Biju Patnaik University of Technology, Odisha B.E./B.Tech CSE Sem 2 syllabus

Mathematics-II

RMA2A001 Mathematics-II

Module-1
Matrix Algebra, Solution of system of linear equations (Gauss Elimination), Rank and Inverse of matrices (Gauss-Jordan), Examples of Vector Spaces.

Module-2
Eigen values and eigen vectors, Symmetric and skew-symmetric matrices, Orthogonal matrices, Complex matrices, Hermitian and skew matrices, Unitary matrices and similarity of matrices, Diagonalisation of Matrices

Module-3
Vector differential calculus: vector and scalar functions and fields, Derivatives, Curves, tangents and arc Length, gradient, divergence, curl

Module-4
Vector integral calculus: Line Integrals, Green Theorem, Surfaceintegrals, Gauss theorem and Stokes Theorem (Without Proof)

Module – 5
Fourier series, Fourier expansion of functions of any period, Even and odd functions, Half range Expansion, Fourier transform and Fourier Integral.

Text Book:
1. Advanced Engineering Mathematics by E. Kreyszig, Tenth Edition,Willey
References:
2. Higher Engineering Mathematics by B.V. Raman, , McGraw Hills

Education
3. Engineering Mathematics by P. S. Das & C. Vijayakumari, Pearson.
4. Advance Engineering Mathematics by P.V.O’NEIL, CENGAGE.

Basic Electronics Engineering

Basic Electronics Engineering

Module 01 :
Introduction to Semiconductors, Junction Diode: Principle of Diodes, V-I characteristics of junction diode, AC and DC Resistance of Diode, Diode Current Equation, Equivalent circuit of Diode, Breakdown Mechanism, Zener Diode, Rectifier circuit, Clipper and Clamper, Avalanche Diode Bipolar Junction Transistor: Transistor Operation, Current Equation in n-p- n &amplifier; p-n-p transistors, CB,CE,CC Configurations and their Characteristics, Load line Analysis, DC Biasing (Fixed bias and Voltage Divider), Introduction to Amplifiers.

Module 02 :
Field Effect Transistor: JFET-types, Operations and their Characteristics,
MOSFETs- types, Operations and their Characteristics
CMOS: Brief Introduction to CMOS, Principle of operation of Digital Inverters, VTC Characteristics,

Module 03:
Operational Amplifiers: The Ideal Op Amp, Inverting and Non – Inverting configurations, Equivalent Circuit model, Op amp application in Integration, Differentiation and Summing Circuits.

Module 04 :
Digital Electronic Principles: Introduction, Binary digits, Logic levels and Digital waveforms, Introduction to basic Logic operation, Number system, Decimal numbers, Binary numbers, Decimal-to-Binary conversion, Simple binary arithmetic, Logic Gates, Boolean algebra and Combinational Logic Circuits: The inverter, The AND, OR, NAND NOR, Exclusive-OR and Exclusive-NOR gate, Boolean operations and expressions, Laws and Rules of Boolean algebra, De Morgan’s theorem, Boolean analysis of logic circuits, Standard forms of Boolean expressions, Boolean expression and truth table. Basic combinational logic circuits, Implementation of combinational logic, the universal properties of NAND and NOR gates, Basic adders.

Text book:
1. Electronic Devices Circuit Theory - by Rober L. Boylestad 11th Edition, Pearson Publication, 2014
2. Microelectronic Circuits by A. S. Sedra and Kenneth C. Smith 7 thEdition, Oxford University Press. 2017
3. Digital Design by M. Morris Mano, 5th Edition, Pearson Publication, 2016.

Basic Mechanical Engineering

(RBM2B001) BASIC MECHANICAL ENGINEERING

MODULE-I Thermodynamics:
Systems, Properties, Process, State, Cycle, Internal energy, Enthalpy, Zeroth Law, First law and Second Law of Thermodynamics, Basic Concept of Entropy, Properties of ideal gas., Properties of pure substances, Steam formation, Types of Steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of Steam tables. Related numericals.

MODULE-II Application of Thermodynamics:
Air compressors, Steam Power Plant, Refrigerators and Heat pump, I.C. Engines (Brief Description of different components of above mentioned systems and working principles with Schematic diagram only)

MODULE-III Basic Power transmission devices:
Belt, Rope, Gear drives.Coupling, clutch, brakes. (Working principle only) Introduction to Robotics: Robot anatomy, joints and links and common robot configurations

MODULE-IV Mechanical Measurements:
Temperature, pressure, velocity, flow, strain, force, torque measurements. (Working principle only).

Text books
i. Basic Mechanical Engineering by Pravin Kumar, Pearson
ii. Basic Mechanical Engineering by A R Israni, P K Shah, BSPublications
iii. Text book of Elements of Mechanical Engineering, S T Murthy, Universitiespress
iv. Basic and applied Thermodynamics by P. K. Nag, Tata McGraw Hill

Basic Civil Engineering

RBC2B002 BASIC CIVIL ENGINEERING

MODULE-I
Introduction and Scope of Civil Engineering. Broad disciplines of Civil Engineering; Importance of Civil Engineering, Early constructions and developments over time, Development of various materials of construction and methods of construction.
Building Material and Building Construction: Bricks: Brick as a construction material and its importance, qualities of a good brick, Stone: classification, composition and characteristics, Cement: Classification, tests for cement, uses of cement, types of cement, Concrete: Quality of mixing water, Workability, Compaction of concrete, concrete mix design, Grade and strength of Concrete. Fundamentals of R.C.C. and Prestressed concrete. Types of steels used in civil engineering works. Building Components and their basic requirements, Mortar, Stone masonry, brick masonry, roof, floors.

MODULE-II Surveying: Linear measurement and chain survey: Use of chains and tapes for measurement of correct length of lines, direct and indirect ranging,Compass surveying: Use of prismatic compass, bearing of a line. Local attraction, Introduction to modern surveying instruments EDM and Total Station.

MODULE-III Fundamental of soil and its classification, Foundations: Types of shallow and deep foundations with neat sketches. Fundamentals of Irrigation Engineering. Introduction of Hydraulics structure like canals, siphons, weirs, dams etc.

MODULE-IV Transport, Traffic and Urban Engineering: Introduction to planning and design aspects of transportation engineering, different modes of transport, highway engineering, rail engineering, airport engineering, traffic engineering, urban engineering.

TEXT BOOKS
i. Basic Civil Engineering, S. Gopi, Pearson
ii. Building Construction, Sushil Kumar, Standard Publishers Distributors
iii. Surveying and Levelling by R. Subramanian, Oxford

UniversityPress

REFERENCE BOOKS
i. Engineering Materials, S.C. Rangwala, Charotar Publishing House
ii. Building Material and Construction, G C Sahu, Joygopal Jena, McGrow Hill
iii. Surveying Vol-1 by R Agor, Khanna Publishers
iv. Basic Civil Engineering, M.S. Palanichamy, McGraw Hill

Basic Electrical Engineering

RBE2B001 Basic Electrical Engineering

Module 1:
DC & AC Circuits Circuit laws: Fundamentals of electrical circuit, Ohm's law, Kirchoff's laws, series and parallel connections, analysis of circuits using Node voltage, mesh current, superposition, Thevenin and Norton Theorems to solve simple circuits with dc excitation. Single phase circuit: Single phase emf generation, Representation of sinusoidal waveforms, average, effective, peak and rms values, j operator, Rectangular and polar representation of phasors, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel).

Module 2:
Three Phase Circuits Three phase circuit: Three phase emf generation, Delta-star and star-delta conversions, voltage and current relations in star and delta connections. solution of the three phase circuits with balanced voltage and balanced load conditions, phasor diagram, measurement of power in three phase circuits.

Module 3:
Magnetic Circuits Magnetic Circuits: MMF, flux, reluctance, inductance. Review of Ampere Law, Biot Savart Law. Magnetic field, BH characteristics and Hysteresis loss, Series and parallel magnetic circuits.

Module 4:
Electrical Machines Transformers (Single Phase): Construction, operation, Phasor diagram and performance testing. Induction Motors (Three Phase): Basic Principles, Rotating Magnetic Field,

Equivalent circuit, Phasor diagram, Torque-Speed Characteristics
Basics of DC machines: EMF Equation, Torque Equation, Methods of Excitation.

Text / References:

1. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010
2. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford UniversityPress, 2011.
3. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India,1989.
4.D.C.Kulshreshtha,“BasicElectricalEngineering”,McGrawHill,2009.

Programming for Problem Solving using C

RPL2B001

PROGRAMMING FOR PROBLEM SOLVING USING C

Unit 1:
Introduction to Programming
Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.).
Idea of Algorithm: steps to solve logical and numerical problems.
Representation of Algorithm: Flowchart/Pseudocode with examples.
From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and logical errors in compilation, object and executable code

Unit 2:
Arithmetic expressions, operators and precedence
Conditional Branching and Loops
Writing and evaluation of conditionals and consequent branching
Iteration and loops
Arrays
Arrays (1-D, 2-D), Character arrays and Strings

Unit 3: Function
Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference
Recursion
Recursion as a different way of solving problems. Example programs,

such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Unit 4: Pointers

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation). Dynamic memory allocation.

Structure

Structures, Defining structures and Array of Structures, Structure vs Union.

File handling: ASCII and binary Files

Unit 5: Basic Algorithms

Searching (Linear and Binary), Basic Sorting Algorithms(Bubble, Insertion, and Selection), Concepts of time and space complexity.

Suggested Text Books

(i) Reema Thareja, Introduction to C Programming, 2nd Edition, Oxford University Press.
(ii) E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill