

JAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, ANANTAPUR

COURSE STRUCTURE FOR I Year B.Tech- (CCC)

ELECTRICAL & ELECTRONICS ENGINEERING

S. NO.	CODE	SUBJECT	CREDITS
1.	C1BS01	Mathematics – I (Common to all branches)	
2.	C1BS02	Mathematics – II (Common to all branches)	
3.	C1CS10	‘C’ and data Structures (Common to ECE & EEE)	
4.	C1EC10	Electronic Devices & Circuits (Common to EEE & CSE)	
5.	C1CE10	Hydraulics & Hydraulic Machinery	
6.	C1EE01	Network Theory	
7.	C1CS11	Computer Programming Lab	
8.	C1EC12	Electronic Devices & Circuits Lab	

B.Tech (CCC) I/IV YEAR

C1BS01

MATHEMATICS-I (Common to all branches)

UNIT-I :

Sequences - Series - Convergence and divergence - Ratio test - Comparison test - Integral test - Cauchy's root test - Raabe's test – Absolute and conditional convergence. Rolle's theorem - Lagrange's Mean Value theorem - Cauchy's Mean value Theorem - Generalized Mean Value theorem (Taylor's Theorem)

UNIT-II :

Functions of several variables - limit and continuity - partial differentiation -Chain rule - Total derivative - Euler's theorem, Jacobian - Functional dependence. Maxima and Minima of functions of two variables with and with out constraints, Radius, Center and Circle of Curvature - Evolutes and Envelopes.

UNIT-III :

Curve tracing - Cartesian, polar and parametric curves. Applications of integration to lengths, volumes and surface areas in Cartesian and Polar coordinates.

UNIT-IV :

Differential equations of first order and first degree - formation. Exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, Orthogonal trajectories, Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomial in x , $e^{V(x)}$, $x^{V(x)}$, method of variation of parameters.

UNIT-V :

Laplace transforms of standard functions - Inverse transform - Linearity - first shifting Theorem. Transforms of derivatives and integrals - Unit step function - second shifting theorem - Dirac's delta function - Differentiation and integration of transforms - Multiple integrals: Double and triple integrals -change of variables – Change of order of integration.

UNIT-VI :

Vector Differential Calculus: Gradient, Divergence, Curl and their related properties of sums, Products, Laplacian and second order operators. Vector integral Calculus: Vector integration - Line integral - work done -Potential function - area, surface and volume integrals. Green's theorem, Stoke's and Gauss' Divergence Theorem. Verification of Green's, Stoke's and Gauss'Theorems. Curvilinear Coordinates - Cylindrical, Spherical Coordinates – Expressions of Grad, div, curl in Spherical, Cylindrical and Curvilinear Coordinates.

UNIT-7:

Matrices — brief review — Inverse of a matrix by adjoint , elementary row transformations — Rank - Normal form — eachelon form. Augmented matrix— Consistency — Solution of system of simultaneous linear homogeneous and non-homogeneous equations.

UNIT-8:

Eigen values, Bigen vectors — properties — Cayley-Hamilton Theorem (Inverse and powers of a matrix by Cayley-Hamifton theorem). Quadratic forms —positive, negative definite — Diagnolization of matrix. Calculation of powers of matrix — Modal and spretral matrices. Real matrices — Symmetric, skewsymmetric, orthogonal. Linear Transformation — Orthogonal Transformation. Quadratic forms — Reduction of quadratic form to canonical form — index —signature.

Complex matrices Hermitian, Skew-Hermitian and Unitary — Eigen values and elgen vectors of complex matrices and their properties.

TEXT BOOKS:

1. Iyengar, Krishna Gandhi, "A Text Book of Engineering Mathematics ", Vol-1, 2002, S.Chand.
2. B.V. Ramana, " Engineering Mathematics", 2002, TMH.
3. C. Sanakraiah, "Engineering Mathematics – I", 2002, Vijaya.
4. P. Nageswara Rao, Y. Narsimhulu, Prabhakara Rao, "Engineering Mathematics I", 2002.

REFERENCE BOOKS:

1. S. K. V. S. Sri Rama Chary, M. Bhujanga Rao, Shankar, "Engineering Mathematics", 2000, BSP
2. Erwin Kreyszig, "Advanced Engineering Mathematics" , 8e, 2001 , John Wiley.
3. Michael D. Green Berg, "Advanced Engineering Mathematics ", 2e, PHI.
4. Sarveswara Rao Koneru, "Engineering Mathematics ", 2002, Orient Longman .
5. N. P. Bali, "Engineering Mathematics – I", Laxmi.

B.Tech (CCC) I/IV YEAR

C1 BS02

MATHEMATICS – II (Common to all Branches)

UNIT – I

Formation of Partial differential equations by elimination of arbitrary constants and arbitrary functions - solutions of standard first order equations of type I, II, III and IV. Solution of one-dimensional heat equation, one-dimensional wave equation and two-dimensional Laplace's equation by the method of separation of variables.

UNIT –II

Fourier integral theorem- Finite and infinite Fourier Transform – Inverse Transforms – Solution to initial boundary value problems. – Z – Transforms. – Inverse Z – Transforms. – Simple Properties – solution of differences equations.

UNIT –III

Complex functions – Continuity – differentiability – Analyticity – Cauchy – Reiman Equations in Cartesian and polar coordinates. Harmonic and Conjugate harmonic functions.

UNIT –IV

Elementary functions and their properties of Sin Z, Cos Z, e^z , log Z, Cosh Z, Sinh Z. Line integral – Cauchy's Integral Theorem – Cauchy's Integral formula – derivative of analytic functions – Taylor's and Laurent's Series. Zeroes and Poles,

UNIT –V

Residue- Residue theorem – Evaluation of standard real integrals – Argument principle – Rouche's theorem and Fundamental theorem of algebra.

Conformal mapping of function Z^n , Sin Z, Cos Z, e^z , log Z. Bilinear Transformation.

UNIT –VI

Numerical Methods-I:

Iterative methods, bisection, Regula false position, Newton-Raphson. –successive approximation methods. Solution of linear simultaneous algebraic equations – Gauss – Jordan and Gauss – Seidel's methods.

UNIT –VII

Numerical Methods-II:

Interpolation. Forward differences – backward differences and central differences. Interpolation Methods. Least square approximation of functions – Linear regression – Polynomial regression.

UNIT –VIII

Numerical Methods-III:

Numerical interpolation by Trapezoidal and Simpson's 1/3 and 3/8th rules – Numerical solution of differential equations by Euler's method – Runge – Kutta methods – Milne's predictor – Corrector methods.

Recommended Text Books

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| 1. Engineering Mathematics | by B.V., Ramana, TMH, Second Edition – 2004. |
| 2. Engineering Mathematics-I | by Iyengar, Krishna Gandhi et.al, S. Chand, 2002. |
| 3. Engineering Mathematics-II | by C. Sankaraiah, Vijaya Publication 2002. |
| 4. Numerical Methods | by S.S.Sastry, Prentice-Hall. |

B.Tech (CCC) I/IV YEAR

C1 CS10

'C' AND DATA STRUCTURES (Common to ECE & EEE)

UNIT - I

Algorithm, flowchart, program development steps, basic structures of C language, C tokens, data types, declaration of variables, assigning values, arithmetic, relational and logical operator, increment and decrement operators, control operator, bit-wise operator, expressions, evaluation, input-output operators,

UNIT - II

IF and SWITCH statement, WHILE, DO-WHILE and For statements, C Programs covering all the above aspects.

UNIT - III

One dimensional & two dimensional arrays, initialisation, string variables, declaration, reading, writing, string handle function, user-defined functions, variables & storage classes, example C Programs.

UNIT - IV

Structure definition, initialising, assigning values, passing of structures as arguments, unions, declaring & initialising of pointers, pointer based expressions, arrays, strings.

UNIT - V

functions and structures, C Program examples, file management in C, opening & Closing, I-O operations files.

UNIT – VI

Stacks, representing stacks in C, Infix, Postfix & Prefix Programs, recursion in C, Queue & its sequential representation, circular queue, sequence.

UNIT – VII

Single Linked List, Double linked list, Header. Circular List, applications, binary trees, representation, tree traversals graph representation, graph traversals spanning trees.

UNIT – VIII

Search techniques: linear and binary search methods, sorting methods Exchange sort, selection sort, quick sort tree sort.

TEXT BOOKS:

1. C & Data Structures - by E. Balaguru Swamy TMH 2002.
2. Data Structures using C - by A.S. Tanenbaum, PHI.

REFERENCE BOOK:

1. Fundamentals of Data Structures - by Horowitz & Sahani.

B.Tech (CCC) I/IV YEAR

**C1 EC10 ELECTRONICS DEVICES AND CIRCUITS
(Common to EEE & CSE)**

UNIT – I : ELECTRON DYNAMICS AND CRO

Motion of charged particles in electric and magnetic fields. Simple problems involving electric and magnetic fields only. Electrostatic and magnetic focusing. Principles of CRT, deflection sensitivity (Electrostatic and magnetic deflection). Applications of CRO: Voltage, Current and Frequency Measurements.

UNIT – II : SEMICONDUCTOR DIODES AND RECTIFIERS

Construction, Principle of operation, V-I characteristics, symbol, equivalent circuit parameter calculation, limitations and specifications of - pn junction diode, zener diode.

UNIT – III : DIODES, FILTERS AND APPLICATIONS

Varactor diode, Tunnel diode and photo diode. Diffusion and transition capacitances of pn junction diode. Hall Effect. Diode applications : Rectifiers - Half wave, Full wave and Bridge Rectifiers, Filters- L, C, π -Section and p -section filters.

UNIT – IV : TRANSISTOR CHARACTERISTICS

Construction, principle of operation, V-I characteristics, symbol, equivalent circuit, parameter calculations, applications, limitations and specifications of-BJT, FET, UJT and MOSFETs (different configurations of transistors are to be considered).

UNIT – V : AMPLIFIERS

Biasing, DC equivalent model, criteria for fixing operating point and methods of Bias-Stabilization, Thermal run away and thermal stability. Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor. Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. comparison of BJT and FET.

UNIT – VI :

RC coupled amplifier - frequency response. Biasing of FET, MOSFET. FET amplifier - frequency response, FET Small signal model. SCR, DIAC, TRIACs. Optoelectronic devices.

UNIT – VII : FEEDBACK AMPLIFIERS

Concepts of feedback Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Simple problems.

UNIT - VIII : OSCILLATORS

Condition for oscillations. RC and LC type oscillators, Crystal oscillators, Frequency

and amplitude stability of oscillators, Generalized analysis of LC oscillators, Quartz (Hartley, Colpitts), RC-phase shift and Wien-bridge oscillators.

TEXT BOOKS:

1. Millman, Halkias, "Electronic Devices and Circuits", TMH.
2. R. L. Boylestad, Louis Nashelsky, "Electronic Devices and Circuits", PEA, PHI.
3. K. Lal Kishore, "Electronic Devices and Circuits", 2002, BSP

REFERENCE BOOKS:

1. Millman, Grabel, "Microelectronics", TMH.
2. Bogart, "Electronic Devices and Circuits", Universal.

B. Tech(CCC)I/IV YEAR

C1 CE10

HYDRAULIC AND HYDRAULIC MACHINERY

UNIT – I

Dimensions and units : physical properties of fluids – specific gravity, viscosity surface tension – vapour pressure and their influence on fluid motion – atmospheric gauge and vacuum pressure – measurement of pressure – manometers.

UNIT – II

Fluid kinematics : stream line, path line and streak lines and stream lines classification of flows, steady unsteady uniform, non uniform, laminar, turbulent, rotational, and irrotational flows – equation of continuity for 1 - dimensional flow.

UNIT – III

Fluid dynamics : surface and body forces – Euler's and Bernoulli's equations for flow along a stream line – momentum equation and its applications.

UNIT – IV

Closed conduit flow : turbulent flow, variation of friction factor with Reynold's number – losses in pipes-in series and in parallel – total energy line – hydraulic gradient line.

UNIT – V

Measurement of flow : pilot tube, venturimeter, and orifice meter – flow through orifices, flow over weirs and notches.

UNIT - VI

Basics of turbo machinery : hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity triangles head, efficiency and work done – application to radial flow turbines.

UNIT – VII

Hydraulic turbines : classification of turbines, impulse and reaction turbines, pelton wheel, Francis turbine and Kaplan turbine – governing of turbines – unit speed – unit quantity – unit power – specific speed – performance characteristics.

UNIT – VIII

Reciprocating and centrifugal pumps : classification – work done – manometric head – losses and efficiencies – specific speed – pumps in series and parallel performance characteristic curves.

Text Books :

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH
2. Fluid Mechanics, Hydraulics and hydraulic machines K.R. ARORA
3. Hydraulic Machinery and Systems Bauga and Sharma.

B. Tech(CCC) I/IV YEAR**C1 EE01****NETWORK THEORY****UNIT – I**

Circuit Concept – R-L-C parameters – Voltage and Current sources – Source transformation – Voltage – Current relationship for passive elements – Kirchhoff's laws – Network Reduction Techniques – Series, Parallel Series-Parallel, Star-to-Delta or delta-to-star transformation

UNIT - II

Magnetic Circuits – Faraday's Laws of electromagnetic induction – Concept of self and mutual inductances – dot convention – coefficient of coupling – Composite Magnetic Circuits – Analysis of Series and Parallel Magnetic Circuits.

UNIT – III

R.M.S. and Average values and form factor of different periodic wave forms , Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference – Concept of Power factor , Real and Reactive Powers - J-notation, Complex and Polar forms of representation, Complex Power – Locus diagrams. Series R-L, R-C, R-L-C and parallel combinations with variation of various parameters- Resonance – Series, Parallel circuits, Concept of Bandwidth and Q-factor.

UNIT – IV

Three phase circuits : Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of 3 phase power, active power and reactive power.

UNIT - V

Network topology - Definitions – Graph – Tree, Basic cutset and Basic Tie set matrices for planar network – Loop and Nodal methods of analysis of Networks with dependent and independent voltage and current sources - Duality & Dual networks.

UNIT – VI

Network theorems : (Without proof) : Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millman's and Compensation theorems for dc and ac excitations.

UNIT – VII

Transient response of RL, RC, RLC circuits (Series and Parallel combinations) for D.C. and sinusoidal excitations - Initial conditions –Classical method and Laplace transform methods of solutions – Response of RL, RC, RLC for step, ramp, pulse and impulse excitations using Laplace transform methods.

UNIT – VIII

Two Port network parameters – Z, Y, (ABCD) Transmission and Hybrid parameters for Resistive Networks – concept of Transformed Network – 2 port network parameters using transformed variables.

Filters – Low pass- High pass and Band pass filters – Constant K and M-derived filters and composite filter design

TEXT BOOKS :

1. Engineering Circuit Analysis - by William Hayt and Jack E. Kemmerly, Mc Graw-Hill Companies, 5th edition.
2. Electric Circuits - J. Edminister & M. Nahvi, - Schaum's Outlines, Tata Mc Graw-Hill Publishing Company Ltd., 1999.
3. Network Theory – by N. Srinivasulu, Hi-Tech. Publishers

REFERECE BOOKS :

1. Network Theory – Sudhakar and Shymmohan, TMH Publications
2. Network Analysis - G.K. Mithal, Khanna Publishers
3. Network Theory – N.C. Jagan & C. Lakshminarayana, B.S. Publications

B. Tech(CCC) I/IV YEAR

C1CS11

COMPUTER PROGRAMMING LAB

Write a C program that evaluates the following algebraic expressions after reading necessary values from the user:

- a. $\frac{ax+b}{ax-b}$
- b. $2.5 \log x + \cos 32^\circ + |x^2 - y^2| + \sqrt{2xy}$

Write a C program for the following

- a) Printing three given integers in ascending order
- b) Sum of 1+2+3+n
- c) $1+x^2/2! + x^3/3! + \dots$ upto ten terms
- d) $x+x^3/3! + x^5/5! + \dots$ upto 7 th digit accuracy
- e) Read X and compute Y = 1 for x>0
Y = 0 for x = 0
Y = -1 for x < 0

Write C program using FOR statement to find the following from a given set of 20 integers.

- i. Total number of even integers
- ii. Total number of odd integers
- iii. Sum of all even integers
- iv. Sum of all odd integers

Write a C program to obtain the product of two matrices A of size (3X3) and B of size (3X2). The result matrix C is to be printed out along with A and B. Assume suitable values for A&B.

Using switch-case statement, write a C program that takes two operands and one operator from the user performs the operation and then print the answer. (Consider operators +, -, /, * and %).

Write C procedures to add, subtract, multiply and divide two complex numbers (x+iy) and (a+ib). Also write the main program that uses these procedures.

The total distance travelled by vehicle in t seconds is given by distance = $ut + \frac{1}{2}at^2$

where u and a are the initial velocity (m/sec.) and acceleration (m/sec²). Write C program to find the distance travelled at regular intervals of time given the values of u and a. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of u and a.

A cloth show room has announced the following seasonal discounts on purchase of items.

Purchase amount	Discount (Percentage)	
	Mill cloth	Handloom items
1-100	-	5.0
101-200	5.0	7.5
201-300	7.5	10.0
above 300	10.0	15.0

Write C Program using Switch and If statements to complete the net amount to be paid by a customer.

Given a number, write C program using while loop to reverse the digits of the number. Example 1234 to be written as 4321.

The Fibonacci sequence of numbers is 1, 1, 2, 3, 5, 8, ... based on the recurrence relation

$$F(n) = f(n-1) + f(n-2) \quad \text{for } n > 2.$$

Write C program using do-while to calculate and print the first m Fibonacci numbers.

Write C programs to print the following outputs using for loop.

<p>1)</p> <pre> 1 2 2 3 3 3 4 4 4 4 5 5 5 5 5 </pre>	<p>2)</p> <pre> 1 2 2 3 3 3 4 4 4 4 5 5 5 5 5 </pre>
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Write a C program to extract a portion of a character string and print the extracted string. Assume that m characters are extracted starting with the nth character.

A Maruthi Car dealer maintains a record of sales of various vehicles in the following form:

Vehicle type	Month of sales	Price (Rs.)
Maruthi – 800	02 / 87	75,000
Maruthi – DX	07 / 87	95,000
Gypsy	04 / 88	1,10,000
Maruthi Van	08 / 88	85,000

Write a C program to read this data into a table of strings and output the details of a particular vehicle sold during a specified period. The program should request the user to input the vehicle type and the period (Starting month & ending month).

Write a function that will scan a character string passed as an argument and convert all lower case characters into their upper case equivalents.

Implement the following data structures using Arrays

- i) Stacks
 - ii) Linear queues
 - iii) Circular queues
 - iv) Dequeue
16. Implement polynomial addition and multiplication with linked list spares matrix.
17. Implement binary search tree using linked list and perform the following operations.
- i) Insertion
 - ii) Deletion
 - iii) In order Traversal
 - iv) Pre order Traversal
 - v) Post Order Traversal
18. Singly linked list and doubly linked lists
- i) Insertion
 - ii) Deletion
 - iii) Loopup
- 19.
- i) Implement Stack using singly linked list
 - ii) Implement queue using singly linked list
20. Implement the following sorting techniques
- i) Bobble sort
 - ii) Insertion sort
 - iii) Quick Sort
 - iv) Heap Sort
21. Implement the following searching method
- i) Sequential Search
 - ii) Binary Search
 - iii) Fibonacci Search
- 22.
- i) Conversion of Infix expression to Postfix notation
 - ii) Simple expression evaluator, that can handle +, -, / and *.
23. Implement the algorithms for the following iterative methods using C, to find one root of the equation $f(x) = x \sin x + \cos x = 0$
- a) Bisection
 - b) false position
 - c) Newton-Raphson
 - d) Successive approximation.
24. Write programs for implementing Gauss-Jordan and Gauss-Seidel methods for solving simultaneous algebraic equations given below.

$$9x_1 + 2x_2 + 4x_3 = 20$$

$$x_1 + 10x_2 + 4x_3 = 6$$

$$2x_1 - 4x_2 + 10x_3 = -15$$

25. Write Computer programs to implement the Lagrange interpolation and Newton-Gregory forward interpolation.
26. Implement in 'C' then linear regression and polynomial regression algorithms.
27. Implement Trapezoidal and Simpson methods.
28. Practice Exercises (in text book 2 of theory) related to :
 - a) Word 2000 Chapter
 - b) Excel 2000 Chapter
 - c) Power Point 2000 Chapter
 - d) Access 2000 Chapter
 - e) Outlook 2000
 - f) Front page 2000

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B. Tech(CCC) I/IV YEAR

C1 EC12

ELECTRONIC DEVICES AND CIRCUITS LAB

1. PN Junction diode characteristics
a) forward bias b) reverse bias
2. Zener diode characteristics
3. Transistor CB characteristics (Input and Output)
4. Transistor CE characteristics (Input and Output)
5. Transistor CC characteristics (Input and Output)
6. Rectifier without filters (Full wave & Half wave)
7. Rectifier with filters (Full wave & Half wave)
8. UJT characteristics
9. FET characteristics
10. Study of CRO
11. Regulated Power Supplies
12. Measurement of h parameters of transistor in CB, CE, CC configurations.
13. CE amplifier
14. CC amplifier (emitter follower)
15. RC coupled amplifier (Two stage)
16. FET amplifier
17. Class A Amplifier
18. Class B Amplifier
19. RC Phase shift Oscillator
20. Feed back amplifier
21. Colpitts Oscillator

22. Tuned Voltage Amplifier
23. Class – C Tuned Power Amplifier
24. Verification of miller theorem