Bridgman and Czocharlski Crystal Growth Techniques.

d. Activities: Following activities shall be implemented to enhance the knowledge of Physics in various streams of Engineering

- Model making
- Concept mapping
- Presentation
- Problem Solving

e. Learning Resources

i. TEXT BOOKS

1. Bhattacharya.D.K, Poonam Tandon, “Engineering Physics”, Oxford University Press, First Edition, 2015.
2. Bhattacharya.D.K, Bhaskaran.A, “Engineering Physics”, Oxford University Press, First Edition, 2010.

ii. REFERENCE BOOKS

1. Halliday.D, Resnick.R, Walker.J, “Principles of Physics”, Wiley, 2015.
2. Serway.R.A, Jewett.J.W, “Physics for Scientists and Engineers”, Cengage Learning, 2010.
3. Tipler.P.A, Mosca.G, “Physics for Scientists and Engineers”, USA, 2007.
4. Mathews.P.M, Venkatesan , “A Text book of Quantum Mechanics”, Tata Mc Graw hill, 2010.
5. William T.Silfvast, “Laser Fundamentals”, Second Edition, Cambridge University Press, New York, 2004.

6. Shankar.R, "Fundamentals of Physics", Yale University Press, New Haven and London, 2014.

Course Code	Course Name	L	T	P	C
GE2101	Principles of Engineering	3	0	0	3

Category: Foundation Courses (Engineering Science Course)

a. Preamble

This course enables the students to understand the importance of engineering discipline and real-time challenges in problem solving. This course focuses on introducing basic principles, physical laws and mathematical foundations that every engineer should know for the analysis of any engineering problem. The course further facilitates to learn the principles of computational engineering tools.

b. Course Outcomes

After successful completion of the course, the students will be able

CO. No.	Course Outcome	Knowledge Level
CO1	To demonstrate the qualities of professional engineer	K2
CO2	To apply the fundamental dimensions and units in engineering applications	K3
CO3	To utilize the mathematical concepts in engineering	K3
CO4	To explain the material properties for engineering applications.	K2
CO5	To utilize the concept of computational tools	K3

c. Course Syllabus

Total: 45 Periods

IMPORTANCE OF ENGINEERING 7

Engineering Profession – Realizing the Importance of Engineering – Common Traits and Habits of Engineers – Expected Quality of Engineering Graduates – Brief about various Engineering Disciplines - Expected Educational Outcomes – Class Room Discipline – Studying Practice – Engineering Design Process – Team Work.

ENGINEERING FUNDAMENTALS 9

Fundamental Dimension and Units – Physical Quantity, SI Units and Symbol – Derived Units – SI Units in Everyday Life – System of Units and Conversion Factors – Unit Conversion – Dimensional Homogeneity – Numerical versus Symbolic Solution – Physical Laws and Observations – Length, Time, Mass, Force and related Parameters – Newton’s Laws of Mechanics – Temperature related Parameters.

MATHEMATICS IN ENGINEERING 9

Linear Models – Linear Equations and Slopes – Linear Interpolation – System of Linear Equations – Nonlinear Models – Polynomial Functions – Stopping Sight Distance – Deflection of a Beam – Exponential and Logarithmic Models – Cooling of Piece of Metal – Decibel Scale – Applications of System of Linear Equations – Basic Integral Calculus.

ENGINEERING MATERIALS 7

Phases of Matter – Physical, Mechanical and Electrical Properties of Materials – Solid Materials: Light Weight Metals – Copper and its Alloys – Iron and Steel – Concrete – Wood – Plastics – Silicon – Glass – Composites – Fluid Materials: Air and Water.

Electronic Spreadsheets

Microsoft Excel – Basic Ideas – Cells and their Address – Creating Formulas in Excel– Excel Functions – Plotting – Matrix Computation– Curve Fitting with Excel.

MATLAB

Basic Ideas – MATLAB Built-in Functions – Importing Data Files into MATLAB – Plotting– Curve Fitting with MATLAB – Symbolic Mathematics with MATLAB

d. Activities: Students shall be exposed to the use of certain concepts of physics, mathematics and selection of materials for engineering design and process applications and to solve simple engineering problems using Excel and MATLAB.

e. Learning Resources**i. TEXT BOOK**

1. Saeed Moaveni, “Engineering Fundamentals: An Introduction to Engineering”, Fourth Edition, Cengage Learning, 2011.

iii. REFERENCE BOOKS

1. Kirk D.Hagen, “Introduction to Engineering Analysis”, Fifth Edition, Pearson Education, 2014.
2. Elizabeth A. Stephan, William J. Park, Benjamin L.Sill, David R. Bowman, Matthew W. Ohland, “Thinking like an Engineer: An Active Learning Approach”, Second Edition, Pearson Education, 2012.
3. Ronald W. Larsen, “Engineering with Excel”, Pearson Education, 2018.
4. Delores M. Etter, “Introduction to MATLAB”, Pearson Education, 2018.

Course Code	Course Name	L	T	P	C
EM2101	Coding Techniques – I	3	0	0	3

Category: Employability Enhancement Courses (Programming Courses)

a. Preamble

This course enables the students to understand the importance of coding to solve the real-time challenges by computer. Coding emphasizes the need to enrich the logical skills of the students to instruct the computer for solving the problems. This course focuses on problem solving using structured programming language.

b. Course Outcomes

After successful completion of the course, the students will be able to

CO.No.	Course Outcome	Knowledge Level
CO1	Understand the importance of programming, Analyze any given problem and Develop algorithm to solve it	K3
CO2	Understanding to applying basic concepts of C Programming	K4
CO3	Insightful analysis of arrays and pointers	K3
CO4	Understanding to applying collective data types and file handling	K4
CO5	Developing simple applications using advanced concepts	K6

c. Course Syllabus

Total: 45 Periods

PROBLEM SOLVING FUNDAMENTALS 9

Programs and Algorithms – Problem Definition – Flow Chart – Fundamental Algorithms (Exchange of values of two variables, Counting, Summation of a set of numbers, Factorial Computation, Sine Function Computation, Generation of Fibonacci Sequence, Reversing the Digits of an Integer, Base Conversion): Problem – Algorithm Development – Algorithm Description – Design Consideration – Applications.

C PROGRAMMING FUNDAMENTALS 9

Types and Values – Pre-processors – Declaration and Prototypes - Constants and Variables – Pre-defined Libraries - Storage Classes – Expressions – Operator Precedence and Associativity - Input and Output Statements – Decision Making and Looping Constructs – Type Casting – Concept of Functions – Parameter Passing mechanism.

ARRAYS AND POINTERS 9

Representation of Single and Multidimensional Arrays – Concept of Pointers – Pointer Arithmetic – Strings – Call by Reference – Dynamic Memory Allocation – Function Pointers.

COLLECTIVE DATA TYPES AND FILE HANDLING 9

Structure and Union – Enumeration – Type Defining Structures – Structures and Pointers - Self Referential Structure - Sequential and Random Access File Handling – Opening and Closing of a File - Input and Output Operations on a File – Handling of Binary files.

Bit Fields – Type def – Macro Functions - User Defined Libraries – Variable Arguments – Command Line Arguments – Recursive Functions – Modular Programming – Package Development.

d. Activities: Students shall be exposed to UNIX C or TURBO C Programming to solve simple problems and able to develop simple C Applications.

e. Learning Resources

i. TEXT BOOKS

1. Dromey R.G, “How to Solve it by Computer”, Prentice Hall, 1982.
2. Brian W. Kernighan and Dennis M. Ritchie, “The C Programming Language” Second Edition, Pearson Education, 2015.

ii. REFERENCE BOOKS

1. Paul Deitel and Harvey Deitel, “C How to Program”, Eighth Edition, Pearson Education, 2016.
2. Byron S. Gottfried, “Theory and Problems of Programming with C”, Schaum’s Outlines, Second Edition, McGraw-Hill, 1996.
3. Yashavant Kanetkar, “Let Us C”, Sixteenth Edition, BPB Publications, 2018.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein., “Introduction to Algorithms”, Third Edition, The MIT Press, 2009.

Course Code	Course Name	L	T	P	C
CY2101	Engineering Chemistry	3	0	0	3

Category: Foundation Courses (Basic science courses)

a. Preamble

This course introduces the basics of chemical principles and highlights their applications in various fields of engineering and technology.

b. Course Outcomes

After successful completion of the course, the students will be able to

CO.No.	Course Outcome	Knowledge Level
CO1	Recognize the methods to analyse and purify the water samples as per industry requirements	K3
CO2	Apply basic concepts of electrochemistry in energy storage devices	K3
CO3	Identify suitable corrosion control methods for real time problems	K3
CO4	Illustrate the structure and properties of polymeric molecules	K3
CO5	Select necessary fuels for industrial applications based on their efficiency	K3

c. Course Syllabus

Total: 45 periods

UNIT I WATER AND ITS TREATMENT 9

Water - Hardness of water - Units of hardness - Estimation of hardness by EDTA method – Alkalinity - types. Boiler feed water – Requirement – Boiler troubles (scale & sludge, caustic embrittlement, boiler corrosion and priming & foaming) - Internal conditioning (phosphate, calgon and carbonate treatment) - External conditioning (zeolite and ion exchange demineralization) - Municipal water treatment process (screening, sedimentation and coagulation, ozonolysis, UV treatment, chlorination) - Desalination (reverse osmosis).

UNIT II ELECTROCHEMISTRY 9

Introduction - Electrochemical cells - Reversible and irreversible cells, Concentration Cells – EMF - Electrode potential, Single Electrode Potential - Nernst Equation (Problems) - Reference electrodes (Calomel electrode) - Glass electrode - EMF Series (Significance and applications) - Applications of EMF measurements (Potentiometric Titrations). Storage Devices: Batteries – Types – Examples - alkaline, lead-acid and lithium batteries - construction, working and commercial applications - Fuel Cells - H₂-O₂ fuel cell.

UNIT III CORROSION AND CORROSION CONTROL 9

Chemical corrosion - Pilling-Bedworth rule - Electrochemical corrosion (Galvanic corrosion, Differential aeration corrosion) - Factors influencing corrosion - Corrosion control (Material selection, design, Sacrificial anode and Impressed cathodic current methods) - Corrosion inhibitors - Protective coatings - Metallic coatings- Electroplating (Au) - Electroless (Cu) plating on printed circuit boards.

UNIT IV POLYMER AND COMPOSITES 9

Introduction – Functionality - Degree of polymerization - Classification of polymers (thermoplastic and thermosetting) - Types and mechanism of polymerization - addition (free radical), condensation and copolymerization - Properties of polymers

(T_g, tacticity, molecular weight-weight average, number average and polydispersity index) - Techniques of polymerization (Bulk, emulsion, solution and suspension) - Conducting polymers (polyaniline) – applications – Composites - FRP and its applications.

UNIT V FUELS

9

Fossil Fuels - classification of fuels – Solid fuels - coal - Analysis of coal (proximate and ultimate) - Carbonization - Manufacture of metallurgical coke (Otto Hoffmann method) - Liquid Fuels - Petroleum processing and fractions - Manufacture of synthetic petrol (Bergius process) - Knocking, Octane number, Cetane number – Gaseous fuels (natural gas, compressed natural gas (CNG), liquefied petroleum gases (LPG), water gas, producer gas) - Biofuels (Biodiesel, Biogas) - Power alcohol.

d. Activities

Activities to improve the conceptual learning:

- Minute paper tests
- Objective Quizzes
- Model/Chart work
- Group discussion / Seminars

e. Learning Resources

i) TEXT BOOKS:

1. Jain, P.C & Monica Jain, “Engineering Chemistry”, 16thed, DhanpatRai Publishing Company (P) Ltd, New Delhi, 2015.
2. Wiley, “Engineering Chemistry”, Second Edition, Wiley India Pvt. Ltd, New Delhi, 2018.

ii) REFERENCE BOOKS:

1. Sivasankar, B, “Engineering Chemistry”, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2010.

2. Dara, S. S &Umare, S. S, “A text book of Engineering Chemistry”, Second Edition, S. Chand & Company Ltd, New Delhi, 2015.
3. Friedrich Emich, “*Engineering Chemistry*”, Scientific International Ltd, 2017.
4. Gowariker, V. R, Viswanathan, N. V & Jayadev Sreedhar, “Polymer Science”, 6thed, New Age International Publishers, 2019.

Course Code	Course Name	L	T	P	C
MA2102	Mathematics Laboratory	0	0	2	1

Category: Foundation Course

a. Preamble

This course promotes students to develop problem solving skills in Engineering and become proficient in Microsoft Excel and MATLAB software tool to solve simple Engineering problems.

b. Course Outcomes

After successful completion of the course, the students will be able to

CONo.	Course Outcome	Knowledge Level
CO1	Solve simple exercises using built-in functions in MS-Excel	K3
CO2	Analyze the numerical data in MS-Excel and interpret using plots	K3
CO3	Apply basic commands in MATLAB to solve matrices	K3
CO4	Demonstrate the usage of polynomials and symbolic math tool in MATLAB	K3
CO5	Interpret numerical data in MATLAB using 2D & 3D plot functions	K3

c. Course Syllabus

Total: 20 Periods

MATHEMATICS LABORATORY

Electronic Spreadsheets

(6 Periods)

- 1) Introduction to Microsoft Excel environment and menu options
- 2) Usage of Built-in functions in Microsoft Excel
- 3) Data analysis and Interpretation in Microsoft Excel

MATLAB (14 Periods)

- 4) Introduction to MATLAB computing environment and basic commands in MATLAB
- 5) Files and Operators in MATLAB
- 6) Matrices in MATLAB
- 7) Polynomials in MATLAB and Curve fitting
- 8) Solving equations in MATLAB-Symbolic Math tool
- 9) Differentiation and Integration in MATLAB
- 10) Graphics in MATLAB

d. Activities

Students shall be given exposure in Microsoft Excel and MATLAB computing environment to solve simple numerical problems.

e. Learning Resources

i. TEXT BOOK

1. Gilat, A., 2004. *MATLAB: An introduction with Applications*. John Wiley & Sons.

ii. REFERENCE BOOKS

1. Lopez, C.P., 2014. *MATLAB Differential and Integral Calculus*, 1st Edition, Springer Apress, 2014.

2. Palm, W.J., 2019. *Matlab for engineering applications*. Mcgraw-Hill College.

Course Code	Course Name	L	T	P	C
PH2102	Physics Laboratory	0	0	3	1

Category: Foundation Courses (Basic Science Courses)

a. Preamble

This course introduces different experiments to test basic understanding of Physics concepts applied in Ultrasonics, optics, elasticity, thermal and semiconductor.

a. Course Outcomes

After successful completion of the course, the students will be able to

CO.No.	Course Outcome	Knowledge level
CO1	Find the compressibility of the given liquid and velocity of the ultrasonic waves using Ultrasonic interferometer and bandgap of the semiconductor using Four probe setup.	K2
CO2	Compute the wavelength and size of the microscopic particles using laser.	K2
CO3	Illustrate the wavelength of different colors present in the polychromatic light source using grating and measure the thickness of the thin wire using Air wedge.	K2
CO4	Interpret the elastic property of the materials using Non-uniform bending method	K2
CO5	Calculate the thermal conductivity of a bad conductor using Lee's Disc and co-efficient of viscosity of a liquid using Poiseuille's flow.	K2

c. Course Syllabus

Total: 30 Periods

PHYSICS LABORATORY

1. Determination of velocity of sound and compressibility of liquid using Ultrasonic Interferometer.
2. Compute the wavelength, and particle size using Laser.
3. Find the Numerical Aperture and acceptance angle of an optical fiber.
4. Determination of wavelength of mercury spectrum using spectrometer grating.
5. Determination of dispersive power of a prism using spectrometer.
6. Analyze the band gap of a semiconductor using Four Probe setup.
7. Measure the thickness of a thin wire using Air wedge method.
8. Determination of Young's modulus by Non-Uniform bending method.
9. Calculate the thermal conductivity of a bad conductor using Lee's Disc method.
10. Find the co-efficient of viscosity of a liquid using Poiseuille's flow method.

d. Activities: Following activities shall be implemented to enhance the experimental knowledge of physics mechanism.

- Problem Solving
- Model making
- Project developing skill
- Instrumentation Analysis

e. Learning Resources

i. TEXT BOOKS

2. Dunlop.R.A, "Experimental Physics", Oxford Univ.press, 1988.

3. Shukla.R.K, Anchal Srivastava, “Practical Physics”, New age international (P) Ltd, 2011.

ii. REFERENCE BOOKS

1. Melissinos.A.C, Napolitano.J, “Experiments in Modern Physics”, Academic Press, 2003.
2. Avadhanulu.M.N, Dani.A.A, Pokley.P.M, “Experiments in Engineering Physics”, S. Chand & Company Ltd, 2002.
3. Dieter K. Schroder, “Semiconductor material and device characterization”, 3rd Edition, Wiley, 2008.
4. Physics Laboratory Manual, Department of Physics, Kamaraj College of Engineering and Technology, Madurai, 2021.

Course Code	Course Name	L	T	P	C
EM2102	Coding Techniques - I Laboratory	0	0	3	1

Category: Employability Enhancement Courses (Programming Courses)

a. Preamble

This course enables the students to develop simple applications in C using basic constructs, arrays, strings, pointers, functions, files, structures and packages

b. Course Outcomes

After successful completion of the course, the students will be able to

CO.No.	Course Outcome	Knowledge Level
CO1	Construct simple C programs using basic expressions and control structures	K3
CO2	Implement the concepts of functions in C	K3
CO3	Insightful analysis of arrays and pointers	K3
CO4	Build C programs to solve simple applications using structures and files	K3
CO5	Developing simple applications using packages	K3

c. Course Syllabus

Total: 45 Periods

1. Simple programs - to be familiar with syntax and structure of C programming
2. Programs using library functions and user-defined functions
3. Programs on conditional constructs (if, if-else-if ladder, switch)
4. Programs on looping constructs (while, do-while, for)
5. Programs using pointers with single and multidimensional arrays
 - i. Searching and Sorting
 - ii. Matrices manipulations
 - iii. String manipulations (palindrome, anagram, etc.,)
6. Programs using function definition , types of function calls and recursion
7. Programs on structures and union, passing entire structure to functions
8. Programs on files
 - i. Creating a text file to store records of N persons, retrieve and display the nth record from a file
 - ii. Copy the content of one file to another file using command line arguments
9. Simple applications using packages

d. Learning Resources

REFERENCE BOOKS

1. Yashavant Kanetkar, “Let Us C”, Sixteenth Edition, BPB Publications, 2018.
2. Brian W. Kernighan and Dennis M. Ritchie, “The C Programming Language” Second Edition, Pearson Education, 2015.
3. Paul Deitel and Harvey Deitel, “C How to Program”, Eighth Edition, Pearson Education, 2016.