C21_ Curriculum

DIPLOMA IN COMPUTER ENGINEERING

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA: HYDERABAD

III SEMESTER

Sl No	Course Code	Course Name	L	T	P	Total Periods per semester	Credits	Mid Sem 1	Mid Sem 2	Internal evaluation	Max Marks	Min Marks	Total Marks	Min marks for Passing including internal
			Teaching Scheme — Instruction periods per week					**Examination Scheme** — Continuous internal evaluation			Semester end examination			
1	SC-301	Applied Engineering Mathematics	4	1	0	75	3	20	20	20	40	14	100	35
2	EC-302	Digital Electronics	4	1	0	75	3	20	20	20	40	14	100	35
3	CS-303	Computer Architecture	4	1	0	75	3	20	20	20	40	14	100	35
4	CS-304	Data Structures Through C	4	1	0	75	3	20	20	20	40	14	100	35
5	CS-305	Oops Through C++	4	1	0	75	3	20	20	20	40	14	100	35
6	CS-306	Data Structures Through C Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
7	CS-307	C++ Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
8	EC-308	Digital Electronics Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
9	CS-309	Multimedia Technologies Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
10	HU-310	Communication and Life Skills Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
11	CS-311	Skill Upgradation	0	0	8	120	2.5	0	0	Rubrics			--	-
	Activities: student performance is to be assessed through Rubrics													

SC-301 - APPLIED ENGINEERING MATHEMATICS

Course Title	Applied Engineering Mathematics	Course Code	SC-301
SEMESTER	III	Course Group	Foundation
Teaching Scheme in periods (L : T : P)	4:1:0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the knowledge of Basic Engineering Mathematics and Engineering Mathematics at Diploma 1st and 2nd Semester level.

Course Outcomes: COs

At the end of the course, the student will have the ability to:

CO 1	Integrate different kinds of continuous functions
CO 2	Integrate various continuous functions using different methods of integration
CO 3	Find the values of definite integrals using fundamental theorem of integral calculus.
CO 4	Apply definite integrals to determine Areas, Volumes of irregular shapes.
CO 5	Find the Mean and RMS values of various functions and Approximate values of Definite integrals using Trapezoidal and Simpson's 1/3rd rule
CO 6	Find order and degree of a Differential equation, form the Differential Equation from given primitive by eliminating the arbitrary constants and Solve Simple DEs of 1st order and 1st degree.

Course Content:

Unit-I

Duration: 14 Periods (L: 11 – T:3)

Indefinite Integration-I

Integration regarded as anti-derivative – Indefinite integral of standard functions. Properties of indefinite integral. Integration by substitution or change of variable. Integrals of the form $\sin^m \theta . \cos^n \theta$. Where m and n are positive integers. Integrals of tan x, cot x, sec x, cosec x and powers of tan x, sec x by substitution. Evaluation of integrals which are reducible to the following forms: (Nine standard integrals)

$$i)\dfrac{1}{a^2+x^2}, \dfrac{1}{a^2-x^2}, \dfrac{1}{x^2-a^2}$$

$$ii)\dfrac{1}{\sqrt{a^2+x^2}}, \dfrac{1}{\sqrt{a^2-x^2}}, \dfrac{1}{\sqrt{x^2-a^2}}$$

$$iii)\sqrt{x^2+a^2}, \sqrt{a^2-x^2}, \sqrt{x^2-a^2}$$

Unit – II

Duration: 10 Periods (L: 8 – T:2)

Indefinite Integration-II

Integration   by decomposition of   the integrand into simple rational algebraic functions. Integration by parts - Bernoulli's   rule.

Unit-III

Duration: 10 Periods (L: 8 – T: 2)

Definite Integral and its Properties:

Definite integral fundamental theorem of integral calculus properties of definite integrals, evaluation of simple definite integrals. Definite   integral as the limit of a sum.

Unit – IV

Duration: 12 Periods (L: 10 – T: 2)

Applications of Definite Integrals:

Areas under plane curves – Sign of the Area – Area enclosed between two curves.   Solid of revolution – Volumes of solids of revolution.

Unit – V

Duration: 10 Periods (L: 8 – T: 2)

Mean , RMS values and Numerical Integration:

Mean values and Root Mean Square values of a function on a given interval. Trapezoidal rule, Simpson's 1/3 rule to evaluate an approximate value of a definite integral.

Unit – VI

Duration: 19 Periods (L: 15 – T: 4)

Differential Equations of First Order:

Definition of a differential equation – order and degree of a differential equation – formation of differential equations – solution of differential equation of first order, first degree : Variables -separable, Homogeneous, Exact, Linear differential equation, Bernoulli's equation.

Reference Books:

1. Integral Calculus Vol. I, by M. Pillai and Shanti Narayan
2. Thomas' Calculus, Pearson Addison –Wesley Publishers
3. Higher Engineering. Mathematics, by B.S. Grewal— Khanna publishers—New Delhi

Suggested E-Learning references

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html
2. E-books: www.mathebook.net

Suggested Learning Outcomes

At the end of the course, the student will have the ability to:

Unit-I

1.0 Use Indefinite Integration to solve engineering problems

    1.1 Use the concept of Indefinite integral as an anti-derivative.

    1.2 Use the indefinite integrals of standard functions and properties of Integrals $\int (u + v)\, dx$ And $\int k\, u\, dx$ where k is constant and *u, v* are functions of *x* in solving simple problems.

    1.3 Solve integration problems involving standard functions using the above rules.

    1.4 Evaluate integrals involving simple functions of the following type by the method of Substitution.

        (i) $\int f\,(ax + b)\, dx$ *where* $f(x)\, dx$ is in standard form.

        (ii) $\int [f\,(x)]^n\, f\,'(x)\, dx$

        (iii) $\int f'(x)/[f(x)]\, dx$

        (iv) $\int f\,\{g(x)\}\, g\,'(x)\, dx$

    1.5 Find the Integrals of *tan x, cot x, sec x* and *cosec x using* the above.

    1.6 Evaluate the integrals of the form $\int Sin^m\, \theta\, Cos^n\theta.\, d\theta$ where m and n are positive integers.

    1.7 Evaluate integrals of powers of *tan x* and *sec x*.

    1.8 Evaluate the Standard Integrals of the functions of the type : (Nine standard integrals)

$$i) \frac{1}{a^2 + x^2}, \frac{1}{a^2 - x^2}, \frac{1}{x^2 - a^2}$$

$$ii) \frac{1}{\sqrt{a^2 + x^2}}, \frac{1}{\sqrt{a^2 - x^2}}, \frac{1}{\sqrt{x^2 - a^2}}$$

$$iii) \sqrt{x^2 + a^2}, \sqrt{a^2 - x^2}, \sqrt{x^2 - a^2}$$

1.9 Evaluate the integrals of the type :

$$\int \frac{1}{a \pm bSin\theta} d\theta, \int \frac{1}{a \pm b\cos\theta} d\theta \text{ and } \int \frac{1}{a\cos\theta \pm b\sin\theta \pm c} d\theta$$.

Unit-II

2.0 Use Indefinite Integration to solve engineering problems
2.1 Evaluate integrals using decomposition method.
2.2 Evaluate integrals using integration by parts with examples.
2.3 Apply the Bernoulli's rule for evaluating the integrals of the form $\int u.v \, dx$.
2.4 Evaluate the integrals of the form $\int e^x [f(x) + f'(x)] \, dx$.

Unit-III

3.0 Understand definite integral and use it in engineering applications
3.1 Use the fundamental theorem of integral calculus in solving problems
3.2 Calculate the definite integral over an interval.
3.3 Apply various properties of definite integrals in engineering problems.
3.4 Evaluate simple problems on definite integrals using the above properties.
3.5 Find definite integral as a limit of sum by considering an area.

Unit –IV

4.0 Understand definite integral and use it in Engineering applications
4.1 Find the Areas under plane curves and area enclosed between two curves using Integration.
4.2 Obtain the Volumes of solids of revolution and solve problems.

Unit –V

5.0 Understand Mean, RMS values and Numerical Methods
5.1 Obtain the Mean value and Root Mean Square (RMS) value of the functions in any given Interval.
5.2 Apply the Trapezoidal rule, Simpson's 1/3 rules for approximation of definite integrals and solve some problems.

Unit –VI

6.0 Solve Differential Equations in engineering problems.
6.1 Identify a Differential equation and find its order and degree

6.2 Form a differential equation by eliminating arbitrary constants.

6.3 Solve the first order first degree differential equations by the following methods:

      (i)   Variables Separable.

      (ii)   Homogeneous Equations.

      (iii)   Exact Differential Equations

      (iv)   Linear Differential equation of the form $\frac{dy}{dx} + Py = Q$,

           Where P and Q are functions of x or constants.

      (v)   Bernoulli's Equation (Reducible to linear form.)

6.4 Solve simple problems leading to engineering applications by using above methods.

Suggested Student Activities

1. Student visits Library to refer Standard Books on Mathematics and collect related material
2. Quiz
3. Group discussion
4. Surprise tests
5. Seminars
6. Home Assignments
7. Mathematics for preparing competitive exams and solving old question papers on arithmetical ability.

CO / PO - MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapped POs
CO1	3	2					3	1, 2 ,7
CO2	3	2					3	1, 2 ,7
CO3	3	2					3	1, 2 ,7
CO4	3	2					3	1, 2 ,7
CO5	3	2					3	1, 2 ,7
CO6	3	2					3	1, 2 ,7

		MID SEM-I EXAM					
S.No	Unit Name	R	U	A	Remarks		
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)			
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)			
	Total Questions	4	4	4			
		MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks		
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)			
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)			
	Total Questions	4	4	4			

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE					Remarks
		R			U	A	
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI			7,8	10(b)	14(b)	
					12(a)	16(a)	
					12(b)	16(b)	
	Total Questions	8			8	8	
Legend:	Remembering (R)	1 Mark					
	Understanding (U)	3 Marks					
	Application (A)	5 Marks					

<u>**TIME: 1: 00 Hour**</u>   <u>**Max. Marks: 20**</u>

PART-A

Instructions: 1. Answer **ALL** questions   04 X 01 = 04

                                2 Each question carries **ONE** mark

1. Integrate $(e^x – \text{Sin } x + x^4)$ with respect to x

2. Find $\int \frac{dx}{5x+7}$ dx

3. Write Bernoulli's rule of integration

4. Find $\int x \log x \, dx$

PART-B

Instructions: 1. Answer **ALL** questions   02 X 03 = 06

                                2. Each question carries **THREE** marks

5 a) Evaluate $\int \frac{x^5}{1+x^{12}} dx$.

                        OR

5 b) Evaluate $\int \frac{dx}{(x^2+16)}$

6 a) Evaluate $\int x \sin x \, dx$

                        OR

6 b) Evaluate $\int \frac{3x+2}{(x-1)(2x+3)} dx$.

PART- C

Instructions: 1. Answer **ALL** questions   02 X 05 = 10
                                2. Each question carries **FIVE** marks

7 a) Evaluate $\int \sqrt{x^2 + 2x + 5} \, dx$
                        OR
7 b) Evaluate: $\int \cos x \cos 2x \, dx$.

8 a) Find $\int x \tan^{-1} x \, dx$.
                        OR

8 b) Find $\int x^4 \cos 2x \, dx$.

<u>**TIME: 1: 00 Hour**</u>   <u>**Max. Marks: 20**</u>

PART-A

Instructions: 1. Answer **ALL** questions   04 X 01 = 04

                             2 Each question carries **ONE** mark

1. Find $\int_0^1 (x^4 + 1)\, dx$

2. Evaluate : $\int_0^\pi Sin3x dx$

3. Evaluate : $\int_0^1 \frac{1}{1+x^2}\, dx$

4. Write the formula to find area bounded by the curve y= f(x) , x-axis, between the limits x=a and x =b

PART-B

Instructions: 1. Answer **ALL** questions   02 X 03 = 06

                             2. Each question carries **THREE** marks

5 a) Evaluate: $\int_0^{\frac{\pi}{2}} \sqrt{1 - Sin2x}\, dx$

             OR

5 b) Evaluate: $\int_0^{\frac{\pi}{2}} sin^2 x dx$

6 a) Find the area bounded by the line 2x + y =8, x-axis and the lines x = 2 and x = 4.

             OR

6 b) Find the Volume of the Solid generated by revolving the part of the Circle

    $x^2 + y^2 = 36$ From x = 0 to x = 4 about x – axis.

PART C

Instructions: 1. Answer **ALL** questions   02 X 05 = 10

                             2. Each question carries **FIVE** marks

7 a) Evaluate: $\int_0^{\frac{\pi}{2}} \frac{\sqrt{Sinx}}{\sqrt{Sinx}+\sqrt{Cosx}}\, dx$

             Or

7 b) Evaluate: $\int_0^{\frac{\pi}{2}} \log cos x dx$

8 a) Find the area enclosed between the Parabolas $y = 3x - x^2$ and $y = x^2 - x$.

             Or

8 b) Find the Volume of the Solid generated by the revolution of the area bounded by the

    Ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, about x- axis.

BOARD DIPLOMA EXAMINATION (C-21)
III SEMESTER END EXAMINATION
SC-301-APPLIED ENGINEERING MATHEMATICS

Time: 2 hours   **[Total Marks: 40]**

PART-A

Instructions: 1. Answer **ALL** questions   08 X 01 = 08
                       2 Each question carries **ONE** mark

1. Find $\int (x^8 - \frac{5}{x})\,dx$

2. Evaluate $\int_0^1 (x^2 + 1)\,dx$

3. Write the formula to find mean value of y = f(x), in the interval (a, b)

4. Find the Order and Degree of the Differential Equation $x\frac{dy}{dx} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$.

5. Write Trapezoidal Rule to find the approximate value of $\int_a^b f(x)dx$.

6. Write the formula to find RMS value of y = f(x) over the range x=a and x = b.

7. Solve $\frac{dy}{dx} = e^{4x+y}$

8. Write the condition for exactness of the differential equation M(x, y)dx + N(x,y)dy =0

PART-B

Instructions: 1. Answer **ALL** questions   04 X 03 = 12
                       2. Each question carries **THREE** marks

9.
   a) Evaluate: $\int_0^{\frac{\pi}{2}} \sqrt{1 - Sin2x}\,dx$

OR

   b) Find the approximate value of $\int_0^6 \frac{dx}{1+x}$ by taking n = 6 using Trapezoidal rule.

10.
   a) Find the area bounded by the Parabola $y = x^2 - 2x + 1$ and x-axis.

OR

   b) Form the Differential Equation from $y = Ae^x + Be^{3x}$ where A, B are arbitrary constants

11.
   a) Find the RMS value of $\sqrt{\log x}$ over the range x= 1 and x= e

OR

   b) Calculate approximate value of $\int_0^4 \frac{dx}{1+x}$ by taking n = 4 using Simpson's 1/3 rule

12.
   a) Solve: $x\frac{dy}{dx} + 2y = logx$.

OR

   b) Solve: $x(1 - y^2)dx + y(1 - x^2)dy = 0$

PART C

13.

a) Evaluate: $\int \frac{1}{x^2 + 8x + 25} dx$

OR

b) Find the RMS value of $y = \sqrt{8 - 4x^2}$ between $x = 0$ and $x = 2$

14.

a) Find the volume of solid generated by revolving the Ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about Major axis

OR

b) Solve: $\frac{dy}{dx} = Sin(x + y)$

15.

a) A curve is drawn to passing through the points given by the following table:

x	1	1.5	2	2.5	3	3.5	4
y	3	3.4	3.7	3.8	2.7	2.6	2.1

Calculate the approximate area bounded by the curve, x-axis and the lines x= 1 and x= 4 using Simpson's 1/3 rule

OR

b) Evaluate: $\int_0^1 \sqrt{(1 - x^2)} dx$ approximately by taking n = 4 using Simpson's 1/3 rd Rule.

16.

a) Solve: $(y^2 - xy)dx = x^2 dy$.

OR

b) Solve: $\frac{dy}{dx} + yCosx = y^3 Sin2x$.

EC-302-DIGITAL ELECTRONICS

Course Title	Digital Electronics	Course Code	EC-302
Semester	III	Course Group	Core
Teaching Scheme in Hrs(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the basic knowledge of electronics in Basic Physics at Secondary school level.

Course Outcomes

CO1	Convert Codes and Solve Boolean expressions using K-map.
CO2	Compare various digital IC logic families and identify them by their characteristics.
CO3	Develop Combinational logic circuits like Adders, MUX , De-mux, encoder, decoder and comparator circuits
CO4	Identify the need of sequential circuits and know different flip-flops.
CO5	Design Registers and counter circuits
CO6	Compare different types of memories and understand Converters.

After completion of the course, the student should be able to

COURSE CONTENT

UNIT 1 –

Basics of Digital Electronics

Duration: 16 Periods (L: 10– T: 6)

 Convert number systems and Solve Boolean expressions using K-map.

Number systems –-Conversion from one number system into another – performing arithmetic operations in binary-Use of weighted and Un-weighted codes- importance of parity Bit-Different postulates in Boolean algebra- Basic logic gates with truth table- universal logic gates - exclusive – OR gate with truth table- De-Morgan's theorems- AND, OR, NOT operations using NAND, NOR gates- De-Morgan's theorems related postulates to simplify Boolean expressions (up to three variables)- standard representations for logical functions

(SOP and POS form)- Boolean expressions from the given truth table- Karnaugh map to simplify Boolean Expression (up to 4 variables only)

UNIT2 –Digital IC logic families

Duration: 08 Periods (L: 08– T: 0)

Compare various digital IC logic families and identify them by their characteristics.

Classification of digital logic families- Important characteristics of Digital ICs- requirements of TTL and CMOS ICs - Propagation delay and Noise margin- Fan-in and Fan-out capacity- Power dissipation- Figure of merit of a logic family- explain TTL NAND gate with open collector- TTL NAND gate with Totem pole output- CMOS NAND gate circuit – Compare logic families- IC numbers of two input Digital IC Logic gates.

UNIT 3–Develop Combinational logic circuits like Adders ,MUX, De-mux, encoder, decoder and comparator circuits.

Duration: 14 Periods (L: 10– T: 4)

Concept of combinational logic circuits- Half adder circuit -truth table- Half-adder using NAND gates only &NOR gates only- Full adder circuit - Truth table- Full-adder using two Half-adders and an OR – gate - a 4 Bit parallel adder using full – adders- 2's compliment parallel adder/ subtractor circuit- Serial adder -Performance of serial and parallel adder- Operation of 4 X 1 Multiplexers- Operation of 1 to 4 demultiplexer- IC numbers - applications- 3 X 8 decoder- BCD to decimal decoder- Decoders- Decimal to BCD encoder- IC numbers -Applications - Tri-state buffer - Types of tri-state buffers-Applications - Digital comparator.

UNIT 4–Identify the need of sequential circuits and know different flip-flops.

Duration: 10 Periods (L: 8– T: 2)

Concept of Sequential logic circuits- NAND and NOR latches with truth tables-Necessity of clock - Clocked SR flip flop circuit using NAND gates- Need for preset and clear inputs - Circuit of Clocked JK flip flop (using S-R flip-flops) with truth table -Race around condition- Master slave JK flip flop circuit - clocked D and T flip flops - Truth table, Circuit diagram

and timing diagram- Symbols of above Flip Flops- Truth tables - Applications for each type of flip flop

UNIT 5–Design Registers and counter circuitsusing flip-flops.

Duration: 14 Periods (L: 10– T: 4)

- Need for a Register - Types of registers- 4 bit shift left and shift right registers - 4-bit bi-directional shift Register - Parallel in parallel out shift register - Universal shift register (74194) - Applications of shift registers. 4-bit asynchronous counter - Asynchronous decade counter with a circuit - 4-bit synchronous counter–Differences between synchronous and asynchronous counters- asynchronous 3 bit up-down counter -Ring counter- applications

UNIT 6– Compare different types of memories and understand Converters.

Duration: 13 Periods (L: 10– T: 3)

Types of memories - Memory read operation, write operation, access time, memory capacity, address lines and word length- ROM and RAM- Diode ROM- - static RAM and dynamic RAM- Flash ROM.

Operational amplifiers- Instrumentation amplifiers- A/D binary weighted resistors- R-2R ladder circuits - D/A converters- counter method and successive approximation method.

Specific Learning Outcomes: upon completing this course the student will be able to

1.0 Understand the basics of Digital Electronics

1.1 Retrieving inter system conversions of Binary, Octal and Hexadecimal number systems.

1.2 Memorizing binary addition, subtraction, Multiplication and Division.

1.3 Perform subtraction of binary numbers in 2's complement method.

1.4 State the use of weighted and Un-weighted codes and list the types.

1.5 Work out 8421, Excess-3 codes.

1.6 Convert a given binary number into Gray code and vice-versa.

1.7 Explain the use of alphanumeric codes (ASCII & EBCDIC)

1.8 State the importance of parity Bit.

1.9 State different postulates in Boolean algebra.

1.10 State and Prove De-Morgan's theorems.

1.11 Interpret the basic logic gates.

1.12 Explain the working of universal logic gates (NAND, NOR gates).

1.13 Explain the working of special purpose (exclusive – OR and exclusive NOR) gates.

1.14 Realize basic gates using NAND, NOR gates.

1.15 Realize Special Purpose gates using NAND / NOR gates.

1.16 Apply De-Morgan's theorems related postulates to simplify Boolean expressions (up to four variables).

1.17 Infer standard representations for logical functions (SOP and POS form)

1.18 Find Boolean expressions from the given truth table and draw the logic circuit.

1.19 Use Karnaugh map to simplify Boolean Expression (up to 4 variables only) in SOP form.

1.20 Use Karnaugh map to simplify Boolean Expression (up to 4 variables only) in POS form.

2.0 Understand different logic families.

2.1   Classify digital logic families (like TTL, CMOS and ECL).

2.2 Outline the important characteristics of Digital ICs

2.3 Explain logic levels and Voltage requirements of TTL and CMOS ICs.

2.4 Define propagation delay , Noise margin, Power dissipation and figure of merit of a Logic family

2.5 Define Fan-in and Fan-out capacity of a digital IC.

2.6 Explain the working of open collector TTL NAND gate with a circuit diagram.

2.7 Explain the working of Totem pole output TTL NAND gate with a circuit diagram.

2.8 Explain the working of CMOS NAND gate with a circuit diagram.

2.9 Compare and contrast   TTL, CMOS and ECL logic families.

2.10   Give IC numbers of Digital IC Logic gates (One for each type).

3.0 Understand the working of combinational logic circuits.

3.1 Explain about combinational logic circuit.

3.2 Discuss half adder and full adder with logic diagram, function table and output expressions.

3.3 Implement half adder circuit using basic gates and Universal gates.

3.4 Realize full-adder using two Half-adders and an OR – gate.

3.5 Explain the working of 4 Bit parallel adder circuit using full adders.

3.6 Explain 2's compliment parallel adder/ subtractor circuit.

3.7 Explain the working of a serial adder circuit.

3.8 Compare the performance of serial and parallel adder.

3.9 Discuss the operation of multiplexer and Decoder/De-multiplexer.

3.10 Explain the operation of 4 X 1 Multiplexer with necessary diagrams.

3.11 Explain the operation of 1 to 4 De Multiplexer with necessary diagrams.

3.12   Describe the operation of decoder/ encoder.

3.13 Explain the operation of 3 x 8 decoder with relevant diagrams.

3.14 Explain the working of BCD to decimal decoder circuit.

3.15 Explain the working of Decimal to BCD encoder circuit.

3.16 State the need for a tri-state buffer and give the two types of tri-state buffers.

3.17 Explain the operation of 2 bit digital comparator and draw its circuit.

3.18 Give the IC numbers of Multiplexers, decoders in TTL/CMOS logic families

3.19 Mention the applications of Multiplexers, Decoders/De Multiplexers and Encoders .

4.0 Understand the working of Sequential logic circuits: Flip Flops

4.1 Explain about Sequential logic circuit.

4.2 Distinguish between combinational and sequential circuits.

4.3 Explain NAND and NOR latches with logic diagrams.

4.4 State the necessity of clock and explain different clocking methods.

4.5 Explain clocked SR flip flop circuit using NAND gates.

4.6 State the need for preset and clear inputs.

4.7 Explain the circuit of JK flip flop (using S-R flip-flops) with truth table.

4.8 What is race around condition in JK flip-flop?

4.9 Explain the working of master slave JK flip flop circuit with necessary diagrams.

4.10 Explain the level clocked D and T flip flops with the help of truth table, logic diagram
      and timing diagram.

4.11 List any 2 commonly used IC numbers of flip flops of each type.

4.12 List two applications for each type of flip flop.

5.0 Understand the working of Sequential logic circuits: Registers and Counter

5.1   State the need for a Register and Classify the registers.

5.2   Explain the working of 4 bit shift left and shift right registers with a circuit and timing
       diagram.

5.3 Explain the working of 4-bit bi-directional shift register with a circuit and timing diagram.

5.4 Explain parallel in parallel out shift register with a circuit and timing diagram.

5.5 List any four common applications of shift registers.

5.6 Define a counter and modulus of a counter.

5.7 Explain the working of asynchronous 3 bit up-down counter with a circuit and Timing diagram.

5.8 Explain the working of 4-bit asynchronous up counter with a circuit and Timing diagram.

5.9 Explain the working of 4-bit synchronous counter with a circuit and Timing diagram.

5.10 Explain the working of decade counter with a circuit and Timing diagram.

5.11 Distinguish between synchronous and asynchronous counters.

5.12 List any 2 commonly used IC numbers of Registers/Counters.

5.13 Explain the working of ring counter.

5.14 List any three applications for counters and ring counter.

6.0 Understand about memories and A/D and D/A converters.

6.1. Discuss the need of memory .

6.2. Define the terms memory read operation, write operation, access time, memory capacity and word length

6.3. Classify various types of memories.

6.4. Explain the working of diode ROM.

6.5. Compare static RAM and dynamic RAM.

6.6. Compare RAM and dynamic ROM.

6.7. State the need for Flash ROM.

6.8. Explain the use of op amp and Instrumentation amplifiers.

6.9. Explain the OP amp instrumentation amplifier circuit.

6.10. Distinguish between Op amp and instrumentation amplifier.

6.11. State the need of A/D and D/A conversion.

6.12. Define the terms resolution, Accuracy, Monotonicity and settling time of D/A converter.

6.13. Draw and explain the circuit of D/A converter using binary weighted resistors.

6.14. Draw and explain the circuit of D/A converter using R-2R ladder network.

6.15. Explain the operation of A/D converter using counter method with a block diagram.

6.16. Explain A/D converter using successive approximation method with a block diagram.

6.17. Compare the performance of above A/D converters

RECOMMENDED BOOKS

1. Digital Computer Electronics by Malvino and leach. 3rdedition Tata McGraw-Hill Education

2. Modern Digital Electronics By RP JAIN TMH

3. Digital Electronics: Principles & Applications by Roger L. Tokheim -McGraw-Hill Education, 2008

4. Digital Electronics by GK Kharate, Oxford University Press.

e-links

1. www.nptel.com

2. www.electronics4u.com

Suggested student activities.

1. Learn how to Test the digital IC's and submit a report.

2. Propose how to manage the e-waste.

3. Perform trouble shooting of the not working equipment in the lab.

4. Learn the latest CMOS IC equivalents of the TTL IC's.

5. Prepare a simple PCB to perform verification of truth table for basic gates.

6. Prepare a PPT on the day to day application of the gates you have studied.

CO PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1 :	Convert number systems and Solve Boolean expressions using K-map.	R/U	1,2,10	16
CO2 :	Compare various digital IC logic families and identify them by their characteristics.	R/U	1,2,5,6,7	8
CO3 :	Design adders using Combinational logic.	R/U/A	1,2,9	14

CO4 :	Develop Combinational logic circuits like MUX , De-mux, encoder, decoder and comparator circuits.	R/U/A	1,2,5,7		10
CO5 :	Identify the need of sequential circuits and design registers using flip-flops.	R/U/A	1,2,5		14
CO6 :	Compare different types of memories and understand Converters.	R/U/A	1,2,3,7		13

MID SEM EXAMINATIONS

S.No	Unit Name	MID SEM-I EXAM			
		R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
	Total Questions	4	4	4	
S.No	Unit Name	MID SEM-II EXAM			
		R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SMESTER END EXAMINATIONS

Sl No	Unit No.	Questions to be set for SEE				Remarks
		R(1 Mark)		U(3 Marks)	A(5 Marks)	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V		5, 6	9(b)	13(b)	
				11(a)	15(a)	
			3	11(b)	15(b)	
6	VI		7,8	10(b)	14(b)	
				12(a)	16(a)	
				12(b)	16(b)	
Total Questions		8		8	8	

C-21 III SEMESTER
EC-302 DIGITAL ELECTRONICS
MODEL PAPER MID- SEM I

IME : 1 HOUR   MAX. MARKS : 20

PART-A

Answer ALL questions.   4 x 1= 4M

1. Convert the binary number 1101101 into its decimal equivalent.

2. Draw the logic symbol of AND and OR gates.

3. Define propagation delay with reference to digital IC.

4. Write CMOS IC nos. of AND and NAND gates.

PART – B

Answer ALL questions.   2 x 3 = 6 M

5 (a) Perform 2's complement of subtraction for the binary numbers 10110 – 110110

OR

5(b) Draw the symbol of NAND gate, write its truth table and output expression.

6(a) Define Fan-in and Fan-out capacity of a digital IC.

OR

6(b) Write the specifications of digital IC's.

PART – C

Answer ALL questions.   2 x 5 = 10 M

7(a) Explain the working of universal logic gates NAND and NOR with truth tables.

OR

7(b) Simplify the Boolean expression using De-Morgan's theorems and draw its simplified logic circuit.

$\underline{AB}CD + B\underline{A}CD + \underline{CBA}D + ABCD + B\underline{C}AD$

8(a) Draw the TTL totem pole circuit and explain.

OR

8(b) Compare the various logic families.

C-21 III SEMESTER

EC-302 DIGITAL ELECTRONICS

MODEL PAPER MID- SEM II

TIME : 1 HOUR   MAX. MARKS : 20

<div align="center">PART-A</div>

Answer ALL questions.   4 x 1= 4M

1. Define combinational logic circuit.

2. Draw the circuit of full adder using half adders.

3. Define a multiplexer.

4. Write any 2 IC nos. of multiplexers.

<div align="center">**PART – B**</div>

Answer ALL questions.   2 x 3 = 6 M

5 (a) Explain the operation of full adder with a truth table.

<div align="center">**OR**</div>

5(b) Compare the performance of serial adder and parallel adder.

6(a) Write the truth table of 1 x 4 de-multiplexer.

<div align="center">**OR**</div>

6(b) Write any 3 applications for each of MUX and decoders.

<div align="center">**PART – C**</div>

Answer ALL questions.   2 x 5 = 10 M

7(a) Explain the working of 4-bit parallel adder using half adders.

<div align="center">**OR**</div>

7(b) Explain 2's compliment parallel adder/subtractor circuit.

8(a) Write the truth table of 1 x 8 demultiplexer and draw its circuit.

<div align="center">**OR**</div>

8(b) Explain the working of BCD to decimal decoder circuit.

C-21 III SEMESTER
EC-302 DIGITAL ELECTRONICS
MODEL PAPER - SEMESTER END EXAMINATION

TIME: 2 HOURS   MAX. MARKS : 40

PART-A

Answer ALL questions.   8 x 1= 8M

1. State any 2 postulates of Boolean algebra.

2. Define a de-multiplexer.

3. What is edge-triggering with reference to clock.

4. Draw the symbol of D and T flip-flop

5. List any 2 IC numbers of JK flip-flop.

6. Define modulus of a counter.

7. Define memory access time.

8. Define accuracy and resolution of converters.

PART – B

Answer ALL questions.   4 x 3 = 12 M

9 (a) List out the specifications of digital IC's.

OR

9(b) Explain clocked SR flip flop using NAND gates.

10(a) Realize a half adder using NAND gates only.

OR

10(b) Distinguish between synchronous and asynchronous counters.

11(a) Write the logic symbol and negative edge triggered truth table of D flip-flop.

        OR

11(b) State the need of a register and list its types.

12(a) Draw the circuit of a decade counter.

OR

12(b) Differentiate between ROM and RAM.

PART – C

Answer ALL questions.   2 x 5 = 10 M

13(a) Simplify the Boolean expression $\sum \pi M(1,3,6,8,14,15)$ using K- map and draw its simplified logic circuit.

OR

13(b) Explain the working of 4-bit left shift register with a circuit and timing diagram.

14(a) Explain the working of 4-bit bit parallel adder using full adders.

OR

14(b) Explain the working of diode ROM.

15(a) Explain the working of parallel-in and parallel-out register with circuit and timing diagram.

OR

15(b) Explain the working of master slave JK flip-flop circuit with necessary diagrams.

16(a) Explain successive approximation method.

OR

16(b) Explain the R-2R ladder network.

CS-303-COMPUTER ARCHITECTURE

Course Title	Computer Architecture	Course Code	CS-303
Semester	III	Course Group	Core
Teaching Scheme in Hrs(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre-Requisites

Fundamentals of Digital Electronics and Basics of Computers and its peripherals.

Course Outcomes

Upon completion of the course the student shall be able to

Course Outcome		
CO1	Recognize and explain the functional units of computers	
CO2	Categorize instruction formats and addressing modes	
CO3	Develop fixed point, floating point arithmetic algorithms	
CO4	Demonstrate about computer memory system.	
CO5	Utilize input and output units efficiently.	
CO6	Contrast vector and pipeline processing , RISC and CISC	

Course Contents

1. Processor Organization:

Duration: 10 Periods

Functional block diagram of Digital computer - Simple accumulator based CPU and function of each unit - Stored program concept.

2. Information representation and Instruction Format:

Duration: 10 Periods

Basic types of information representation - floating point representation and fixed point representation of numbers-complements- Operand- Opcode and address - zero address, one address, two address and three address instructions – Addressing modes.

3. Computer Arithmetic:

Duration: 10 Periods

Fixed point addition and subtraction, multiplication and division operations with flowcharts - floating point addition, subtraction, multiplication and division operations with flowcharts.

4. Organization of Computer Memory system:

Duration: 15 Periods

Main and auxiliary memory - Need for memory hierarchy in a computer -Significance of various memory devices characteristics: access time, access rate, alterability, permanence of storage, cycle time - Associative Memory - Virtual memory organization in a computer system - Virtual address and physical address organization - Principle and advantage of cache memory organization- Principle of memory interleaving in a computer.

5. Input and output organization:

Duration: 15 Periods

Peripheral devices - Need for an interface - Three modes of data transfer - Synchronous and asynchronous data transfer -Hand shaking procedure of data transfer - Programmed I/O method of data transfer - Interrupted initiated I/O - DMA controlled transfer - Priority interrupt, polling, and daisy chaining priority – Bus systems

6. Pipeline, Vector Processing and Processors Architecture:

Duration: 15 Periods

Principle of Parallel processing-Flynn's classification of Parallel processing-Principles of pipeline processing - Advantages of parallel processing and pipeline processing -Arithmetic instruction pipeline -Vector processing and array processor- Processor- Introduction, Advanced processor technology, instruction set architectures, CISC scalar processor, RISC scalar processor, comparison between CISC and RISC.

REFERENCE BOOKS:

1. Computer System Architecture – M.Moris Mano, IIIrd Edition, PHI /Pearson, 2006.

2. Computer Organization – Car Hamacher, Zvonks Vranesic, Safwat Zaky,V Edition, McGraw Hill, 2002.

3. Computer Organization and Architecture – William Stallings SeventhEdition, PHI/Pearson, 2006.

4. Computer Architecture and Organization – John P. Hayes, Mc GrawHill International editions,1998.

5. Computer architecture and organization , 4th edition , P Chakraborty ,JAICO publishers

Suggested Learning Outcomes:

Upon completion of the course the student shall be able to

1.0 Processor Organization
1.1 Draw the functional block diagram of Digital computer and explain the function of each unit.
1.2 Draw the block diagram of simple accumulator based CPU.
1.3 Explain the function of each unit.
1.4 Define the terms micro operation, macro operation, instruction cycle, fetch cycle and execution cycle.
1.5 Define stored program concept.
1.6 Describe the sequential execution of a program stored in memory by the CPU

2.0 Information representation and Instruction Format
2.1 Explain the basic types of information representation in a computer.
2.2 Define floating point representation and fixed point representation of numbers.
2.3 Illustrate the same with example.
2.4 Distinguish between Fixed point and Floating point representations.
2.5 Complements.
2.6 (r-1)'s Complement.
2.7 (r)'s Complement.
2.8 Instruction format.
2.9 Define Operand, Opcode and address.
2.10 Explain zero address, one address, two address and three address instructions with simple examples.
2.11 Explain addressing modes.

3.0 Computer Arithmetic
3.1 Explain the fixed point addition and subtraction operations with flowchart.
3.2 Explain the Fixed point multiplication operation with flowchart.
3.3 Develop Booth multiplication algorithm with flowchart.
3.4 Explain the Fixed point division operation with flowchart.
3.5 Describe floating point addition, subtraction operations with flowchart
3.6 Explain floating point multiplication operation with flowchart.
3.7 Explain floating point division operation with flowchart.

4.0 Organization of Computer Memory system
4.1 Distinguish between main and auxiliary memory.
4.2 Explain the need for memory hierarchy in a computer.
4.3 State the significance of various memory device characteristics: access time, access rate, alterability, permanence of storage, cycle time.
4.4 Discuss Associative Memory
4.5 Explain virtual memory organization in a computer system
4.6 Explain virtual address and physical address organization.

4.7   State the principle of locality of reference.

4.8   Explain cache memory organization.

4.9   Analyse the importance of the principle of memory interleaving in a computer.

5.0 Input and output organization

5.1   List any five peripheral devices that can be connected to a computer.

5.2   Explain the need for an interface.

5.3   List out three modes of data transfer.

5.4   Compare synchronous and asynchronous data transfer.

5.5   Discuss strobe controlled procedure of data transfer

5.6   Discuss hand shaking procedure of data transfer.

5.7   Explain programmed I/O method of data transfer.

5.8   Explain interrupted initiated I/O.

5.9   Explain DMA controlled transfer.

5.10 Explain priority interrupt, polling, and daisy chaining priority.

5.11 Explain Input Output Processor.

5.12 List bus systems.

5.13 Explain about bus system.

6.0 Pipeline, Vector Processing and Processors Architecture

6.1   Explain the principle of Parallel processing.

6.2   Describe Flynn's classification of Parallel processing.

6.3   Explain the principle of pipeline processing.

6.4   List advantages of parallel processing.

6.5   List advantages of pipelining.

6.6   Compare parallel processing and pipelining.

6.7   Explain arithmetic instruction pipeline.

6.8   Explain vector processing.

6.9   Explain array processor.

6.10 Introduction to processors.

6.11 Explain about advanced processor technology

6.12 Describe instruction set architecture with examples.

6.13 Describe RISC processor

6.14 Describe CISC processor.

6.15 Give the differences between RISC and CISC processors.

Suggested Student Activities

1   Student activity like mini-project, surveys, quizzes, etc. should be done in group of 5-10 students.

2. Each group should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned Course coordinator and Program Coordinator
3. Each group should conduct different activity and no repeating should occur.
4. Visit different sites relevant to topics. Listen to the lectures and submit a handwritten report.
5. Explore and analyze topics to improve the level of creativity and analytical skill by taking Quiz/ tests/ assignments. Documents have to be maintained as a record.
6. Create a power point presentation on the topic relevant to course or advanced topic as an extension to the course to improve the communication skills. Documents have to be maintained as a record.
7. A Case study on Moore's Law about the processors and submits a report.
8. Conduct a survey on types of memories and also about the cost and speed of various memories with comparison.

Suggested E-learning references https://www.studytonight.com/computer-architecture/https://www.phy.ornl.gov/csep/ca/node2.htmlhttps://nptel.ac.in/courses/106 102062/

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Recognize and explain the functional units of computers	**R,U**	**1,2,3,4,7**	**8**
CO2	Categorize instruction formats and addressing modes	**R,U**	**1,2,3,4,7**	**10**
CO3	Develop fixed point, floating point arithmetic Algorithms	**R,U**	**1,2,3,4,7**	**10**
CO4	Demonstrate about computer memory system.	**R,U**	**1,2,3,4,7**	**12**
CO5	Utilize input and output units efficiently.	**R,U**	**1,2,3,4,7**	**10**
CO6	Contrast vector and pipeline processing , RISC and CISC	**R,U**	**1,2,3,4,7**	**10**
		Total Sessions		**60**

MID SEM – I Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM – II Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

S.No	Unit Name	R			U	A	Remarks
1	Unit-I	4	1		9(a)	13(a)	
2	Unit-II		1		9(a)	13(a)	
3	Unit-III		2		10(a)	14(a)	
4	Unit-IV		2		10(a)	14(a)	
5	Unit-V		3	5,6	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	Unit-VI		3	7,8	10(b) 11(a) 11(b)	14(b) 16(a) 16(b)	
Total Questions		8			8	8	

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

TIME:ONEHOUR   **MAXIMUM**

MARKS:20

PART-A

MARKS: 4 X1=4

NOTE: 1. Answer all questions.
2. Each question carries one mark.
1. Define micro operation
2. Define macro operation.
3. Write the instruction format
4. Define opcode

PART-B

MARKS: 2 X3=6

NOTE: 1. Answer one question each from 5 and 6.
2. Each question is of internal choice type
3. Each question carries three marks.

5.a) Draw the functional block diagram of Digital computer
(OR)
5. b) Write about instruction cycle, fetch cycle and execution cycle.
6.a) Compare Fixed point and Floating point representations
(OR)
6. b) List basic types of information representation in a computer

PART-C

MARKS: 2 X5=10

NOTE: 1. Answer one question each from 7 and 8.
2. Each question is of internal choice type
3. Each question carries five marks.

7. a) Draw and explain the block diagram of simple accumulator based CPU.
(OR)
b). Describe the sequential execution of a program stored in memory by theCPU
8.a) Explain zero address, one address, two address and three address instructions with simple examples. (OR)

8b) Explain any five addressing modes.

TIME:ONEHOURS   **MAXIMUMMARKS:20**

PART-A

MARKS: 4 X1=4

NOTE: 1. Answer all questions.
2. Each question carries one mark.
1. Define normalization.
2. What is use biasing in floating point representation?
3. Define access time.
4. What is a cycle time?

PART-B

MARKS: 2 X3=6

NOTE: 1. Answer one question each from 7 and 8.
2. Each question is of internal choice type
3. Each question carries three marks.

5. a) Draw the flow chart of fixed point multiplication.
   (OR)
5. b) Draw the flow chart of floating point multiplication.

   a) Compare main memory and auxiliary memory. (OR)
6. b) Explain the need for memory hierarchy in acomputer.

PART-C

MARKS: 2 X5=10

NOTE: 1. Answer one question each from 7 and 8.
2. Each question is of internal choice type
3. Each question carries five marks.

   7 a) Explain the fixed point addition and subtraction operations with flowchart.
   (OR)
7. b) Explain floating point division operation with flowchart.

8. a) Discuss in detail Associative Memory
   (OR)
   8.   b) Explain virtual memory organization in a computer system

TIME:TWOHOURS   **MAXIMUM MARKS: 40**

PART-A

MARKS: 8 X 1=8

NOTE: 1. Answer all questions.
2. Each question carries one mark.

1. Define micro operation.
2. Define access time.
3. Define bus.
4. What is a cycle time?
5. List any two peripheral devices.
6. What is synchronous data transfer?
7. Define pipelining.
8. Define vector processing.

PART-B

NOTE: 1. Answer one question each from 9, 10, 11and 12.

MARKS: 4 X3=12

2.Each question is of internal choice type
3. Each question carries three marks.

9. a) Write about instruction cycle, fetch cycle and execution cycle.
   (OR)
9. b) Explain destination initiated strobe for data transfer.

10. a) Compare main memory and auxiliary memory
    (OR)
10. b) Write advantages of parallel processing

11. a) Explain the need for an interface.
    (OR)
11. b) Explain source initiated data transfer using handshaking.

12. a) Write advantages of pipelining.

    (OR)
    b) Compare parallel processing and pipelining

PART-C

13. a) Explain any five addressing modes.
    (OR)
13. b) Explain programmed I/O method of data transfer.

14. a) Write about the fixed point addition and subtraction operations with flowchart.
    (OR)
14. b) Explain array processor.

    15.a) Explain interrupted initiated I/O mode of data transfer.
    (OR)

15. b) Discuss in detail about Input Output Processor

16. a) Explain Flynn's classification of Parallel processing
    (OR)
    16. b) Explain arithmetic instruction pipeline.

CS-304-DATA STRUCTURES THROUGH C

Course Title	Data Structures Through C	Course Code	CS-304
Semester	III	Course Group	Core
Teaching Scheme in Hrs(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Prerequisites

Knowledge of C Programming Language

Course Outcomes

Upon completion of the course the student shall be able to

	Course Outcome
CO1	Have a understanding of store and manage the addresses of dynamically allocated blocks of memory.
CO2	Be able to analyze the efficiency of programs based on time complexity.
CO3	Have a good knowledge of sorting techniques
CO4	Be able to understand principle of searching techniques .
CO5	Have a Understanding of stack, queue and linked list operation.
CO6	Have a knowledge of tree and graph concepts.

Course Contents

1. Pointers

Duration: 10 Periods

Pointer - Declaration and Initialization of Pointers- Accessing the address of a variable using & operator- Accessing a value of a variable through pointer - Differentiate address and de-referencing operators - Pointer Arithmetic- precedence of address and de-referencing operators - Relationship between Arrays and Pointers - Accessing array elements using pointers- Pointers as Function Arguments - Discuss Array of Pointers with examples- pointers and structures.

2. Introduction to Data structures

Duration: 10 Periods

Dynamic Memory allocation – Introduction to Dynamic memory allocation, Allocating a block of memory using Malloc, Allocating multiple blocks of memory using Calloc, Releasing the used space using Free, Altering the size of memory using Realloc.

Data structures – Data types & Abstract data type(ADT), Categorization of data structures - Linear & non linear , Algorithm analysis- time complexity – elementary asymptotic (big-oh, Omega, Theta notation) and space Complexity.

3. Sorting

Duration: 10 Periods

Sorting Algorithms– bubble sort program and algorithm analysis for time complexity, selection sort program and algorithm analysis for its time complexity, insertion sort program and algorithm analysis for time complexity, quick sort program and algorithm analysis for time complexity& Merge sort program and algorithm analysis for time complexity, Application of sorting techniques.

4. Searching

Duration: 06 Periods

Searching Algorithms – sequential(Linear) search - program and algorithm analysis, Binary search-program and algorithm analysis, and application of searching techniques.

5. Linear data structures

Duration: 14 Periods

➢ **Stack and Queues** - Implementation of stacks, application of stacks, converting infix to postfix expression and evaluation of expression – Applications & Implementation of queues, Circular queues, Priority queue – sparse matrix.

➢ **Linked Lists –** Creation of Singly linked lists – insert, delete, search and replace an element in a single linked list – Create circular singly linked list.   Doubly linked list – Create, insert, delete elements in doubly linked list - Create circular double linked list.

6. Non Linear Data Structures

Duration: 10 Periods

Trees - Trees –Binary trees – Linear representation – Linked list representation, tree traversals, Tree Conversion & Applications

Recommended Books

1. Understanding pointers in C- YashwanthKanetk.

2. Data Structures using C – E Balaguru Swamy

3. Data Structures: A Pseudocode Approach with C++ - Gilberg / Forouzan

4. Data Structures using C – Aaron M. Tanenbaum.

5. Data structures through C- Yashwanth Kanetkar.

Special Learning Outcomes

Upon completion of the course the student shall be able to

1.0 Basics of Pointers

 1.1 Define Pointer

 1.2 Illustrate declaration and initialization of Pointers.

 1.3 Illustrate accessing the address of a variable using & operator

 1.4 Illustrate accessing a value of a variable through pointer

 1.5 Differentiate between address of operator(&) and de-referencing operators (*).

 1.6 Discuss about pointer arithmetic.

 1.7 Illustrate precedence of address of operator (&) and de-referencing operators (*)

 1.8 Illustrate relationship between arrays and pointers.

 1.9 Illustrate accessing array elements using pointers.

 1.10   Discuss Array of Pointers with examples.

 1.11   Illustrate use of pointer to structure.

 1.12   Illustrate concept of structures containing pointers.

 1.13   Explain Self referential structures with examples

2.0 Introduction to Data Structures

 2.1 Explain dynamic memory management functions MALLOC, CALLOC, FREE and REALLOC and illustrate with examples to use these functions

 2.2 Define data structure and classify them

 2.3 Explain linear data structures

 2.4 Describe nonlinear data structures

 2.5 Explain data types and abstract data types

 2.6 State algorithm analysis for time requirements.

3.0 Sorting techniques

3.1 Define sorting

3.2 State the need of sorting

3.3 List the four methods of sorting

3.4 Explain the method of bubble sort

3.5 Write the algorithm for bubble sort and define its complexity

3.6 Discuss the program for bubble sort

3.7 Explain the method of selection sort

3.8 Write the algorithm for selection sort and define its complexity

3.9 Discuss the program for selection sort

3.10 Explain the method of insertion sort

3.11 Write the algorithm for insertion sort and define its complexity

3.12 Discuss the program for insertion sort

3.13 Explain the method of quick sort

3.14 Explain the method of merging sort.

3.15 Discuss the program to implement merge sort.

3.16 List applications of sorting.

4.0 Searching Techniques

4.1 Define searching

4.2 State the need of searching

4.3 List two types of searching

4.4 Explain the method of Linear Search

4.5 Write the algorithm for Linear Search and its complexity

4.6 Discuss the program for Linear Search

4.7 Explain the method of Binary Search

4.8 Write the algorithm for Binary Search and its complexity

4.9 Discuss the program for Binary Search.

4.10 Applications of searching and sorting.

5.0 Linear Data structures

5.1 Define stack

5.2 Explain the two operations of a stack

5.3 Implementation of stacks

5.4 List applications of stacks

5.5 Convert infix to postfix expression

5.6 Evaluate postfix expression

5.7 Define queue

5.8 Explain the operations on queues

5.9 Discuss application of queues

5.10 Explain array implementation of queue

5.11 Implement circular queues

5.12 Explain priority queues

5.13 Definition of sparse matrix – converting ordinary matrix to sparse matrix.

5.14 List advantages of linked lists

5.15 State the purpose of dummy header

5.16 Create a singly linked list and display it

5.17 Perform insertion and deletion operation on a singly linked list

5.18 Know how to search and replace an element in a single linked list.

5.19 Create a circular singly linked list

5.20 Insert and delete elements in a doubly linked list

5.21 Create a circular doubly linked list

6.0 Know the Tree structures

6.1 Define a tree.

6.2 Explain the terminology related to tree.

6.3 Define a binary tree.

6.4 Explain the linear representation and linked list representation of a Binary tree.

6.5 Write a program to create and display a tree.

6.6 Perform traversal operation on trees.

6.7 Construct a tree using inorder and preorder traversal.

6.8 Construct a tree using inorder and postorder traversal

6.9 Convert general trees to binary trees

6.10 Perform operations on a binary tree

6.11 List Applications of trees

Suggested Activities
Student activity like mini-project, quizzes, etc. should be done in group of 5-10 students.

1. Each group should do any one of the following type of activity or any other similar activity related to the course with prior approval from the course coordinator and program coordinator concerned.
2. Each group should conduct different activity and no repetition should occur.
3. Explore and analyze topics to improve the level of creativity and analytical skill by taking Quiz/ tests/ assignments. Documents have to be maintained as a record.
4. Create a power point presentation on the topic relevant to course or advanced topic as an extension to the course to improve the communication skills. Documents have to be maintained as a record.
5. Visit different sites relevant to topics. Listen to the lectures and submit a handwritten report
6. Coding competitions

Suggested E-learning references

1. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2. **https://www.programiz.com/dsa**
3. **https://www.geeksforgeeks.org/data-structures/**
4. **https://www.w3schools.in/data-structures-tutorial/intro/**

CO-PO Mapping Matrix

	Course Outcome	CL	Linked PO	Teaching Hours
CO1	Have a understanding of store and manage the addresses of dynamically allocated blocks of memory.	**R, U, A**	**1,2,3,7**	**10**
CO2	Be able to analyze the efficiency of programs based on time complexity.	**R, U, A**	**1,2,3,7**	**10**
CO3	Have a good knowledge of sorting techniques	**R, U, A**	**1,2,3,7**	**10**
CO4	Be able to understand principle of searching techniques.	**R, U, A**	**1,2,3,7**	**06**
CO5	Have a Understanding of stack, queue and linked list operation.	**R, U, A**	**1,2,3,7**	**14**
CO6	Have knowledge of tree and graph concepts.	**R, U, A**	**1,2,3,7**	**10**

MID SEM – I Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM – II Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

S.No	Unit Name	R			U	A	Remarks
1	Unit-I	4	1		9(a)	13(a)	
2	Unit-II						
3	Unit-III		2		10(a)	14(a)	
4	Unit-IV						
5	Unit-V		3	5,6	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	Unit-VI			7,8	10(b) 11(a) 11(b)	14(b) 16(a) 16(b)	
Total Questions		8			8	8	

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD
CS-304, III Data Structures Through C
MID EXAM - IMODEL QUESTION PAPER

Time: 1 hour   Max. Marks: 20

PART-A

Note: 1.Answer <u>All</u> questions.

4X1=4 Marks

2.Each carries 1 marks.
1. What is dereferencing operator?
2. Define pointer
3. Define linear data structure
4. What is dynamic memory allocation?

PART-B

Note:1. Answer any one question from 5 & 6.

2X3=6Marks

2.   Each carries 3marks
5(a). Write a program to access array elements using pointers
                    OR
5(b). Explain self referential structure
6(a). Explain about algorithm analysis for time requirements
                    OR
6(b).List any five applications of non linear data structure

PART-C

Note:1. Answer any one question from 7 & 8.

2X5=10Marks

2.   Each carries 5marks
7(a). Explain self referential structure with an example
                        OR
7(b). Write a program to access value of variable using pointer
8(a). Write a program to demonstrate calloc( )
                    OR
8(b). Write a program to demonstrate free( )

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD
CS-304, III Data Structures Through C
MID EXAM – II MODEL QUESTION PAPER

Time: 1 hour   **Max. Marks:20**

PART-A

Note: 1.Answer <u>All</u> questions.
   4X1=4 Marks
   2.Each carries 1 marks.

1. Write the need of sorting
2. List sorting methods
3. Define searching
4. Write the leaner search time complexity

PART-B

Note:1. Answer any one question from 5 & 6.
2X3=6Marks
   2.   Each carries 3marks

5(a). Explain the procedure of selection sort with example

                    OR

5(b). Explain the procedure of bubble sort with example

6(a).Write the procedure for linear search

                    OR

6(b). Explain the time complexity of binary search

PART-C

Note:1. Answer any one question from 7 & 8.
   2X5=10Marks
   2.   Each carries 5marks

7(a). Write a C program insertion sort

                    OR

7(b) . Explain the procedure for merge sort with example

8(a). Write a C program on binary search

                    OR

8(b). Write a C program for linear search

C18-Semester End Examination (SEE)
Model Paper- CS-304, III Semester, Data Structures Through C

Time: 2 Hours   **Total Marks: 40**

PART – A

Instructions: **8 Q X 1 M = 08 Marks**

i) Answer all the following questions:

ii) Each question carries one mark

1. What is self referential structure ?

2. Define sorting

3. Write any two differences between linear and non-linear data structures

4. What is linear search

5. Write any two advantages of linked list

6. Define Stack

7. Define tree

8. List any two applications of Trees

PART – B

Note: 1. Answer 4 questions from 9,10,11&12   **4 Q X 3 M = 12 Marks**

2. Each question carries three marks

9(a). Write about algorithm analysis for time requirements

OR

9(b). List applications of stacks

10(a). Explain the method of selection sort

OR

10(b). Define the terminology a) Leaf b)Root c)depth

11(a). Convert the following infix to postfix expression

a+b-c

OR

11(b). Evaluate the following postfix expression

2+4/3*2

12(a). Write the tree traversal techniques and give example for one of them

OR

12(b). List Applications of binary trees

Note: 1. Answer 4 questions from 13,14,15&16   **4 Q X 5 M = 20 Marks**

   2. Each question carries five marks

13(a). Write a simple program to demonstrate malloc( ).

OR

13(b). Write a program create a singly linked list and display it.

14(a). Explain quick sort method with example

OR

14(b). Construct a tree using given inorder and preorder traversal
    inOrder = {2,5,6,10,12,14,15} and   preOrder = {10,5,2,6,14,12,15}

15(a). Write a program to implement singly linked list.

OR

15(b). Write a program to implement queue.

16(a). Explain the linear representation and linked list representation of a Binary tree

OR

16(b). Write a program to construct a binary tree

CS-305-OOP's through C++

Course Title	OOP's through C++	Course Code	CS-305
Semester	III	Course Group	Core
Teaching Scheme in Hrs(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Prerequisites

Knowledge of C Language

Course Outcomes

Upon completion of the course the student shall be able to

Course Outcome	
CO1	Learn the Principles of object oriented programming.
CO2	Develop programs using classes, objects and functions.
CO3	Understand C++ I/O operations.
CO4	Develop programs for constructors, destructors and operator overloading concepts.
CO5	Learn base class, derived class and types of inheritance and develop programs for different types of inheritances, virtual base class and virtual functions.
CO6	Develop programs for different types of templates.

Course Contents

1. Principles of object oriented programming:

Duration: 10 Periods

Software crisis - Software evolution - Procedure oriented programming - Object oriented paradigm - basic concepts of object oriented programming - benefits of OOP's.

2. Introduction to C++

Duration: 15 Periods

Structure of C++ program - I/O Operations – statements – keywords - operators in C++ - dynamic memory allocation - default arguments – Class – object- functions - classes & structures - friend function - inline functions - passing objects to functions – pass by value

and pass by reference - returning objects from functions - virtual function - function overloading.

3. C++ I/O operators

Duration: 10 Periods

C++ I/O operators - formatted I/O - I/O manipulators - file I/O - binary I/O functions - file I/O functions

4. Constructors, Destructors and Operator Overloading :

Duration: 15 Periods

Constructor and destructor - Parameterized constructors - Multiple Constructors - Constructors with default arguments - Copy Constructor – dynamic constructor - Destructors - Operator Overloading - Overloading of Binary Operators - Overloading of Unary Operators -Rules for overloading of operators - Example programs. operator overloading,

5. Derived classes and inheritance:

Duration:15 Periods

Base Class and derived class - access control – Inheritance - types of inheritance – Single, Multi level, Multiple, Hybrid, Multipath, Hierarchical - virtual base class - virtual functions.

6. Templates

Duration:10 Periods

Need for Templates – classification of templates, function templates with single argument and multiple argument - class templates with single argument and multiple argument.

Recommended Books
1. Teach yourself C++- Helbertschildt Osborne McG
2. Object-oriented Programming with C++- PoornachandraSarang PHI
3. Programming with C++- E. Balaguruswamy – TMH
4. Computer Science: A Structured Approach using C++- Forouzan/Gillberg - Thomson
5. C++ & OOPS Paradigm- DebasishJana PHI

Special Learning Outcomes
Upon completion of the course the student shall be able to

1.   Principles of object oriented programming:
1.1   History of Software crisis

1.2   Know about Software evolution

1.3   Understand procedure oriented programming

1.4   Describe Object oriented paradigm

1.5   State Basic concepts of object oriented programming

3.6   Write the format and working of file I/O functions like open( ), read( ), write( ), count( )

4   Constructors, Destructors and Operator Overloading

4.1   Define constructor and destructor.

4.2   Explain Parameterized constructors.

4.3   Know Multiple Constructors in a class.

4.4   Understand Constructors with default arguments

4.5   Describe Copy Constructor.

4.6   Describe Dynamic constructor

4.7   Define Destructors and develop a program to demonstrate destructors.

4.8   Describe Operator Overloading

4.9   Develop the programs for Overloading of Binary Operators

4.10   Develop the programs for Overloading of Unary Operators

4.11   Develop the programs for Overloading of Binary Operators with operator function as member and friend function

4.12   Develop the programs for Overloading of Unary Operators with operator function as member and friend function

4.13   List the rules for overloading of operators

5.   Understand derived classes and inheritance

5.1   State the necessity of inheritance.

5.2   Explain the relation between base class and derived class.

5.3   Know the syntax for defining a derived class

5.4   Explain three types of access control – public, private & protected.

5.5   List Types of Inheritances and explain them with examples

5.6   Develop a program using C++ for Single inheritance

5.7   Develop a program using C++ for Multi level inheritance

5.8   Develop a program using C++ for Multiple inheritance

5.9   Develop a program using C++ for Hybrid inheritance

5.10   Develop a program using C++ for Multipath inheritance

5.11   Develop a program using C++ for Hierarchical inheritance

5.12   Virtual base class.

5.13   Explain concept of virtual functions and its applications.

6.   Know Templates

6.1   Explain the need for Templates**.**

6.2   List types of Templates.

6.3   Understand Function Templates

6.4   Develop C++ program for Templates with Single Argument Types.

6.5   Develop C++ program to Create function based Templates.

6.6   Develop C++ program for Templates with multiple argument types.

6.7   Use of Class Templates

6.8   Mention the Syntax of Class Template with single parameter and multiple parameters.

6.9   Develop C++ program to Create Classes based on Template with single parameter and multiple parameters..

6.10 Develop C++ program using Class Template for Stack Data Structure.

Suggested Activities

Student activity like mini-project, quizzes, etc. should be done in group of 5-10 students. Each group should do any one of the following type of activity or any other similar activity related to the course with prior approval from the course coordinator and program coordinator concerned.

1.   Each group should conduct different activity and no repetition should occur.
2.   Explore and analyze topics to improve the level of creativity and analytical skill by taking Quiz/ tests/ assignments. Documents have to be maintained as a record.
3.   Create a power point presentation on the topic relevant to course or advanced topic as an extension to the course to improve the communication skills. Documents have to be maintained as a record.
4.   Visit different sites relevant to topics. Listen to the lectures and submit a handwritten report
5.   Coding competitions

Suggested E-learning references
  1.   **https://www.tutorialspoint.com/cplusplus/index.htm**
  2.   **http://www.cplusplus.com/doc/tutorial/**
  3.   **https://www.programiz.com/cpp-programming**
  4.   **https://beginnersbook.com/2017/08/c-plus-plus-tutorial-for-beginners/**
  5.   **http://www.cplusplus.com/files/tutorial.pd**f

CO-PO Mapping Matrix

	Course Outcome	CL	Linked PO	Teaching Hours
CO1	Learn the Principles of object oriented programming.	**R, U**	**1,2,3,4,7**	**10**
CO2	Develop programs using classes, objects and functions	**R, U, A**	**1,2,3,4,7**	**10**
CO3	Use C++ I/O operators, formatted I/O, I/O manipulators, file I/O, binary I/O functions, file I/O functions	**R,U**	**1,2,3,4,7**	**14**
CO4	Apply constructors, destructors and operator overloading concepts and develop associated programs.	**R,U, A**	**1,2,3,4,7**	**06**
CO5	Learn base class, derived class and types of inheritance and develop programs for different types of inheritance, virtual base class and virtual functions.	**R,U, A**	**1,2,3,4,7**	**12**
CO6	Classify templates and develop programs for types of templates.	**R, U**	**1,2,3,4,7**	**08**
			Total Sessions	**60**

MID SEM – I Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM – II Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

S.No	Unit Name	R			U	A	Remarks
1	Unit-I	4	1		9(a)	13(a)	
2	Unit-II						
3	Unit-III		2		10(a)	14(a)	
4	Unit-IV						
5	Unit-V		3	5,6	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	Unit-VI			7,8	10(b) 11(a) 11(b)	14(b) 16(a) 16(b)	
Total Questions		8			8	8	

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD
CS-305, OOP's Through C++
MID EXAM - I MODEL QUESTION PAPER

Time: 1 hour   **Max. Marks: 20**

PART-A

Note: 1.Answer <u>All</u> questions.

                                                                   4X1=4 Marks

    2.Each carries 1 marks.
1.   List any four properties of OOP's
2.   What is meant by Procedure oriented language
3.   Define class
4.   What is "this" operator?

PART-B

Note:1. Answer any one question from 5 & 6.

                                                                   2X3=6Marks

2.Each carries 3marks
5(a). Explain the benefits of OOP's
OR
5(b). What is procedure oriented language? 6(a). Compare classes with structures
OR
6(b). Explain about reference with the help of program

PART-C

Note:1. Answer any one question from 7 & 8.

                                                                   2X5=10Marks

    2.Each carries 5marks

7(a). Explain the basic components of object oriented programming.
OR
7(b). Explain the software crises and Software evolution 8(a).Write a program in C++ to demonstrate function overloading
OR
8(b). Write a program in C++ to demonstrate returning of objects from functions

Time: 1 hour   **Max. Marks:20**

PART-A

Note: 1.Answer <u>All</u> questions.

                                                                               4X1=4 Marks

2.Each carries 1 marks.
  1.   Define formatted I/O
  2.   Write the syntax of fopen( )
  3.   What is copy constructor?
  4.   Define destructor

PART-B

 Note:1. Answer any one question from 5 & 6.   **2X3=6Marks**
 2.Each carries 3marks

5(a). Write a C++ program to perform read operation from a file OR

5(b). List the C++ I/O operators with their meaning 6(a). Explain about multiple constructor
OR

6(b). Differentiate between constructor and destructor

PART-C

Note:1. Answer any one question from 7 & 8.   **2X5=10Marks**
       2.Each carries 5marks

7(a). Explain the Binary I/O functions get( ) and put( )
OR

7(b). Explain the classes of stream.h

8(a)Write a C++ program to demonstrate binary operator overloading OR

8(b). Write a C++ program to demonstrate constructor with default arguments

Time: 2 Hours   **Total Marks: 40**

PART – A

Instructions:

                            8 Q X 1M = 8 Marks

i) **Answer all the following questions:**
ii) **Each question carries one mark**

1. List the properties of OOP's
2. What is destructor?
3. Define inheritance
4. Write about software crises
5. What is hybrid inheritance?
6. What is base class?
7. Define template
8. Write the syntax for class template

PART – B

Note: 1. Answer 4 questions from 9,10,11&12

                         4 Q X 3 M = 12 Marks

     2. Each question carries three marks

9(a). Explain the concepts of object oriented programming
OR
9(b). Explain about multiple inheritance
10(a). Write the rules for overloading of operators
OR
10(b). Explain the need for Templates
11(a). Write the relation between base class and derived class
OR
11(b). Write the format / syntax for defining a derived class 12(a). List the types of
Templates.
OR
12(b). Write and explain the syntax of Template

PART – C

Note: 1. Answer 4 questions from 13,14,15&16

4 Q X 5 M = 20 Marks

    2. Each question carries five marks

13(a). Explain the concept of passing objects to functions

OR

13(b). Write a C++ program to demonstrate multi path inheritance 14(a). Write a C++ program to demonstrate binary operator overloading.

OR

14(b). Write a C++ program to demonstrate class template for stack data structure 15(a). Write a C++ program to demonstrate multi level inheritance

OR

15(b). Write a C++ program to demonstrate virtual function 16(a). Write a C++ program to Create function based Templates

OR

16(b). Write a C++ program for Templates with multiple argument types

CS-306-Data structures through C lab

Course Title	Data Structures through C Lab	Course Code	CS-306
Semester	III	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

Knowledge of Computer Operation.

Course Outcome

Course Outcome	
CO1	Apply Pointers and Dynamic Memory allocation techniques
CO2	Implement Sorting and Searching algorithms
CO3	Implement Linear data structures
CO4	Implement Non Linear data structures

Course Content

Unit No	Unit name	Hours/Periods
1	Pointers and Dynamic Memory allocation	7
2	Sorting and Searching algorithms	12
3	Linear data structures	15
4	Non Linear data structures	11
	Total	45

Reference books:
1. Understanding pointers in C- Yashwanth Kanetk.
2. Data Structures using C – E Balaguru Swamy
3. Data Structures: A Pseudocode Approach with C++ - Gilberg / Forouzan
4. Data Structures using C – Aaron M. Tanenbaum.
5. Data structures through C- YashwanthKanetkar

E-References:
1. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2. https://www.programiz.com/dsa
3. https://www.geeksforgeeks.org/data-structures/
4. https://www.w3schools.in/data-structures-tutorial/intro/

Mapping Course Outcomes with Program Outcomes

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Write programs using Pointers and dynamic memory allocation	R, U, A	1,2,3,4,7	7
CO2	Illustrate sorting and searching techniques using programs	R, U, A	1,2,3,4,7	12
CO3	Demonstrate linked list, stacks and queues using programs	R,U, A	1,2,3,4,7	15
CO4	Demonstrate binary tree construction and tree traversals	R,U, A	1,2,3,4,7	11
			Total Sessions	45

LIST OF EXERCISES

1. Write simple programs to demonstrate usage of pointers
2. Write simple programs to demonstrate usage of dynamic memory operators
3. Write a program on Selection sort
4. Write a program on insertion sort
5. Write a program on bubble sort
6. Implement a program for merge sort on two sorted lists of elements
7. Write a program on linear search
8. Write a program on binary search
9. Write a program on creation, insertion, deletion & display of elements in a singly linked lists
10. Write a program to implement a singly circular linked list
11. Write a program on creation, insertion, deletion & display of elements in a doubly linked lists
12. Write a program on searching, sorting, reverse the elements of a given single linked list.
13. Write a program to Implement a stack.
14. Write a program to implement a queue.
15. Write a program to create a binary tree & its traversal operations .

CS-307-C++ Lab

Course Title	C++ Lab	Course Code	CS-307
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45
CIE	60 Marks	SEE	40 Marks

Pre requisites
Knowledge of Computer Operation.
Course Outcome

	Course Outcome
CO1	Use of I/O operators, loops, Classes, objects and functions
CO2	Use of Constructors, Destructors and Operator overloading
CO3	Implement Derived classes and types of inheritance
CO4	Implement Templates

Course Content

Unit No	Unit Name	Hours/ Periods
1	I/O operators, loops, Classes, objects and functions	**13**
2	Constructors, Destructors and Operator overloading	**13**
3	Derived classes and types of inheritance	**13**
4	Templates	**6**
	Total	**45**

Course outcomes

	Course Outcome	CL	Linked PO	Teaching Hours
CO1	Write programs using classes, objects and functions	R, U, A	1,2,3,4,7	15
CO2	Construct programs using Constructors, Destructors and Operator overloading	R, U, A	1,2,3,4,7	15
CO3	Demonstrate Derived classes and types of Inheritance	R,U, A	1,2,3,4,7	15
CO4	Develop programs using Templates	U, A	1,2,3,4,7	10
			Total Sessions	**45**

Reference Books:

1. Teach yourself C++-- Helbertschildt Osborne McG
2. Object-oriented Programming with C++--- PoornachandraSarang PHI
3. Programming with C++-- E. Balaguruswamy – TMH
4. Computer Science: A Structured Approach using C++--Forouzan/Gillberg - Thomson
5. C++ & OOPS Paradigm-- DebasishJana PHI

E-References:

1. https://www.tutorialspoint.com/cplusplus/index.htm
2. http://www.cplusplus.com/doc/tutorial/
3. https://www.programiz.com/cpp-programming
4. https://beginnersbook.com/2017/08/c-plus-plus-tutorial-for-beginners/
5. **http://www.cplusplus.com/files/tutorial.pdf**

List of Experiments

1   Write programs using input and output operators and comments.

2   Write programs using if/ if – else/ nested if statement.

3   Write programs using loop statements – while/ do-while / for.

4   Write programs using arrays.

5   Write programs using classes & object.

6   Write programs using constructor and destructor.

7   Write programs working with two/more classes using Friend function.

8   Write programs using inline function.

9   Write a program to pass an object as a functions argument – pass object by value,
       pass object by reference.

10   Write a program to demonstrate the use of operator overloading on unary operator
       & binary operators like ++ operator and << operator.

11   Write a program to demonstrate the use of function overloading.

12   Write a simple program on array of objects and pointers to objects.

13   Write programs using new, delete with classes.

14   Write simple programs illustrating use of all types of inheritances.

15   Write a program to illustrate virtual base class.

16   Write a Program to illustrate virtual functions.

17   Write a Program to illustrate class templates.

18   Write a Program to illustrate function templates.

EC-308-Digital Electronics Lab

Course Title	Digital Electronics Lab	Course Code	EC-308
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact /Periods	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the basic skills of Handling bread boards and PCB.

Course outcomes:

On successful completion of the course, the students will be able to attain below Course Outcome

	Course Outcome	CL	Linked PO	Teaching Hours
CO1	Identify Basic Gates and Logic Families	R/U/A	1,2,3,4,5,6,7,8	**9**
CO2	Realization of Boolean Functions using Gates	R/U/A	1,2,3,4	**15**
CO3	Verification of truth tables of Multiplexers and DeMultiplexers/encoder, BCD decoder.	R/U/A	1,2,3	**9**
CO4	Flip Flops & Timing Circuits Counters & Shift Registers	A	1,2,3,10	**12**
				45

Course Contents:

I. **Basic Gates and Logic Families**

1. **Identify Digital ICs and noting down pin details from data sheets**

a) Identify the given digital ICs and draw the pin diagrams. (Use TTL and CMOS ICs of AND,   OR,NOT, NAND, NOR and XOR gates with two and three inputs).

b) Realize basic gate functions using toggle switches and a bulb.

2. **Verify the truth tables of basic gates using universal gates.**

a) Verify the truth table of 7403 IC (open collector quad 2input NAND gate).

b) Verify the Truth table of 4073 IC.

3.

a) Implement OR gate using NAND gates only and verify the Truth Table

b) Implement NOT gate using using NOR gates only and verify the Truth Table

4.

a) Verify the truth table of AND gate using NOR gates only.

b) From the data sheets find out CMOS equivalent of above ICs.

II. **Realizing Boolean Functions.**

5.

a) Verify the truth table of XOR using TTL NAND gates only.

b) Verify the truth table of XOR using CMOS NOR gates only.

c) From the data sheets find out CMOS Equivalent of XOR ICs.

6.

a) Implement a given Boolean function using basic gates and verify the truth table.

b) Implement a given Boolean function using NAND gates only and verify the truth table.

7.

a) Verify the truth table of half adder using basic gates only.

b) Verify the truth table of half adder using NAND gates only.

8.

a) Verify the truth table of full adder using 2 half adders.

b) Implement a full adder using NOR gates only.

III. **Realization of Boolean Functions using Multiplexers and Demultiplexers**

9. a) Verify the truth table of IC 74153MUX.

   b) Verify the truth table of IC 74154 DE-MUX.

10. a) Verify the function of 74148 Encoder and write the truth table

    b) Verify the function of 74138 Decoder and write the truth table

11. a) Verify the to decimal decoder and write function of BCD its truth table.

    b) Verify the function of decimal BCD to encoder and write its truth table.

IV. **Flip Flops &Sequential Circuits**

12. a) Construct clocked RS FF using NAND gates and Verify its truth table.

    b) Verify the truth table of CD 4013 Dual D flip Flop

13. a) Verify the functionality and truth table of 74L71 RS flip flop with Preset and Clear

   b) Verify the Truth table of JK FF using 7476 IC.

14. a) Construct and verify the function of decade counter using 7490 ICs.

    b) Verify the function of up/down counter using 74190, 74193

15. a) Verify the function of CD 4029 up/down counter.

    b) Verify the function of shift register (ICs like 7495or 74194 etc.)

    c) Verify the function of Johnson counter using CD 4017 IC

CS-309-Multimedia Technologies Lab

Course Title	Multimedia Technologies Lab	Course Code	CS-309
Semester	III	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact /Periods	45
CIE	60 Marks	SEE	40 Marks

Prerequisites

- Knowledge of formats of using text, pictures, audio, graphics and video.
- Knowledge of Computer and basic application usages.

Course Objectives

Learn the various multimedia technologies and demonstrate proficiency in developing the multimedia presentations.

Course Outcome

Course Outcome	
CO1	Use CorelDRAW software to apply styles and templates and create animations.
CO2	Use PhotoShop software to edit photos and manipulate images and create brochures.
CO3	Use Adobe Flash software to develop and play animations, audio and video content, games, and web apps.
CO4	Use *Macromedia Director to* create interactive cross-platform multimedia presentations, animations and CD-ROM's.
CO5	Use Adobe Premiere software to edit videos for film, TV, and the web.
CO6	Use Maya software to create animations and visual effects

Course Content

Unit Number	Unit Name	Periods
1	CorelDRAW	8
2	PhotoShop	8
3	Flash	8
4	Macro MediaDirector	5
5	AdobePremiere	7
6	MAYA	9
	Total	**45**

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

	Course Outcome	Experiment Linked	CL	Linked PO	Lab Sessions
CO1	Use CorelDRAW software to apply styles and templates and create animations.	1,2,3,4,5,6	R,U, A	1,2,3,4,5,7	8
CO2	Use PhotoShop software to edit photos and manipulate images and create brochures.	7,8,9,10,11,12	R,U, A	1,2,3,4,5,7	8
CO3	Use Adobe Flash software to develop and play animations, audio and video content, games, and web apps.	13,14,15,16,17	R,U, A	1,2,3,4,5,7	8
CO4	Use *Macromedia Director to* create interactive cross-platform multimedia presentations, animations and CD-ROM's.	18,19,20	R,U,A	1,2,3,4,5,7	5
CO5	Use Adobe Premiere software to edit videos for film, TV, and the web.	21,22	R,U,A	1,2,3,4,5,7	7
CO6	Use Maya software to create animations and visual effects	23,24,25,26,27,28,29,30		1,2,3,4,5,7	9
				Total Sessions	45

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Multimedia Technologies Lab	3	3	3	3	3	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

RECOMMENDED BOOKS:

1. Practical Photoshop® CS6, Level 1 by Barbara ZukinHeiman, Donald Laird, Corrine Haverinen, Windsor Green, & Marilyn P. Kelly Practical Photoshop.
2. Project Flash MX by Nat Gertler, Thomson Delmar Learning Publication.
3. An introduction toCorelDraw12.0   BPBPublication
4. Introduction to AdobePhotoShop7.0/CS BPBPublication
5. Introduction toFLASHMX   BPB Publication
6. Introduction toAdobePremier   BPBPublication
7. Introduction toMAYA6.0   BPBPublication
8. Introduction to Macromediadirector   BPBPublication
9. Macromedia Director 8.5 Shockwave Studio for 3D: Training from the Source by Phil Gross and Michael Gross Macromedia Pres
10. Comdex Multimedia and Web Design Course Kit, DreamTech, Vikas Gupta,

Suggested E-learning references

1. https://www3.cs.stonybrook.edu/~lori//classes/MM/DirectorIntro.html
2. **https://www.coreldraw.com/en/pages/10600028.html**
3. **https://www3.cs.stonybrook.edu/~lori/classes/facdev/MDintro.htm**
4. **https://www.tutorialspoint.com/basics_of_computer_science/basics_of_computer _science_multimedia.htm**
5. **https://www.educba.com/flash-tools/**
6. **https://www.slideshare.net/sathyananthinis/online-assignment-39536910**
7. **https://www.vtc.com/products/Macromedia-Director-5-tutorials.htm**
8. **https://www.smashingmagazine.com/2009/08/the-ultimate-collection-of-maya-3d-tutorials/**

Course Delivery

The course will be delivered through Demonstration and Practices.

List of Exercises:

1. Familiarize with CORELDRAW, its shortcuts.
2. Perform the operation of implementing drawing and shaping of objects
3. Work with styles and templates
4. Organize the objects
5. Create styles and templates
6. Create special effects using CorelDAW
7. Familiarize with Phtoshop and its shortcuts.
8. Perform painting and patching
9. Generate graphics for creating images using Photoshop
10. Generate graphics for websites and brochures using Photoshop
11. Familiarization of conversion of black and white picture into colour picture.
12. Generate graphics for videos using Photoshop
13. Familiarize with Flash and its features.
14. Create tweening (shape, motion) in Flash
15. Familiarize with Action script in Flash
16. Post sound to the animations using Flash
17. Create website using Flash
18. Familiarize with Macromedia Director and its shortcuts.
19. Perform the editing in Macromedia Director
20. Create animations using Macromedia Director
21. Edit the captured video in AdobePremiere
22. Blend multiple audio tracks using AdobePremiere
23. Familiarize with Maya and its shortcuts
24. Perform the operation of implementing drawing and shaping of objects
25. Work with material editor in Maya
26. Organize the objects(modeling) using Maya
27. Create texturing using Maya
28. Create special effects using Maya
29. Create animation to objects using Maya
30. Post sound to animations using Maya

Course Title	Communication and Life Skills Lab	Course Code	HU-310
Semester	III	Course Group	Practical
Teaching Scheme in Periods- L: T:P	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours	45
CIE	60 Marks	SEE	40 Marks

Rationale:

The course is designed to impart listening skills and life skills to the students of diploma which will help them a great deal in personal and professional fronts.

Prerequisites:

The course requires the basic knowledge of vocabulary, grammar, and four language learning skills, viz. Listening, Speaking, Reading and Writing.

Course Contents

I. **Listening Skills-I**

Duration: 6 (L 2 P 4)

- A paragraph
- A song
- A recipe
- A dialogue

II. **Life Skills – I**

Duration: 6 (L2 P 4)

1. **Introduction to Life Skills**
   - What are life skills?
   - Importance of life skills
   - Practicing life skills
2. **Attitude**
   - Features of attitude
   - Attitude and behaviour
   - Attitude formation
   - Positive attitude
   - Negative attitude
   - Overcoming negative attitude
   - Attitude at workplace
3. **Adaptability**
   - Need for adaptability
   - Willingness to experiment
   - Fear of failure

- Think ahead
- Stay positive
- Open mind
- Curiosity
- Being in present

III. Listening Skills – II

Duration: 9 (L 3 P 6)

- Biography
- Interview
- A Report
- Telephone Conversation

IV. Life Skills – II

Duration: 9 (L 3 P 6)

4. Goal setting
- Importance of setting goals
- What is goal setting
- Short term goals
- Long term goals
- Achieve goals using SMART

5. Motivation
- Why motivation
- Characteristics of motivation
- Extrinsic motivation
- Intrinsic motivation

6. Time Management
- Features of time
- Secrets of time management
- Time wasters
- Prioritisation
- Productive time
- Time Quadrant

V. Life Skills – III   **Duration: 6 (L 2 P 4)**

7. Creativity

- Flexibility
- Curiosity
- Determination
- Innovative ideas

8. Critical Thinking
- Observation
- Curiosity
- Introspection
- Identify biases
- Critical Analysis

9. Problem Solving and Decision Making

- Define the problem
- Generate Options
- Evaluate and choose an option
- Implement Solution
- Monitoring and seeking feedback

VI.   Life Skills – IV

Duration: 9 (L 3 P 6)

10. Leadership Qualities and Teamwork
- Significance of Leadership
- Factors of leadership
- Leadership styles
- Leadership Skills
- Importance of Teamwork
- Characteristics of a good team
- Benefits of teamwork
- Problems of teamwork
- Qualities of team player

11. Stress Management/Managing Emotions
- Components of Emotions
- Stress busters
- Managing Emotions
- Emotions at workplace

12. Core Human Values / Forming Values
- Honesty and integrity
- Work Ethics
- Ego and Respect
- Trust and Truthfulness
- Social Responsibility
- Character formation
- Designing Destiny

Course Outcomes:

	At the end of the course the students will have the ability to:
Listening Skills - I	Identify the main or the central idea. Listen for specific details. Learn the pronunciation.
Listening Skills - II	Listen for drawing inferences. Listen for accuracy. Listen to convey ideas.
Life Skills – I	Know the Life Skills. Practice life skills for a better life. Think positively. Develop positive attitude. Overcome negative attitude. Develop adaptability in any situation.
Life Skills – II	Know the importance of setting goals. Set goals using SMART features. Get inspired to get success. Get personal and professional success. Manage time effectively. Learn various time management techniques. Learn the importance of prioritisation.
Life Skills – III	Learn to be creative. Think innovatively. Know the reasons for a problem. Learn to overcome problems. Learn the various techniques to solve the problems. Learn to make proper decisions on time. Think 'out of the box'. Think critically.
Life Skills – IV	Develop trust and confidence. To develop healthy and wealthy life. Know how to be a leader. Learn the qualities of a good leader. Learn the qualities of a good team. Learn the advantages and disadvantages of a team. Differentiate between Eu-stress and Distress. Manage stress effectively.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapping POs
310.1	-	-	-	-	3		3	5,7
310.2	-	-	-	-	3	2	3	5,6,7
310.3	-	-	-	-	3	3	3	5,6,7
310.4	-	-	-	-	2	2	3	5,6,7
310.5	-	-	-	-	2	2	3	5,6,7
310.6		-	--	--	2		3	5,7

Suggested Student Activities:
- Listening Comprehension
- Seminars
- Presentations
- Games using Online Dictionaries
- Sharing the information using emails, chats and groups
- Find a solution to the problem
- Making innovative things through recycling
- Creating advertisements
- Five-minute activities on Life Skills
- Watching videos on life skills and making presentations
- Case studies
- Role Plays
- Dialogues

Evaluation Pattern:

I. Continuous Internal Examination: **60 Marks**

     a. **Mid Sem- I**   20 marks
         Syllabus:
             i. Listening Skills - I
             ii. Life Skills - I

     b. **Mid Sem – II**   20 Marks
         Syllabus:
             i. Listening Skills - II
             ii. Life Skills - II

     c. **Internal assessment**:   20 marks

        i. Seminars: 10 marks

        ii. Assignments: 5 marks

        iii. Lab record submission: 5 marks

II. Semester End Examination :   **40 Marks**

    a. Listening: 10 Marks

    b. Life Skills topics: 15 Marks

    c. *Viva Voce*   :   15 Marks

References:

a. Flint, Chrisand Jamie Flockhart*Listening: A2 (Collins English for Life: Skills)* Collins. 2013

b. Brown, Stephen E. English in Everyday Life. McGraw-Hill Education.2008

c. Mohanraj, Jayashree. *Let Us Hear Them Speak: Developing Speaking-Listening Skills in English*.Sage. 2015

d. Susan Earle – Carlin. *Q Skills for Success: Listening and Speaking 5: Student Book with Online Practice*. Oxford University Press. 2013

e. Kumar, Sanjay and Pushpa Latha. *Communication Skills: A Work Book*.Oxford University Press. 2018

f. Carnegie, Dale.*The Leader in You*. Simon & Schuster: 1995

g. Carnegie, Dale.*The Art of Public Speaking*. Prabhat Prakashan. NewDelhi.2013

h. Kaye, Martin. *Goal Setting (Workbook Included): Goals & Motivation: Introduction To A Complete & Proven Step-By-Step Blueprint For Reaching Your Goals (Goal Setting Master Plan 1)*. Kindle Edition. MK Coaching.2016.

i. West, Steven. *Critical Thinking Skills: Practical Strategies for Better Decision making, Problem-Solving and Goal Setting.* Kindle Edition.2018

j. Tracy, Brain. *Goals*. Berret-Koehler PublishersInc. San Francisco. 2017

k. Tracy, Brain. *Master your Time Master your Life.* Penguin Random House Inc. New York. 2017

l. Sean Covey. *The 7 Habits of Highly Effective Teens.* Simon and Schuster,2011

E-Learning Resources:

a. http://www.bbc.co.uk/worldservice/learningenglish/youmeus/learnit/learnitv39.shtml

b. https://www.examenglish.com/leveltest/listening_level_test.htm

c. https://www.oxfordonlineenglish.com/listening?utm_referrer=https%3A%2F%2Fwww.google.co.in%2F

d. https://takeielts.britishcouncil.org/prepare-test/free-ielts-practice-tests/listening-practice-test-1

e. https://learnenglish.britishcouncil.org/en/listening

f. https://www.cambridgeenglish.org/learning-english/activities-for-learners/?skill=listening

g. https://www.businessenglishsite.com/business-english-listening.html

<u>**Time : 1 Hour**</u>   **Total Marks: 20**
<u>**Marks**</u>

Part – A   **10 marks**

1. Listening Comprehension: 5 X 2 = 10
    (Teacher should give the questions before reading the passage given below)

   There are two problems which cause great worry to our educationists – the problem of religious and moral instruction in a land of many faiths and the problem arising out of a large variety of languages.

   Taking up the education of children we see that they should be trained to love one another, to be kind and helpful to all, to be tender to the lower animals and to observe and think right. The task of teaching them how to read and write and to count and calculate is important, but it should not make us lose sight of the primary aim of moulding personality in the right way.

   For this it is necessary to call into aid, culture, tradition and religion. But in our country. we have in the same school, to look after boys and girls born in different faiths and belonging to families that live diverse ways of life and follow different forms of worship associated with different denominations of religion. It will not do to tread the easy path of evading the difficulty by attending solely to physical culture and intellectual education.

   It is not right for us in India to be dissuaded from this by considerations as to overtaking the young mind. What is necessary must be done and it is not in the fact too great a burden. On the basis of reading the above passage, answer the following questions:

1. Which two problems have our educations to face?

2. What is the primary aim of the education of children?

3.How should the problem of religious and moral instruction be dealt with?

4. Which basic training is the writer talking about?

5. How can we serve the spiritual needs of school children?

PART- B   **10 Marks**

Instruction: Answer any one of the questions in 150 words.

2. What are the benefits of developing an optimistic sense towards your life?

3. Give an instance from your life when you adapted yourself to a new situation.

<u>**Time : 1 Hour**</u>   **Total Marks: 20 Marks**

Part – A   **10 marks**

1. Listening Comprehension: 5 X 2 = 10

   (Teacher should give the questions before reading the passage given below)

   Isaac Newton figured out why objects fall to the ground and why the planets move the way they do. Isaac Newton was born in Lincolnshire, England, in 1643. His father died before he was born but, despite having a difficult childhood, he gained a place at Cambridge University. When the plague broke out he was forced to stay at home and, with so much free time on his hands, Newton started to wonder about what made things fall.

   Newton said that he was inspired to think about forces when he saw an apple fall from a tree. He came up with the theory of gravity, an invisible force that pulls all of the objects in the Universe together, and the reason things don't float off into the sky.

In 1685, Newton described his Laws of Motion – a mathematical guide to how an object's movement is affected by speed and mass. Two years later, Newton published his ideas about gravity in a book which contains many of the foundations of modern science.

   Newton also invented a new kind of telescope called a reflector. It used a mirror to collect light instead of lenses, and was much more powerful than existing telescopes. He also showed that white light was made up of all the colours of the rainbow.

1. What did Isaac Newton find?
2. Where did Isaac Newton born?
3. Which disease broke out in his childhood?
4. What was the telescope that Isaac Newton invented?
5. From which colour rainbow is made up of?

PART- B   **10 Marks**

Instruction: Answer any one of the questions in 150 words.

2. What were the short term goals which you set to yourself and how you managed to achieve them in the recent past?

3. Explain -   i) how you prioritise your tasks.

                    ii) how you manage your time in the best possible way.

<u>**Time: 3 Hours**</u>   <u>**Total Marks: 40**</u>
<u>**Marks**</u>

Part – A   **10 marks**

1. *Listen to the following passage and answer the questions give below it.* **5 X 2 = 10**
(Teacher should give the questions before reading the passage)

Some of us think that writing is only for writers. But writing is for all of us. As Julia Cameron notes in her book The Right to Write: An Invitation and Initiation into the Writing Life, "I believe we all come into life as writers." Writing can be beneficial for all of us, because it can be therapeutic. One of the most powerful parts of therapy is cultivating the ability to observe our thoughts and feelings, said Elizabeth Sullivan, a licensed marriage and family therapist in San Francisco. And that's what writing helps us do.

"Most of us do not think in complete sentences but in self-interrupted, looping, impressionistic cacophony," she said. Writing helps us track our spinning thoughts and feelings, which can lead to key insights (e.g., I don't want to go to that party; I think I'm falling for this person; I'm no longer passionate about my job; I realize how I can solve that problem; I'm really scared about that situation.) Writing is "speaking to another consciousness – 'the reader' or another part of the self. We come to know who we really are in the present moment," she said. Writing also creates a mind-body-spirit connection, she said. "When you use your hands to pen or type something directly from your brain, you are creating a powerful connection between your inner experience and your body's movement out in the world." We hold worries, fears and memories in our bodies, Sullivan said. When we use the body in positive ways – such as dancing or writing — we stay in the present moment, we inhabit our bodies, and we can heal ourselves, she said. "Writing is a small movement but it is incredibly powerful when you are writing down what is in your mind."

Free writing or journaling is simply writing what's on your mind. It's letting it all hang out without censoring yourself. According to Sullivan, this could be: "Today I woke up and found the car window smashed and I wondered if the glass replacement guys go out at night and do it."

"Poetry is a natural medicine; it is like a homeopathic tincture derived from the stuff of life itself–your experience," writes John Fox in Poetic Medicine: The Healing Art of Poem-Making.

Sullivan suggested writing a short letter to a loved one. Imagine this person has written to you and asked you: "How are you doing, really?" Another exercise is to "write to someone with whom you have 'unfinished business' without sending it." The goal is for you to gain a clearer understanding of your own thoughts and feelings about the person, she said.
Answer the following questions:

1. Why does Julia Cameron believe that we all come into life as writers
2. What is the most important therapeutic quality of writing?
3. Whose consciousness does a writer touch through his or her writing?
4. How does Elizabeth Sullivan describe our thinking? Why does she say so?
5. Which word in the passage means 'a coarse unpleasant noise'?

Part – B   **15 marks**

2. Seminar Presentations on Life Skills topics:

Part – C   **15 marks**

3. Viva Voce.

Course Title	Skill Upgradation	Course Code	CS-311
Semester	III	Course	Core
Teaching Scheme in periods	0:0:8	Credits	2.5
Methodology	Activities	Total Contact	120
CIE	Rubrics	SEE	Nil

Rationale: This course is introduced for all semesters with a purpose of providing outside classroom experiences that lead to overall development of the students. One whole day is allocated for activities.

Course Objective:
1. To create an awareness on Engineering Ethics and Human Values.
2. To instill Moral, Social Values and Loyalty.
3. Create awareness about social responsibilities of Engineers
4. To improve Communication and Participation skills

	Course Content and Blue Print of Marks for CIE		
ActivityNo	Activity	Periods	Frequency
1	Haritha Haram(plantation &Maintenance)/ Waste management /Swachh Bharat	21	7 times in a semester
2	Mini projects	18	6 times in a semester
3	Online Video Tutorials/ MOOCs in SWAYAM /NPTEL/ e-Journals	16	4 times in a semester
4	Seminars/Quizzes/ Technical Paper Presentations /Group discussions/ Participate in Tech fests and coding competitions	24	6 times in a semester
5	Field Visits/Field Practice(also within the campus)	14	2 times in a semester
6	Expert/Guest Lectures • Safety and Responsibilities of an Engineer • Occupational crime/Cyber crimes • Responsibility of engineers • Emerging technologies	27	4 Times in a semester
	Total Periods	120	

Note: in case Expert faculties are not available English faculty may handle the expert lectures or Video clips on the suggested lectures may be played and the suggested activities are flexible.

Course Outcomes:

CO	Outcome	CO/PO Mapping
CO1	Application of known knowledge on real time problems	1,2,3,4,5,6,7
CO2	Practice the moral values that ought to guide the Engineeringprofession.	5,6,7
CO3	Develop the set of justified moral principles of obligation, ideals that ought to be endorsed by the engineers and applythem in real life situations	5,7
CO5	Create awareness of saving environment through activities	3,4,5,7
CO6	Create awareness of Constitution of India	5

COURSE CONTENT:

SAFETY, RESPONSIBILITIES OF ENGINEERS

Safety and risk-definition- - assessment of safety and risk - risk benefit analysis and reducing risk–-Personal risk-Public risk-Reducing risk-Voluntary Risk-Collegiality and loyalty–Authority- Types-collective bargaining - occupational crime –Responsibility of engineers–Types-Social responsibility-Professional responsibility- confidentiality-conflicts of interest-liability

Evaluation:

The student must maintain a record of all activities conducted on *skill upgradtion/ Activities* day andprepare a soft copy of report and submit it to their mentor or upload to the institute website or mail.

The reports shall be evaluated by the mentors though rubrics and accordingly give the eligibility for 2.5 credits. The student must have participated in at least 75% of activities to get eligibility.

CO-PO MAPPING MATRIX							
	Basic & Discipline knowledge	Problem Analysis	Design Development tools	Engineering Tools	Engineering for society and Enviroment	Project Management	Lifelong learning	Mapped PO
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	✓	✓	✓	✓	✓	✓	✓	1,2,3,4,5,6,7
CO2					✓	✓	✓	5,6,7
CO3					✓		✓	5,7
CO4			✓	✓	✓		✓	3,4,5,7
CO5					✓			5

FORMAT FOR STUDENT ACTIVITY ASSESSMENT

DIMENSION	Unsatisfactoy 1	Developing 2	Satisfactoy 3	Good 4	Exemplary 5	Score
Collection of Data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to thetopic	Collects a great deal of information; all refer to the topic	2
Fulfill team"s roles & duties	Does not perform any duties assigned to the team role	Performs very littleduties	Performsnearly allduties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely doesthe assignedwork; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	2
Listen to other team mates	Is always talking; never allows anyone else to speak	Usually does mostof the talking; rarely allows others tospeak	Listens, but sometimes talk too much	Listensand contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	2
					TOTAL	10/4=2.5

All student activities should be done in a group of 4-5 students with a team leader.

NOTE: **This is only an example. Appropriate rubrics may be devised by the concerned course co-coordinator for assessing the given activity.If the average score is greater than 1(>1), then 2.5 credits will be awarded to student.**