MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

B. Tech I Year - II SEM (Common to all branches)

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TECHNICAL REPORT WRITING
(14ENG12T02)

Course Objectives:

The objective of the course is to understand the process of effective communication by enhancing the learner's reading and writing skills, which would then be used to write documents like technical reports and basic business communication.

Learning Outcomes:

Students will get the required training in documentation, presentation, discussions, facing interviews and develop communicative competence.

UNIT – I

Communication Process - Communication networks- formal and informal - Barriers to communication

UNIT –II

Reading **-** Surveying a text - reading for important points - making inferences - identifying text structure - reading graphics - comparing sources - critical reading - comparing viewpoints

UNIT-III

Writing - Effective Writing - Elements - Choice of Words and Phrases - Sentence Construction and Length - Technical Style of Writing -Business Style of Writing

UNIT – IV

Report Writing - Basic Business communication - Types of Reports

UNIT – V

Data Collection - Preparatory Steps - Sources of Data Methods of Data Collection - Mail Questionnaire - Report Structure - Data Analysis & Illustrations - Editing and proofreading - using technical tools for effective technical writing

PRESCRIBED TEXTBOOK

Sharma, R.C. and K. Mohan. 2011. *Business Correspondence and Report Writing*. Fourth Edition. New Delhi: Tata McGraw Hill and Post-lecture reading material

REFERENCES:

1. Raman, Meenakshi and Sangeeta Sharma, 2011. *Technical Communication: Principles and Practice*, 2/e. New Delhi: Oxford University Press.
2. Gerson, Sharon J and Steren M. Gerson. 2011.*Technical Writing : Process and Product.* Third Edition. India : Pearson Education Asia.
3. Mishra, Sunita and C. Muralikrishna. 2004. *Communication Skills for Engineers.* Delhi: Pearson Education Pte. Ltd.
4. Krishna Mohan and Meenakshi Raman. 2010. *Advanced Communicative English.* New Delhi : Tata McGraw Hill
5. Eric H. Glendinning, Beverly Holmström *Study Reading: A Course in Reading Skills for Academic Purpose* Cambridge University Press 2004
6. Liz Hamp-Lyons, Ben Heasley *Study Writing: A course in writing skills for academic purposes* Cambridge University Press 2006
7. Thomas N Huckin and Olsen *Technical Writing & Professional Communication* McGraw-Hill, 1991
8. William Strunk *Elements of Style* B N Publishing 2007 (E book available)
9. Dorothy E Zemach and Lisa A Rumisek *College Writing: From Paragraph to Essay* Macmillan 2003 (e-book available)

ONLINE SOURCES:

https://owl.english.purdue.edu/

http://www.uefap.com/

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B.Tech I year - II Sem (Common to all branches)   **L   T   C**
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LINEAR ALGEBRA & COMPLEX ANALYSIS
(14MAT12T02)

Course Objective:
The course is meant as an introduction to Linear Algebra and Theory of Complex variable functions and their applications. Vector spaces, basis and dimension of vector spaces. Linear transformations, range and kernel. Elementary row operations, System of linear equations. Eigenvalues and Eigenvectors. Complex functions and their analyticity. Elementary complex functions, complex integration. Taylor and Laurent series expansions. Calculus of residues and their applications.

Learning Outcomes:

Student should be able to:

❖ Find the power of a matrix using Eigen values and Eigen vectors
❖ Acquire sufficient information of analytic functions using CR-equations.
❖ Gain effective awareness of diverse types of functions in complex variables.
❖ Get knowledge on improper integrals.

UNIT-I (Linear Algebra): (Text book-1: 2.1-2.4, 4.1, 4.2, 4.4, 4.5 4.7)
Solutions of linear systems of equations, The inverse of a matrix, Vector spaces, subspaces, linear independence, basis and dimension. Rank and inverse of a matrix and applications. Co-ordinates and change of basis.

UNIT-II: (Linear Algebra): (Text book-1: 3.4, 5.2 and 5.3)
Definition and examples, kernel and range of linear transformation. The matrix of a linear transformation, Composite and invertible linear transformations, Eigenvalues and Eigenvectors.

UNIT-III: (Complex Analysis): (Text book-2: 12, 15-24, 26)
Complex numbers, Functions of a complex variables, Limit and continuity, Derivative, CR-equations, analytic functions.

UNIT-IV (Complex Analysis): (Text book-2: 29-36, 40, 44, 46, 50 and 52)

Exponential, trigonometric and hyperbolic functions, Logarithmic functions, Complex exponents, inverse functions, Contour integrals, anti-derivatives. Cauchy-Goursat theorem, Cauchy Integral formula, Morera's theorem (No proof).

UNIT-V (Complex Analysis): (Text book-2: 53, 60, and 62, 68-73, 78-80)
Fundamental theorem of algebra, Liouville's theorem, Laurent series (No proof), Residues, Cauchy Residue theorem, Improper real integrals.

Text Books:
1) Elementary linear Algebra by Stephen Andrilli and David Hecker, 4th Edition, Elsevier, 2010
2) Complex variables and applications by R. V Churchill and J. W. Brown, 8th edition, 2008, Mcgraw-Hill.

Reference Books:

1) Linear Algebra and its Applications by D.C. Lay, 3rd edition, Pearson Education, Inc.
2) Complex Variables with Applications by A. D. Wunsch, 3rd edition, Pearson Education, Inc.

Self Learning Resources (websites)

7. http://www.nptelvideos.com/mathematics/
8. https://www.khanacademy.org/math/
9. http://ocw.mit.edu/courses/mathematics/
10. http://online.stanford.edu/
11. http://www.mooc-list.com/
12. http://mits.ac.in/library.php

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B. Tech I Year II Sem(Common to all branches)

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ENGINEERING PHYSICS
(14PHY12T01)

Course Objectives:

There has been an exponential growth of knowledge in the recent past opening up new areas and challenges in the understanding of basic laws of nature. Physics is an exact science which provides the basic logic and structure to build an understanding of other branches of science and engineering.

The laws of physics play a key role in the development of science, engineering and technology. Sound knowledge of physical principles is of paramount importance in understanding new discoveries, recent trends and latest developments in the field of engineering. In this course, the subjects of Mechanics, oscillations, Waves and Optics are covered with the aim to prepare the students for advanced level courses. The objective of this course is to develop problem solving skills.

Learning Outcomes:

Upon successful completion of this course, Engineering Physics students should be able to:

- Describe and explain the fundamental physical principles and laws of Mechanics in Physics.
- Explain the role of the different realms of physics and their applications in both scientific and technological systems.
- Apply these principles, together with logical and mathematical reasoning, to situations of the physical world.
- Analyze a problem and develop the problem solving skills.
- Define and evaluate the fundamentals of mechanical testing of materials.

UNIT-1

VECTORS AND KINEMATICS AND NEWTONIAN MECHANICS [13]:

VECTORS AND KINEMATICS: Introduction, Vectors, Vector multiplication, Velocity and Acceleration, Motion in Plane, Polar Co-ordinates. {Text Book 1: Section 1.1-1.9}

NEWTONIAN MECHANICS: Introduction, Newton's Laws, Applications of Newton's laws and everyday forces of Physics (Self reading), Constraint equations and applications. {Text Book 1: Section 2.4 -2.5}

UNIT -II

MOMENTUM, WORK AND ENERGY [14]

MOMENTUM: Introduction, Dynamics of a system of particles, conservation of momentum, Impulse and restatement of the momentum relation, flow of mass, momentum transport. {Text Book 1: Section 3.1 -3.6}

WORK AND ENERGY: Introduction, Equations of motion in one-dimension and several dimensions, work energy theorem and applications, Potential energy, force, small oscillations in bound system, non-conservative forces, power, conservation laws and particle collisions. {Text Book 1: Section 4.1 -4.14}

UNIT-III
ANGULAR MOMENTUM & INTRODUCTION TO SHM [10]

Introduction, Angular momentum of particle, torque, fixed axis rotation. Dynamics of pure rotation about an axis, physical pendulum, motion involving both translation and rotation. {Text Book 1: Section 6.1 -6.7}

SIMPLE HARMONIC MOTION: Introduction, Displacement, velocity and acceleration in SHM. {Text Book 2: Chapter 1 & 2}

UNIT-IV
SIMPLE HARMONIC MOTION & TRANSVERSE WAVE MOTION [16]

SIMPLE HARMONIC MOTION: Damped Harmonic oscillator, Forced Harmonic oscillations, energy of a simple harmonic oscillator. Superposition of vibrations along same direction and in perpendicular directions, Lissajous figures {Text Book 2: Chapter 1 & 2}

TRANSVERSE WAVE MOTION: Introduction, Waves, solution of wave equation, reflection and transmission, standing waves, energy of vibrating string, standing wave ratio, wave group and group velocity. {Text Book 2: Chapter 7, pp: 201-213,230}

UNIT-V
PHYSICAL OPTICS [12]

Introduction - Interference, Newton's rings interference from two and more sources. Diffraction, intensity distribution, Fraunhoffer diffraction, transmission diffraction grating, resolving power. {Text Book 2: Chapter 8, pp:267-293}

Text Books:
1. D. Kleppner and R. Kolenkow, "An Introduction to Mechanics", Tata McGraw-Hill Edition, 2007.
2. French, Anthony P, "Vibrations and Waves", CBS, 1987.

Reference Books:
1. H. J. Pain, "The Physics of Vibrations & Waves" ,6th edition, John Wiley & Sons, Inc., 2005.
2. Halliday/Resnick/Krane," Physics Vol I & II", 5th Edition, John Wiley, 2003.
3. Berkeley Physics Course, Volume- I, Tata-McGraw Hill.

B. Tech I Year - II SEM (Common to all branches)

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COMPUTER PROGRAMMING
(14CSU12T01)

Course Objectives:
- ➢ To make the student understand problem solving techniques and their applications
- ➢ Students will be able to understand the syntax and semantics of C programming language
- ➢ Get acquaintances with data structures, searching and sorting techniques using C++ generic programming.

Learning Outcomes:
After Completion of this course students will be able to
- ➢ Student can effectively apply problem solving techniques in designing the solutions for a wide-range of problems
- ➢ Student can choose appropriate data structure and control structure depending on the problem to be solved
- ➢ Student can effectively use existing data structures and design new data structures appropriate to the problem to be solved
- ➢ Student can modularize the problem and also solution
- ➢ Student can use appropriate searching and sorting technique to suit the application

UNIT-I
C Programming: Structure of C Program, C Tokens: Variables, Data types, Constants, Identifiers, key words and Operators, Expressions. **Control Structures**: Conditional Statements (Simple if, if-else, Nested -if-else, Switch). Iterative Statements (for, While, Do-While), Jump Statements (break, Continue).

UNIT-II
Functions: Functions Introduction, User defined function, accessing a function, Function prototypes, storage classes **Arrays**: Defining an array, processing an array, one dimensional arrays, two dimensional arrays **Searching:** Linear and Binary. **Sorting:** Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, and Quick Sort. **Pointers**: Fundamentals, Pointer Declarations, Pointers and one dimensional array, Dynamic memory allocation.

UNIT-III
Strings: Declaring and Defining a string, Initialization of strings, , Strings Library functions
Structures: Defining a structure, Processing a structure **Files**: File Definition, Opening and closing a data file, Reading and Writing a data file, Files I/O Functions.

UNIT-IV
C++ Programming: Objects, Class Definition, Class Members, Access Control, Constructors and destructors, parameter passing methods, , dynamic memory allocation and deal location

(new and delete), Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control

UNIT-V

Data Structures: Classification of Data Structures. **Stacks and Queues**: Stacks, Stacks Operations, Stack Implementation by using arrays, Queues, Queues Implementation by using arrays, Types of Queues . **Linked Lists**: Single Linked lists, Operations

TEXT BOOKS:

1) The C Programming Language, Kernighan and Ritchie, 2 nd Edition, Prentice Hall, India, 1988.(UNITS-I, II, III)
2) C++: The Complete Reference. Third Edition. Herbert Schildt. Osborne McGraw-Hill. Berkeley New York St. Louis San Francisco. Auckland Bogotá Hamburg .(UNIT-IV)
3) Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition,   Universities Press Orient Longman Pvt. Ltd.(UNIT-V)

REFERENCES:

1) Programming in ANSI C, E. Balagurusamy, Sixth Edition, Tata Mc-Graw Hill Publishing Co.Ltd.-New Delhi
2) Problem Solving & Program Design in C, Hanly, Jeri R and Elliot. B Koffman, Pearson Education, 5 th edition, 20007.
3) Fundamentals of Data Structures in C++ by Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Universities Press, Second Edition.
4) Lipmen C++ Book

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B. Tech. – I Year II Sem (Common to all Branches)

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BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(14EEE12T01)

Course Objectives:
- To learn the basics of the Electrical and Electronics Engineering
- To learn basic Electric & Magnetic Circuits
- To learn basics of Semiconductor Devices and Digital Electronics

Learning Outcomes:
> Upon successful completion of the course, students will be able to:
- Analyze the D.C., A.C. electrical circuits and magnetic circuits
- Apply the electrical circuit concepts to practical circuits
- Analyze the magnetic circuits
- Analyze the components of transformers, rotating electrical machines and their operation
- Ability to identify electronic components and their use in practical circuits

UNIT 1: DC Circuit Analysis
Voltage and current sources, resistors and ohm's law, KCL, KVL, Independent and Dependent sources, Instantaneous power, Nodal and Mesh Analysis, Linearity and Superposition application in circuit analysis, Source transformation, Inductors and capacitors and their integral relationships, First order circuits.

UNIT 2: AC Circuit Analysis
A.C. Voltage & Current, Complex numbers, Frequency-domain analysis, Power and Power-factor, First order circuits, Poly-phase circuits.

UNIT 3: Magnetic Circuits and Transformers
Magnetic circuits and materials. Introduction, Ideal transformer, Equivalent circuit, Non-ideal transformer, Regulation and efficiency.

UNIT 4: DC and AC Rotating Machines
DC machine Construction, Armature reaction and commutation, Methods of excitation and speed control, Principle of operation of Induction motor and Synchronous motor.

UNIT 5: Introduction to Semiconductor Devices
V-I characteristics of junction diode, Ideal diode, Non ideal diode, clipper Half wave rectifier, Full wave rectifier, bridge rectifier. PNP and NPN transistors and the operating zones, BJT as amplifier and biasing techniques.

Text Book:
   1. Leonard S. Bobrow: Fundamentals of Electrical Engineering, Oxford University Press, Second Edition, 2005.

Reference Book:
   1. Hughes: Electrical and Electronic Technology, Pearson Education, Ninth Edition, 2008.

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B. Tech I Year - II SEM (ME)

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WORKSHOP PRACTICE
(14ME12P01)

Course Objectives:
- The objective of this course is to learn how the physical things we use are manufactured and gain technical knowledge and skills. The concept based knowledge will be useful in all the disciplines the students are going to specialize.
- The manufacturing processes include Machining, Casting, Joining processes, metal forming, and Sheet metal work. The students are exposed to resources in manufacturing and usage of computers in manufacturing. A brief review of the properties and heat treatment of common engineering materials and of measuring and gauging tools are also included.

Learning Outcomes:
After Completion of this course students will be able to
- Course enables the students to understand the various manufacturing processes. And they can identify the related manufacturing processes, tools, machines and inspection tools to manufacture the products.
- Students will make the models by using all the manufacturing processes.

Trades:

1. **Carpentry**
2. **Welding**
3. **Fitting**
4. **Foundry**
5. **Black smithy**
6. **Sheet metal**
7. **Machine shop**
8. **Metrology**
9. **CNC programming**
10. **Manufacturing simulation**

Text Books:
   1. B S Nagendra Parashar and R K Mittal, Elements of Manufacturing Process, Prentice Hall of India, 2008, 6th print.

Reference Books:
   1. Campbell J.S., Principles of Manufacturing Materials and Processes, Tata McGraw-Hill, New Delhi, 1999 print.

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B. Tech I Year II Sem

PHYSICS PRACTICALS
(14PHY12P01)

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List of Experiments

(10 Experiments out of 12)

1. **Error Analysis and graph drawing**
   To plot the graph for given data assuming certain error and to find the slope and intercept of the best fit graph.

2. **Coupled pendulum**
   To find the spring constant of the material of the spring.

3. **The vibrating string (Melde'sapparatus)**
   To determine the frequency of the tuning fork.

4. **Stewart Gees' apparatus**
   To determine the Magnetic field along the axis of a current carrying coil.

5. **Resonance LCR circuit**
   To calculate the resonant frequency of the LCR circuit.

6. **Newton's rings**
   To determine the radius of curvature of the given curved surface.

7. **Diffraction due to single slit**
   To determine the width of the single slit.

8. **Diffraction grating**
   To determine the wave lengths of different spectral colors of a white light source.

9. **Prism**
   To determine the dispersive power of a prism.

10. **Diffraction grating – Laser**
    To determine the wavelength of a laser source.

11. **Wedge method.**
    To determine the thickness of a given wire.

12. **Energy gap**
    To determine the energy gap of a semiconductor p-n junction diode.

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COMPUTER PROGRAMMING PRACTICALS
(14CSU12P02)

Course Objectives:
- To make the student learn C Programming language.
- To make the student solve problems, implement them using C & C++ programming languages.
- To strengthen the ability to identify and apply the suitable data structure for the given real world problem.

Learning Outcomes:
After Completion of this course students will be able to
- Apply problem solving techniques to find solutions to problems.
- Able to use C & C++ languages features effectively and implement solutions using C & C++ languages.
- Be capable to identity the appropriate data structure for a given problem or application.
- Improve logical and programming skills.

LIST OF EXPERIMENTS
1) a) Write a C program to swap the two numbers.
   b) Write a C program to find the roots of a quadratic equation.
   c) Write a C program to compute the factorial of a given number.
2) a) Write a C program to find the series of prime numbers in the given range.
   b) Write a C program to generate Fibonacci numbers in the given range.
3) a) Write a C program to check for number palindrome.
   b) Write a C program to generate Pascal Triangle.
4) Implement the following operations on matrices using C
   a) Sum of Two Matrices   b) Product of Two matrices
   c) Transpose of Matrix
5) Write a C program to find Factorial, GCD, fibonacci, towers of hanoi, sum of digits, base conversions, reversal of numbers. (Using recursion).
6) Write a C program to implement all string operations(strlen(), strcpy(), , strcmp(), strcat(), strrev(), strstr(), strchr()) without using standard string library functions.
7) Write a C program to find the student grade by using structures.
8) Write a C program to perform the operations addition, subtraction, multiplication of Complex numbers using structures.
9) Write a C program to copy the file contents from one file to another file(pass file names as command line arguments).

10) Implement the following searching techniques using C++ templates (Generic Programming)

        a) Linear Search   b) Binary Search

11) Implement the following sorting techniques using C++ templates

        a) Bubble Sort   b) Selection Sort   c) Insertion Sort

12) Implement the following sorting techniques using C++ templates

        a) Merge sort   b) Quick sort.

13) Implement the following Data Structures using C++ templates

   a) Stack ADT   b) queue ADT   c) Circular queue ADT

14) Write a C++ Program to convert infix to postfix expression and its evaluation.

15) Implement Singly linked list ADT and operations(Insertion, Deletion, Traversing)

References:

1. "Programming with C", Byron Gottfried, Third Edition, Schaum's Outlines, Mc Graw Hill.
2. "Fundamentals of Data Structures in C", Horowitz, Sahni, Anderson-freed, Second Edition, Universities Press.
3. "The C Programming Language", Brian W. Kernighan, Dennis M. Ritchie, Pearson.
4. "Classic Data Structures", Samantha, PHI
5. Fundamentals of Data Structures in C++ by Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Universities Press, Second Edition.
6. "Pointers in C", Yeswant Kanetkar, BPB publications.