MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

Four Year Course-wise Pattern for B.Tech Program

Year	First Semester			Second Semester		
	Course Code	**Course Name**	**Credits**	**Course Code**	**Course Name**	**Credits**
I	14ENG11T01	Functional English	4	14ENG12T02	Technical Report Writing	3
	14MAT11T01	Advanced Calculus	4	14MAT12T02	Linear Algebra & Complex Analysis	4
	14CHE11T01	Engineering Chemistry	4	14PHY12T01	Engineering Physics	4
	14MEC11T01	Engineering Graphics	4	14CSU12T01	Computer Programming	4
	14CHE11T02	Environmental Science	2	14EEE12T01	Basic Electrical & Electronics Engineering	3
	14CHE11P01	Chemistry Practicals	2	14ME12P01	Workshop Practice	2
	14CSU11P01	Computing Practicals	2	14PHY12P01	Physics Practicals	2
				14CSU12P02	Computer Programming Practicals	2
		Total	**22**		**Total**	**24**
II	Six Theory Courses		18	Six Theory Courses		18
	Two Practical Courses		4	Two Practical Courses		4
		Total	**22**		**Total**	**22**
III	Six Theory Courses		18	Six Theory Courses		18
	Two Practical Courses		4	Two Practical Courses		4
		Total	**22**		**Total**	**22**
IV	Six Theory Courses		18	4 Theory Courses		12
				Seminar		2
	Two Practical Courses		4	Project work/Thesis		10
		Total	**22**		**Total**	**24**

Total Credits 180

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

L	T	C
4	1	4

FUNCTIONAL ENGLISH
(14ENG11T01)

Course Objectives:

The syllabus has been designed to enhance communication skills of the students of Engineering and Technology. The course enables students to communicate in English for academic and social purpose and helps them improve their grammatical accuracy and vocabulary. It also inculcates the habit of reading for pleasure.

Learning Outcomes:

Students will get the required training in LSRW skills through the prescribed text and develop their ability to communicate effectively. The course will help them acquire the adequate language and soft skills required by employers.

UNIT-1

Humour- An Astrologer's Day
Parts of Speech, Singular – Plural words, Kinds of Nouns & Pronouns, Articles
Word Formation: Prefixes, Suffixes and Compounds
Basics of Phonetics, Word Stress and Intonation
Making grammatical and meaningful sentences
Greeting, Taking Leave, Introducing Oneself & Others

UNIT -II

Inspiration – Building A State
Finite Verbs, Non-finite Verb forms, Question Tags
Homophones, Homonyms, Homographs, Synonyms, Antonyms, Commonly Confused Words Paragraph Writing, Expansion of Proverbs, Note Making
Making Requests, Interrupting, Apologizing and Making polite conversations

UNIT-III

Sustainable Development – Water: The Elixir of Life
Tenses
One-Word Substitutes
Listening for the theme and the gist
Formal and Informal Letters
Giving Directions and Instructions, Making Suggestions, Offering Advice, Agreeing and Disagreeing

UNIT-IV

Relationships – The Wood Rose
Subject – Verb Agreement, Voice: Active and Passive, Prepositions.
Phrasal Verbs and Idioms
Listening for specific details and information
Information Transfer
Narrating, Expressing Opinions and Speaking on the Telephone

UNIT-V

Science and Humanism – Progress
Conditional Sentences, Conjunctions, Common Errors
Collocations, Technical Vocabulary, Common Vocabulary errors
Listening for Opinions and Attitude
E Mails
Story Telling

Text Book:

Using English published by Orient Blackswan

Reference Books:

1.*Raymond Murphy's Intermediate English Grammar with CD,* Raymond Murphy, Cambridge University Press, 2012.
2.*Communication Skills,* Sanjay Kumar &Pushpalatha,Oxford University Press, 2012.
3. *A Course in Communication Skills*, Kiranmai, Dutt& Co Foundation Books, 2012.
4.*Current English grammar and usage,* S M Guptha, PHI, 2013.
5.*Powerful Vocabulary Builder,*AnjanaAgarwal, New Age International Publishers, 2011.
6.*Listening Extra*, Miles Craven, Cambridge University Press.
7.*Speaking Extra*, Mick Gammidge, Cambridge University Press.
8.*Reading Extra*, Liz Driscoll, Cambridge University Press.
9.*Writing Extra*, Graham Palmer, Cambridge University Press.
10.*Speak Well*, JayashreeMohanraj et al, Orient Blackswan.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

B.Tech I Year - I Sem (Common to all branches) **L T C**
4 1 4

ADVANCED CALCULUS
(14MAT11T01)

1. Course Objectives: Calculus is needed in every branch of science & engineering, as all dynamics is modeled through differential & integral equations. Functions of several variables appear more frequently in Science than functions of a single variable. Their derivatives are more interesting because of the different ways in which the variables can interact. Their integrals occur in several areas such as probability, fluid dynamics, and electrically, just to name a few. All these lead in a natural way to functions of severable variables. Mathematics of these functions is one of the finest achievements of modern Mathematics.

2. Learning Outcomes:

At the end of this course, students should be able to obtain

- Ability to understand graphing and conic sections to trace the geometric shapes of various curves like Cartesian, polar and parametric relevant to the field of Engineering.
- The knowledge to work in functions of several variables provides mathematical solutions to various engineering problems.
- The knowledge of integral calculus and applications of integration to solve complex problems.
- Efficiency to apply tools for convergence of various tests and the series expansions necessary for engineering problems.

UNIT I [10.5-10.8, Chap 2, 13.1,13.3,13.4,13.5] **(12 hours)**

Polar coordinates and Curvature:

Polar coordinates, Graphing, polar equations of conic Sections, Integration, properties of limits, infinity as a limit, continuity and differentiability of vector functions , arc length, velocity and unit tangent vector, Curvature, Normal vector, Torsion and Binormal vector, Tangential and normal components of velocity and acceleration.

UNIT II [14.1-14.8] **(15 Hours)**

Functions of Severable Variables:

Functions of severable variables, level curves, Limits, Continuity, Partial derivatives, chain Rule, Directional derivative, gradient vectors, Tangent planes & normal line, Maximum, Minimum & Saddle points of functions of two or three variables, Constrained Maxima & Minima, Method of Lagrange multipliers.

UNIT III [15.1, 15.3,15.4,15.6,15.7] **(10 Hours)**

Multiple Integrals:

Double Integrals, Area, Change of integrals to Polar Coordinates, Change of order of integration, Triple Integral, Integral in Cylindrical and Spherical Coordinates.

UNIT IV [16.1-16.5,16.7,16.8] (12 Hours)

Vector Calculus:

Line integral, work, circulation, flux, path independence, potential function, conservative fields; Green's theorem in the plane, Surface area & Surface Integral; Stokes'theorem ,Gauss divergence theorem.

UNIT V [11.1-11.8] [11.1-11.2 is for self-study] (11 hours)

Sequence and Series:

Sequence of real numbers frequently occurring limits, infinite series different tests of Convergence, series of non-negative terms, absolute & conditional convergence, alternating series, Power series, Maclaurin series, Taylor series of functions.

Text Book:

Weir, MD, Hass J, Giordano FR: Thomas' Calculus Pearson education 11th ED, 2007.

Reference Books:

1. Erwin Kreyszig - Advanced Engineering Mathematics, 8th Edition Wiley-India, 2007
2. James Stewart - Calculus, 5e, Cengage learning, 2003.
3. Monty J. Strauss, Gerald L. Bradley, & Karl J. Smith – Calculus 3rd Edition, Pearson 2007.

Self Learning Resources (websites)

1. http://www.nptelvideos.com/mathematics/
2. https://www.khanacademy.org/math/
3. http://ocw.mit.edu/courses/mathematics/
4. http://online.stanford.edu/
5. http://www.mooc-list.com/
6. http://mits.ac.in/library.php

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

L	T	C
4	1	4

ENGINEERING CHEMISTRY
(14CHE11T01)

Course Objectives:

- To impart students an in-depth knowledge of various aspects of chemistry as applied to engineering.
- To bridge the theoretical concepts and their practical engineering applications, thus highlighting the role of chemistry in the field of engineering.

Learning Outcomes:

After Completion of this course students will be able to

- Understand the fundamentals of water technology; corrosion and its control; applications of polymers in domestic and engineering area; types of lubricants and their applications; and recent trends in electrochemical energy storage devices.

UNIT-1

WATER TREATMENT AND ANALYSIS: Impurities in water, Hardness of water and its determination (EDTA Method), alkalinity. Chemical analysis of water: Dissolved Oxygen, Chlorides, Softening of water by Ion Exchange and Reverse Osmosis method. Water treatment for drinking purpose-coagulation, sedimentation, filtration, sterilization- chlorination and ozonization. Concept of break point chlorination.

UNIT -II

THERMODYNAMICS AND CHEMICAL KINETICS: Thermodynamics: Thermodynamic Systems, State Functions, Thermal Equilibrium and Temperature, Work, Internal Energy and Heat Transfer, Heat Capacity. Natural and Reversible Processes, Entropy and Second Law, Entropy Changes in (a) accompanying change of phase, isothermal and (c) isobaric processes. Standard free energy change in chemical reactions.

Chemical Kinetics: Rate Laws, Order, Rate Constants, Arrhenius Equation, Rate-determining step, Reaction mechanisms.

UNIT – III

INSTRUMENTAL METHODS OF ANALYSIS AND POLYMERS: Instrumental methods: Infrared spectroscopy-principle and applications. Chromatography – classification (paper, thin layer and gel permiation) and uses.

Nucleophilic substitution reactions (both S_N1 and S_N2) of alkyl halides. Elimination reaction of alkyl halides; Addition reactions to >C=C< bond. Classification of Polymers, Types of polymerization, Molecular weight of polymers- number average and weight average molecular weights, plastics, some important commercial thermoplastics and thermosetting resins, Elastomers, Synthetic rubbers.

UNIT-IV

ELECTROCHEMISTRY AND CORROSION: Types of electrolytes, Electrochemical cells, Electrode potential, Galvanic cells, Nernst equation, Measurement of EMF, types of electrodes, concentration cells, Batteries- Lead-acid, Ni-Cd, Lithium and Lithium ion batteries. Hydrogen-oxygen fuel cell-principle and applications.
Corrosion: Types of corrosion, Factors influencing rate of corrosion, Corrosion control methods, Protective coatings.

UNIT-V

ENGINEERING MATERIALS AND NANOSCIENCE: Cementing materials- Lime, Cement, Gypsum, Refractories, Abrasives, Insulators, lubricants. Liquid crystals – classification and applications
Lubricants – definition, classification, Extreme pressure lubrication mechanism, important properties – viscosity, viscosity index, saponification number, flash point and pour point.
Introduction to nanoscience and nanomaterials, synthesis – sol-gel and hydrothermal methods, characterization by powder XRD (Scherrer's equation) and photocatalytic application – dye degradation.

Text Books:

1. P.W. Atkins & Julio de Paula, 'The Elements of Physical Chemistry', Fifth edition (Oxford University Press, Oxford 2009).
2. T. W. Graham Solomons and Craig B. Fryhle, 'Organic Chemistry' 10th edition, John Wiley & Sons Inc., New York 2011.

Reference Books:

1. D. W. Ball, 'Physical Chemistry', First Edition, India Edition (Thomson, 2007).
2. L. G. Wade, Jr. and M. S. Singh, 'Organic Chemistry', 6th Edition, Pearson Education Inc., 2006.
3. Perry and Green, Perry's Chemical Engineers' Handbook, 9th Edition, Section 2, McGraw Hill.
4. Dr S. S. Dara and Dr S. S. Umare, A Text book of Engineering Chemistry, S. Chand & Company Ltd, 2000 1st Ed.
5. Instrumetnal methods of chemical analysis—Willard Merrit, Dean Seatle.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

B. Tech I Year - I SEM (Common to all branches)	**L**	**T**	**P**	**C**
	2	**1**	**4**	**4**

ENGINEERING GRAPHICS
(14ME11T01)

Course Objectives:

- Engineering Graphics is the primary medium for development and communicating design concepts. Through this course the students are trained in Engineering Graphics concepts with the use of **AutoCAD**. The latest ISI code of practice is followed.
- Computerized drawing is an upcoming technology and provides accurate and easily modifiable graphics entities easy data storage and retrieval facility and enhances creativity.

Learning Outcomes:

After Completion of this course students will be able to

- Draw Orthographic projections of different objects.
- Visualize 3-Dimensional objects and draw isometric projections.
- Use in techniques and able to interpret the drawings in various fields of engineering.

UNIT-I

Introduction to AutoCAD commands, simple drawings, Orthographic Projections-Theory, techniques, first angle projections, multi view drawing from pictorial views.

UNIT-II

Projections of points: Positions, notation system and projections.
Projections of lines: positions, terms used, different cases, traces of lines and finding true lengths, auxiliary projections.

UNIT-III

Projections of planes: positions, terms used, different cases and projections procedure
Projections of Solids: Projections of Regular Solids inclined to one planes.

UNIT-IV

Sections and Developments of Solids: Section Planes and Sectional View of Right Regular Solids-Prism, cylinder. True shapes of the sections.
Development of Surfaces of Right Regular Solids-Prism, Cylinder and their Sectional Parts.

UNIT-V

Intersections of surfaces of solids: Intersection between: Line-plane, Plane-plane, line-solid, solid-solid.

Isometric Projections: Theory of isometric drawing, construction of isometric projection from orthographic.

Text Books:

1. D.M. Kulkarni, A.P. Rastogi and A.M. Sarkar., Engineering Graphics with AutoCAD, PHI Learning Private Limited, New Delhi 2009.

Reference Books:

1. Dhananjay A Jolhe, Engineering Drawing: with an introduction to AutoCAD, Tata McGraw Hill, 2008.
2. Warren J. Luzadder & Jon M. Duff Fundamentals of Engineering Drawing, 11^{th} edition, Prentice Hall of India, New Delhi.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

B. Tech I Year - I SEM (Common to all branches)	**L**	**T**	**C**
	2	**1**	**2**

ENVIRONMENTAL SCIENCE
(14CHE11T02)

Course Objectives:

- To make the students to get awareness on environment
- To under the importance of protecting renewable energy sources, biodiversity and pollution causes due to the day today activities of human life to save earth from the inventions of engineers.

Learning Outcomes:

After Completion of this course students will be able to

- Understand the natural environment and its relationship with human activities
- Analyze human impacts on the environment
- Integrate facts, concepts and methods from multiple disciplines and apply to the environmental problems
- Understand the role to be played by human beings towards pollution control

UNIT – I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: Definition, Scope and Importance– Need for Public Awareness. Renewable energy Resources , Solar energy-solar cells, solar batteries, wind energy, wind mills, ocean energy, tidal energy and non-renewable energy resources, LPG, water gas, producer gas.

World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

UNIT – II

ECOSYSTEMS: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem. b. Grassland ecosystem c. Desert ecosystem d. Aquatic – Lake ecosystems.

UNIT – III

BIODIVERSITY AND ITS CONSERVATION: Introduction, Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India –Value of biodiversity: consumptive use, Productive use, social, ethical and aesthetic values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – IV

ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of a. Air Pollution, b. Water pollution, c. Soil pollution, d. Marine pollution, e. Noise pollution, f. Nuclear hazards Solid Waste Management: Causes**,** effects and control measures of urban and industrial wastes – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – V

SOCIAL ISSUES AND THE ENVIRONMENT: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting and watershed management –Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies Population growth, variation among nations, Population explosion.

Text Book:

3. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press, 2005.

Reference Book:

6. Environmental Science & Engineering by Dr. A. Ravikrishnan, Hitech Publishing Company Pvt. Ltd. 2013.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

L	P	C
0	3	2

CHEMISTRY PRACTICALS
(14CHE11P01)

Course Objectives:

- To impart students a better knowledge of various aspects of chemistry as applied to engineering.
- To bridge the theoretical concepts and their practical engineering applications, thus highlighting the role of chemistry in the field of Chemical engineering.

Learning Outcomes:

After Completion of this course students will be able to

- Carry out chemical analysis both volumetrically and instrumentally.

Volumetric Analysis

1. Estimation of total, permanent and temporary hardness of water by EDTA method.
2. Estimation of Copper (II) in water by Iodometry.
3. Estimation of alkalinity of water sample.
4. Estimation of Iron (II) in waste water by dichrometry.
5. Estimation of Dissolved Oxygen by Winklers method.

Instrumental Method of Analysis

1. Estimation of ferrous ion by potentiometric titration (redox titration).
2. Esimation of acid (HCl) by potentiometric acid-base titration.
3. Dissociation constant of weak electrolyte by conductometry
4. Determination of unknown strength of an acid solution by conductometric titration
5. Determination of manganese by colorimetry.
6. Determination of solubility product of sparingly soluble salt (AgCl or PbSO4) by conductometric method.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

P	**T**	**C**
3	**0**	**2**

COMPUTING PRACTICALS
(14CSU11P01)

Course Objectives:

- To make the student understand problem solving techniques and their applications
- Students will be able to understand the syntax and semantics of python.
- Get acquaintances with classes and objects, stacks and queues using python.

Learning Outcomes:

After Completion of this course students will be able to

- Apply problem solving techniques to find solutions to problems.
- Able to use python effectively and implement solutions using it.
- Be capable to identity the stack and queues for a given problem or application.
- Improve logical and programming skills.

Week 1

a) Develop animated models using scratch tool

Week 2

a) Develop the flowchart for finding a number is even or odd.
b) Develop a flowchart for displaying reversal of a number.
c) Develop a flowchart for finding biggest number among three numbers

Week 3

a) Develop a flowchart for swapping two values using functions.
b) Develop a flowchart to sort the list of numbers.
c) Develop a flowchart to find largest element in an array.

Week 4

a) Implement Python script to read person's age from keyboard and display whether he is eligible for voting or not.
b) Implement Python script to find biggest number between two numbers.

Week 5

a) Implement Python Script to generate prime numbers series up to n.
b) Implement Python Script to check given number is palindrome or not.
c) Implement Python script to print factorial of a number.

Week 6

a) Implement Python Script to perform various operations on string using string libraries.
b) Implement Python Script to check given string is palindrome or not.

Week 7

a) Define a function max_of_three() that takes three numbers as arguments and returns the largest of them.
b) Write a program which makes use of function to display all such numbers which are divisible by 7 but are not a multiple of 5, between 1000 and 2000.

Week 8

a) Define a function which generates Fibonacci series up to n numbers.
b) Define a function that checks whether the given number is Armstrong.

Week 9

a) Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number.
Suppose the following input is supplied to the program:34,67,55,33,12,98. Then, the output should be: ['34', '67', '55', '33', '12', '98'] ('34', '67', '55', '33', '12', '98').
b) With a given tuple (1,2,3,4,5,6,7,8,9,10), write a program to print the first half values in one line and the last half values in one line.

Week 10

a) Write a python script to perform basic dictionary operations like insert, delete and display.
b) Write a python script to find frequency of words in a file using dictionaries.

Week 11

a) Write Python script to display file contents.
b) Write Python script to copy file contents from one file to another.

Week 12

a) Define a class named Rectangle which can be constructed by a length and width. The Rectangle class has a method which can compute the area.
b) Define a class named Circle which can constructed by radius. The derived classes Area, Circumference uses methods called calArea(), calCirc() respectively to calculate area, circumference of circle.

Week 13

a) Implement Python script to develop stack ADT and its operations.
b) Implement Python script to evaluate postfix expression.

Week 14

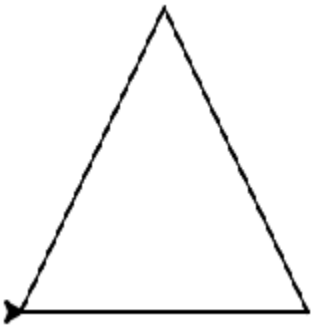
a) Implement Python script to develop queue ADT and its operations.

b) Implement Python script to perform tree traversals.

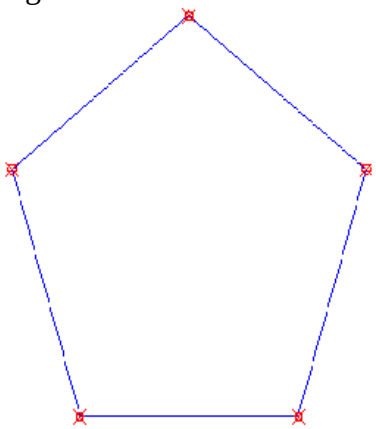
Week 15

Write a python script to display following shapes using turtle.

a)



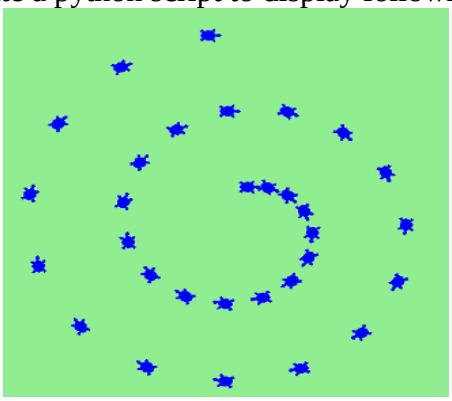
b)



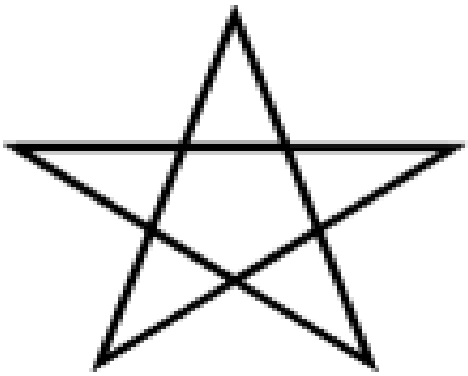
Week 16

Write a python script to display following shapes using turtle.

a)



b)



NOTE: Concepts related to Lab programs will be covered in Lecture hours.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

L	T	C
3	2	3

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/

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

L	T	C
4	1	4

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

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

L	T	C
4	1	4

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.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

L	T	C
3	1	3

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

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

L	T	C
4	0	4

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.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

B. Tech I Year - II SEM (ME)

L	T	P	C
0	0	3	2

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.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

B. Tech I Year II Sem

PHYSICS PRACTICALS
(14PHY12P01)

P	T	C
3	0	2

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.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

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

P	T	C
3	0	2

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.