MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

B. TECH IT (R20) COURSE STRUCTURE & SYLLABUS –I-II
Applicable From 2020-21 Admitted Batch

I YEAR - II SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2020002	Engineering Mathematics - II	BS	3	1	0	4	30	70	100
2	2020006	Applied Physics	BS	3	1	0	4	30	70	100
3	2020502	Data Structures	ES	3	0	0	3	30	70	100
4	2020009	Engineering Drawing Practice	ES	1	0	4	3	30	70	100
5	2020071	Applied Physics Lab	BS	0	0	3	1.5	30	70	100
6	2020572	Data Structures Lab	ES	0	0	2	1	30	70	100
Total Credits				10	2	9	16.5	180	420	600

2020002: ENGINEERING MATHEMATICS-II   L T P C
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B.Tech. I Year II Semester
Course Objectives: To learn
- Methods of solving the differential equations of 1st and higher order.
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, etc.
- Concept of Sequence and nature of the series.
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

Course Outcomes: After learning the contents of this paper the student must be able to
  Co 1: Identify whether the given differential equation of first order is exact or not
  Co 2: Solve higher differential equation and apply the concept of differential equation to real world problems.
  Co3: Analyse the nature of sequence and series.
  Co 4: Apply the del operator to vector and scalar valued functions.
  Co5: Evaluate the line, surface and volume integrals and converting them from one to Another.

UNIT-I: First Order and First-Degree ODE and its applications
Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay. Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Learning outcomes:
- Identify whether the given differential equation of first order is exact or not.
- Apply the concept of differential equation to real world problems.
- Understand the conepts of linear and Non linear differential equations.
- Analyze Exact and Non Exact differential equations.
- Explain formation of differential equations, Homogeneous equations.

UNIT-II: Higher Order Linear Differential equations
Linear differential equations of second and higher order with constant coefficients, RHS term of the type e^{ax}, Sin ax, Cos ax, and x^n, $e^{ax} V(x)$, $x^n V(x)$, method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

Learning outcomes:
- Identify essential characteristics of linear differential equations with constant coefficients.
- Apply higher order DE's for solving some real world problems.
- Understand the differential equations with constant coefficients by appropriate method.
- Analyse Legendre's equation and Cauchy-Euler equation.
- Explain Method of variation of parameters.

UNIT-III: Sequences & Series
Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences.
Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test,

p-test, D-Alembert's ratio test; Raabe's test,logarithmic test; Cauchy's Integral test; Cauchy's root test; Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

Learning outcomes:
- Identify the Sequence, types of sequences.
- Apply the concept of sequence and series to real world problems.
- Understand the logical knowledge of forming the series.
- Analyzethe nature of sequence and series.
- Explain Alternating series.

UNIT-IV: Vector Differential Calculus
Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives. Solenoidal and Irrotational vectors, Scalar potential functions. Vector Identities.

Learning outcomes:
- Identify scalar and vector point functions.
- Apply Del to scalar and vector point functions.
- Understand the concepts of Solenoidal and irrotational vectors.
- Analyze the physical interpretation of Gradient, Divergence and curl.
- Explain vector identies.

UNIT-V: Vector Integral Calculus
Line integral-Work done, Surface Integrals-Flux of a vector valued function and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

Learning outcomes:
- Identify the work done in moving a particle along the path over a force field.
- Apply Greens, Stokes and Divergence theorems in evaluation of double and triple integrals.
- Understand the concepts of Line Integral.
- Analyze the Flux of a vector valued function.
- Explain Vector valued theorems to real world problems.

TEXT BOOKS:
1   B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2   Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
3   G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.

REFERENCES:
1.   Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2.   S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

2020006: APPLIED PHYSICS

B.Tech. I Year II Semester   **L T P C**
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Course Objectives:
- Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.

- Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics, optoelectronics and dielectric and magnetic properties and a broad base of knowledge in physics.

- The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.

- To study applications in engineering like memory devices, transformer core and electromagnetic machinery.

Course Outcomes: Upon graduation:
- The student would be able to learn the fundamental concepts on Quantum behavior of matter in its micro state.

- The knowledge of fundamentals of Semiconductor devices and their applications.

- Design, characterization and study of properties of optoelectronic devices help the students to prepare new materials for various engineering applications.

- Study about Lasers and fiber optics which enable the students to apply to various systems involved with communications.

- The course also helps the students to be exposed to the phenomena of dielectric and magnetic properties.

UNIT-I: Quantum Mechanics
Introduction to quantum physics, Black body radiation, Photoelectric effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.

Learning Outcomes:
    Understand the fundamental concepts of quantum mechanics.
    Explain the physical significance of wave function.
    Apply Schrödinger's wave equation for a free particle.
    Analyze the particle behavior in different potential regions.
    Evaluate the significance of energy values in one dimensional box.

UNIT-II: Semiconductor Physics
Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier transport: diffusion and drift, p-n junction diode, Zener diode and their V-I Characteristics, Bipolar Junction Transistor (BJT): Construction, Principle of operation, Hall effect.

Learning Outcomes:

Understand the energy band formation of semiconductors.
Explain the properties of n-type and p-type semiconductors.
Apply the Hall effect for various types of semiconductors.
Analyze the various types of diodes.
Evaluate the hall coefficient of semiconductors.

UNIT-III: Optoelectronics

Radiative and non-radiative recombination mechanisms in semiconductors, LED : Device structure, Materials, Characteristics and figures of merit, Semiconductor photodetectors: Solar cell, PIN and Avalanche photodiode and their structure, working principle and Characteristics.

Learning Outcomes:

Understand the basic principle involved in LED.
Explain about various types of photodiodes.
Apply the knowledge on various diodes.
Analyze the working of PIN and Avalanche diodes.
Evaluate the characteristics of diodes.

UNIT-IV: Lasers and Fibre Optics

Lasers: Introduction to Lasers, Coherence, Population inversion, Pumping, Lasing action, Types of Lasers: Ruby laser, Carbon dioxide (CO_2) laser, He-Ne laser, Semiconductor laser; Applications of laser.

Fibre Optics: Introduction, Block diagram of fiber optic communication system, Total internal reflection, Acceptance angle and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

Learning Outcomes:

Understand about Laser and fiber optics.
Explain the working principle of laser and optical fibers.
Apply optical fibers in communication system.
Analyze the applications of optical fibers in medical, communication and other fields.
Evaluate the laser and fiber optic concepts in various fields.

UNIT-V: Dielctric and Magnetic Properties

Dielectric properties: Introduction to dielectrics, Polarisation, Permittivity and Dielectric constant, Types of polarisation (Qualitative), Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectrics.

Magnetic properties: Introduction to magnetism, Magnetisation, permeability and susceptibility, Classification of magnetic materials, Domain theory of ferro magnetism, Hysteresis, Applications of magnetic materials.

Learning Outcomes:

Understand the concept of polarization in dielectric materials.
Explain various types of polarization of dielectrics and classification of magnetic materials.
Apply Lorentz field and Claussius- Mosotti relation in dielectrics.
Analyze the ferromagenetism on the basis of domain theory.
Evaluate the applications of dielectric and magnetic materials.

TEXT BOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learing.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand

REFERENCES:

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL.

2020502: DATA STRUCTURES

B.TECH I YearIISem.

L T P C
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Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:
- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, heaps, graphs.
- Introduces searching and sorting matching algorithms

Course Outcomes:
- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and searching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, heaps, graphs, andAVL-trees.

UNIT - I
Introduction to Data Structures: Abstract Data Types, Linear List – Singly Linked List- Operations, Double Linked List- Operations, Circular Linked List-Operations.

UNIT – II
Stacks and Queues: Stack-Operations, Array and Linked Representations of Stacks, Stack applications, Queues-operations, Array and Linked representations, Queue Applications.

UNIT - III
Trees: Tree Terminology, Binary Trees**,** Tree Traversal methods, Binary Search Trees - Operations, AVL Trees, Height of AVL Tree, Operations, Red Black Trees- Definition and Representation and Applications, B Trees, Operations on B Tress, B+ Trees

UNIT - IV
Searching- Linear Search, Binary Search
Sorting- Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort, Heap sort.

UNIT - V

Graphs: Graph Implementation Methods. Graph Traversal Methods.
Hashing: Hash Table Representation**,** hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

TEXTBOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, *Universities Press*.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, *PHI/Pearson Education*.

REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilbergand B.A. Forouzan, Cengage Learning.

B.Tech. I Year II Semester   **L T P C**
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Pre Requisites: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

Course Objective:

- The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation.
- To prepare the student to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- To get exposure to a CAD package.

Course Outcomes:

1. Familiarize with BIS standards and conventions used in engineering graphics.
2. Draw various engineering curves e.g., ellipse, parabola, cycloids and involutes etc and construct various reduced scales e.g., plain and diagonal scale.
3. Develop the lateral surfaces of simple solids
4. Ability to draw orthographic projections and isometric projections of given engineering components.
5. Visualize different views like elevation and plan for a given line, plane figures or solid objects.
6. Apply drafting techniques and use 2D software e.g., AutoCAD to sketch 2D plane figures.

UNIT – 1 INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their Significance-Drawing Instruments and their Uses-Conventions in Drawing-BIS -Lettering and Dimensioning.

Geometrical Constructions: Bisecting a Line, Arc. Dividing A Line into 'N' Equal Parts, Construction of Polygons, Division of Circle into Equal Parts (8 And 12)

Construction of Scales: Plain, Diagonal and Vernier Scale.

Conic Sections: Ellipse, Parabola, Hyperbola and Rectangular Hyperbola- General Methods only.

Engineering Curves: Cycloid, Epicycloid, Hypocycloid

Involutes: For Circle, Triangle, Square, Pentagon and Hexagon.

Learning Outcome:

1. To understand the basic standards, conventions of engineering drawing and how to use the instruments in drawing.
2. Learn and draw the various types of curves used in engineering application.

UNIT – 2 ORTHOGRAPHIC PROJECTIONS

Principles- Assumptions- Different Angles of Projection.

Projections of Points- orientation in all the quadrants

Projections of Lines- Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

Projections of Planes: Surface Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

Learning Outcome:
1. Knowledge in various planes of projections
2. To draw the front view, top view and side views of the given geometrical elements

UNIT – 3   PROJECTIONS OF SOLIDS

Classification of solids- Axis- Parallel, Perpendicular, Inclined to one plane and Inclined to both planes- Prisms, Pyramids, Cylinder and Cone

Learning Outcome:
1. To understand the various solid types
2. To draw all the views of the given solid in all possible orientations.

UNIT – 4   SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

Types of Section Planes, Sectioning Prisms, Pyramids, Cylinders and Cones using various planes.
Development of surfaces of right Regular Solids- Parallel Line Method, Radial Line Method.

Learning Outcome:
1. To identify the cut surfaces and represent the sectional views graphically when the solid is sectioned.
2. To develop the surfaces of solid using various methods.

UNIT – 5 ISOMETRIC PROJECTIONS AND PERSPECTIVE PROJECTIONS

Principles, Isometric Views of Planes, Solids- Box Method, Offset Method, Compound solids, Sectioned Solids. Conversion of Isometric to Multi view projection and vice versa.

Learning Outcome:
1. Knowledge in principles of isometric projection
2. Conversion of isometric to orthographic and vice-versa.

Text Books:
1. N.D.Bhatt, Elementary Engineering Drawing, Charotar Publishers,2012.
2. Basanth Agrawal and C M Agrawal –Engineering Drawing 2e –,McGraw-Hill Education(India) Pvt.Ltd.

References:
1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishers
2. Engineering Drawing- Johle/Tata Macgraw Hill.
3. K.Veenugopal, –Engineering Drawing and Graphics + Autocad New Age International Pvt.Ltd, 2011.

2020071: APPLIED PHYSICS LAB

B.Tech. I Year II Semester	**L**	**T**	**P**	**C**
	0	**0**	**3**	**1.5**

COURSE OBJECTIVES:
➢ To gain practical knowledge by applying the experimental methods to correlate with the theoretical knowledge of physics concepts.

➢ To learn the usage of electrical and optical systems for measurements.

➢ Apply the analytical techniques and graphical analysis to the experimental data.

➢ To develop intellectual communication skills through discussion on basic principles of scientific concepts in a group.

COURSE OUTCOMES:
➢ Understand the concepts of the error and analysis.

➢ Explain the different measuring devices and meters to record the data with precision.

➢ Apply the experimental skills to design new experiments in engineering.

➢ Analyze the theoretical knowledge and correlate with the experiment.

➢ Evaluate the various parameters accurately.

List of Experiments:
1. Energy gap of P-N junction diode: To determine the energy gap of a semiconductor diode.
2. Solar Cell: To study the V-I Characteristics of solar cell.
3. Photoelectric effect: To determine work function of a given material.
4. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.
5. LASER: To study the V-I characteristics of LASER sources.
6. Optical fibre: To determine the Numerical aperture and bending losses of Optical Fibres
7. Stewart – Gee's experiment:
    Determination of magnetic field induction along the axis of a current carrying coil.
8. Hall effect: To determine Hall co-efficient of a given semiconductor.
9. LCR Circuit: To determine the resonance frequency and Quality factor of LCR Circuit.
10. R-C Circuit: To determine the time constant of R-C circuit.

Note: Any 8 experiments are to be performed

2020572: DATA STRUCTURES LAB

B.Tech. I Year IISem.   L   T/P/D   C

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Prerequisites: A Course on "Programming for problem solving".

Course Objectives:
- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes:
- Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

LIST OF EXPERIMENTS

1. Write a program that uses functions to perform the following operations on singly linked list.:
   i) Creation   ii)Insertion   iii)Deletion   iv)Traversal

2. Write a program that uses functions to perform the following operations on doubly linked list.:
   i) Creation   ii)Insertion   iii)Deletion   iv)Traversal

3. Write a program that uses functions to perform the following operations on circular linked list.:
   i) Creation   ii)Insertion   iii)Deletion   iv)Traversal

4. Write a program that implement stack (its operations)using
   i) Arrays   ii)Pointers

5. Write a program that implement Queue (its operations)using
   i) Arrays   ii)Pointers

6. Write a program to implement the tree traversal methods.

7. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Bubble sort   ii)Selection sort   iii) Insertion sort

8. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Merge Sort   ii)Quick sort   iii) Heap sort

9. Write a program that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
   i) Linear search   ii) Binary search

10. Write a program to implement the graph traversal methods.

TEXTBOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, *Universities Press*.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J.Augenstein, *PHI/Pearson Education*.

REFERENCE:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage*Learning*.