CURRICULUM – 2018

(C-18)

DIPLOMA IN COMPUTER ENGINEERING

STATE BOARD OF TECHNICAL EDUCATION & TRAINING

TELANGANA, HYDERABAD

Sl No	Course Code	Course Name	Teaching Scheme					Examination Scheme						
			Instruction periodsper week			Total Periods per semester	Credits	Continuous Internal Evaluation			Semester End Examination			
			L	T	P			Mid Sem1	Mid Sem 2	Internal Evaluation	Max Marks	Min Marks	Total Marks	Min marks for Passing including internal
1	18CM 301F	APPLIED ENGINEERING MATHEMATICS	3	1	0	60	3	20	20	20	40	14	100	35
2	18CM 302C	DIGITAL ELECTRONICS	3	1	0	60	3	20	20	20	40	14	100	35
3	18CM 303C	COMPUTER ARCHITECTURE	3	1	0	60	3	20	20	20	40	14	100	35
4	18CM 304C	DATA STRUCTURES THROUGH C	3	1	0	60	3	20	20	20	40	14	100	35
5	18CM 305E	RDBMS	3	1	0	60	3	20	20	20	40	14	100	35
6	18CM 306P	DIGITAL ELECTRONICS LAB	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18CM 307P	DATA STRUCTURES THROUGH C LAB	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18CM 308P	RDBMS LAB PRACTICE	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18CM 309P	MULTIMEDIA LAB PRACTICE	1	0	2	45	1.5	20	20	20	40	20	100	50
10	18CM 310P	COMMUNICATION AND LIFE SKILLS LAB	1	0	2	45	1.5	20	20	20	40	20	100	50
11		Skill Upgradation	0	0	7	105	2.5	0	0	Rubrics			--	-
			20	5	17	630	25	200	200	200		400	170	1000
11	Activities: student performance is to be assessed through Rubrics													

APPLIED ENGINEERING MATHEMATICS

Course Title **: APPLIED ENGINEERING MATHEMATICS**	Course Code **: 18COMMON301F**
SEMESTER : **III**	Course Group **: Foundation**
Teaching Scheme (L : T : P) : **36 :24 : 0 (** in Periods)	Credits : **3 Credits**
Type of Course : **Lecture + Assignments**	Total Contact Periods : **60**
CIE : 6**0 Marks**	SEE : **40 Marks**
Programmes : **Common to all Engineering Diploma Programmes**	

Pre requisites

This course requires the knowledge of Basic Engg. Mathematics and Engg. 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 functions
CO 2	Integrate functions using different methods
CO 3	Find the values of definite integrals.
CO 4	Solve simple problems of Areas, Volumes.
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	Form the Differential Equation and Solve Simple DEs of 1st order and 1stdegree.

Course Content:

Unit-I **Duration: 10 Periods (L: 6.0 – T:4.0)**

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:

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

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

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

Unit – II **Duration: 08 Periods (L: 4.8 – T:3.2)**

Indefinite Integration-II

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

Unit-III **Duration: 06 Periods (L: 3.6 – T:2.4)**

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: 10 Periods (L: 6.0 – T:4.0)**

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: 08 Periods (L: 4.8 – T:3.2)**

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: 18 Periods (L: 10.8 – T:7.2)**

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

Suggested E-Learning references

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html

2.E-books:www.mathebook.net

Suggested Learning Outcomes

Unit-I

1.0 Use Indefinite Integration to solve engineering problems

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

1.2 State the indefinite integral of standard functions and properties of Integrals $\int (u + v)\, dx$ And $\int ku\, dx$ where k is constant and u, v are functions of x.

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

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

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

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

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 State 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 State the fundamental theorem of integral calculus

3.2 Explain the concept of definite integral.

3.3 Calculate the definite integral over an interval.

3.4 State various properties of definite integrals.

3.5 Evaluate simple problems on definite integrals using the above properties.

3.6 Explain 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.

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 Explain the Trapezoidal rule, Simpson's 1/3 rules for approximation of definite integrals And provide some examples.

Unit –VI

6.0 Solve Differential Equations in engineering problems.

6.1 Define a Differential equation, 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 $dy/dx + Py = Q$,

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

CO / PO - MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
CO1	3	2	2	1			1			3	1,2,3,4,7,10
CO2	3	2	2	1			1			3	1,2,3,4,7,10
CO3	3	2	2	1			1			3	1,2,3,4,7,10
CO4	3	2	2	1			1			3	1,2,3,4,7,10
CO5	3	2	2	1			1			3	1,2,3,4,7,10
CO6	3	2	2	1			1			3	1,2,3,4,7,10

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-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) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI		3 (7,8)	10(b) 12(a) 12(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

III SEMESTER

SKILL UPGRADATION IN - APPLIED ENGINEERING MATHEMATICS

ACTIVITY ASSESSMENT Steps

1. **Mathematical concepts**
2. **Procedure**
3. **Explanation**
4. **Working with others**
5. **Mathematical errors**

ACTIVITIES

1 .Write a short notes on different types of integrals.

2. Prepare a notes on different methods to evaluate integrals.

3. List out Properties of definite integrals.

4. List out and explain various applications of definite integrals.

5. Explain the procedure to solve problems on Areas using integration

6. Explain the procedure to find volumes of irregular shapes of solids of revolution using integration.

7. Prepare a presentation to find Mean values and R.M.S values of any given function.

8. Explain the procedure to calculate approximate area by using Trapezoidal rule.

9. Explain the procedure to calculate approximate area by Simpson's 1/3 rule

10. Prepare a presentation on solving 1^{st} order differential equations using any suitable method.

CO / PO - MAPPING OF ACTIVITIES

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	1			1	2	2	3
CO2	3	2	2	1			1	2	2	3
CO3	3	2	2	1			1	2	2	3
CO4	3	2	2	1			1	2	2	3
CO5	3	2	2	1			1	2	2	3
CO6	3	2	2	1			1	2	2	3

CO7	3	2	2	1			1	2	2	3
CO8	3	2	2	1			1	2	2	3
CO9	3	2	2	1			1	2	2	3
CO10	3	2	2	1			1	2	2	3

Rubrics for Activity assessment

CATEGORY	**4**	**3**	**2**	**1**
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Procedures	Typically, uses an efficient and effective procedure to solve the problem(s).	Typically, uses an effective procedure to solve the problem(s).	Sometimes uses an effective procedure to solve problems, but does not do it consistently.	Rarely uses an effective procedure to solve problems.
Explanation	Explanation is detailed and clear.	Explanation is clear.	Explanation is a little difficult to understand, but includes critical components.	Explanation is difficult to understand and is missing several components OR was not included.
Working with Others	Student was an engaged partner, listening to suggestions of others and working cooperatively throughout lesson.	Student was an engaged partner but had trouble listening to others and/or working cooperatively.	Student cooperated with others, but needed prompting to stay on-task.	Student did not work effectively with others.
Mathematical Errors	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors.	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors.

Code: C18-Common-301F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

BOARD DIPLOMA EXAMINATIONS

MID SEM –I, MODEL PAPER, III SEMESTER

APPLIED ENGINEERING MATHEMATICS

TIME: 1: 00 Hours Max. Marks: 20

PART-A

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

2 Each question carries **ONE** mark

1. Integrate: $e^x - \sin x + x^4$
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 any **TWO** 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 : $\int \frac{dx}{(x^2+25)}$

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 any **Two** 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 : $\int cosx\ cos2x dx$.

8 a). Find $\int xTan^{-1}x dx$.

Or

8 b) Find $\int x^4 Cos2x dx$.

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Code: C18-Common-301F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

BOARD DIPLOMA EXAMINATIONS

MID SEM –II, MODEL PAPER, III SEMESTER

APPLIED ENGINEERING MATHEMATICS

TIME: 1: 00 Hour Max. Marks: 20

PART-A

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

2 Each question carries **ONE** mark

1. Integrate : $\int_0^1 (x^4 + 1)\, dx$
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 any **TWO** questions 02 X 03 = 06

2. Each question carries **THREE** marks

Find the Mean value of the function y = logx on [1 , e]

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 any **Two** 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 : $\int_0^{\frac{\pi}{2}} \log sin\, x dx$

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.

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C18-common

SUB.CODE:301F

BOARD DIPLOMA EXAMINATION,(C-18)
MODEL PAPER
III SEMESTER EXAMINATION
APPLIED ENGINEERING MATHEMATICS

Time: 2 hour [Total Marks: 40]

PART-A

Instructions: 1. Answer **ALL** questions 08 X 01 = 08

2 Each question carries **ONE** mark

1. Integrate: $x^7 - 3/x$

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: $\frac{dy}{dx} = e^{2x+y}$

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

PART-B

Instructions: 1. Answer any **FOUR** questions 04 X 03 = 12

2. Each question carries **THREE** marks

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

Or

9 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

10 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

11 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

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

PART C

Instructions: 1. Answer any **FOUR** questions 04 X 05 = 20

2. Each question carries **FIVE** marks

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

Or

13 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

14 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

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

Or

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

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DIGITAL ELECTRONICS

Course Title :	**DIGITAL ELECTRONICS**	Course Code	**18CM-302 C**
Semester	**III**	Course Group	**Core**
Teaching Scheme in Hrs(L:T:P)	**45:15:0**	Credits	**3**
Type of Course	**Lecture + Assignments**	Total Contact Hours :	**60Periods**
CIE	**60 Marks**	`SEE	**40 Marks**

Prerequisites

Knowledge of Computer Fundamentals

Course Outcomes

Upon completion of the course the student shall be able to

Course Outcome	
CO1	Familiarize various number systems and codes.
CO2	Simplify Boolean expressions using various Logic Gates
CO3	Demonstrate different types of combinational logic circuits.
CO4	Develop Combinational logic circuits.
CO5	Design registers using flip-flops.
CO6	Design counter circuits.

Course Contents

UNIT 1 – Number Systems **Duration: 10 Periods**

Binary, Octal, Hexadecimal number systems –comparison with Decimal system-Conversion of a given decimal number into Binary, Octal, and Hexadecimal numbers and vice versa- Conversion of a given binary number into octal and hexadecimal number system and vice versa- binary addition, subtraction, Multiplication and Division- 1's complement and 2's complement numbers of a binary number- - Use of weighted and Un-weighted codes- Binary equivalent number for a number in 8421, Excess-3 and Gray Code and vice-versa- Use of alphanumeric codes (ASCII & EBCDIC)- importance of parity Bit-

UNIT 2 – Logic Gates and Boolean Algebra **Duration : 10 Periods**

Different postulates in Boolean algebra- Basic logic gates AND, OR, NOT gates with truth table- universal logic gates (NAND, NOR 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)

UNIT 3 – Combinational logic circuits and adder circuits. Duration: 10 Periods

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-

UNIT 4– MUX, DE-MUX, Encoder and Decoder circuits. Duration: 8 Periods

Operation of 4 X 1 Multiplexers- Operation of 1 to 4 demultiplexer- IC numbers -applications- 3 X 8 decoder- BCD to decimal decoder- Encoders- 8X3 Encoder - Decimal to BCD encoder- Applications - Tri-state buffer - Types of tri-state buffers-Applications - Digital comparators

UNIT 5– Flip Flops and Registers Duration: 12 Periods

Classification of digital logic families - Concept of Sequential logic circuits- Latch-NAND and NOR latches with truth tables-Necessity of clock - Concept of level clocking and edge triggering, Clocked SR flip flop circuit using NAND gates- Need for preset and clear inputs - Circuit of level Clocked JK flip flop (using S-R flip-flops) with truth table -Race around condition- Master slave JK flip flop circuit - Level clocked D and T flip flops - Truth table, Circuit diagram and timing diagram- Symbols of above Flip Flops- Truth tables of edge triggered D and T flip flops - Applications for each type of flip flop- Need for a Register - Types of registers- 4 bit shift left and shift right registers - Parallel in parallel out shift register - Applications of shift registers.

UNIT 6– Counters and Semiconductor memories Duration: 10 Periods

Modulus of a counter- 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 - Registers and counters - Ring counter- applications - Types of memories - Memory read operation, write operation, access time - ROM and RAM- Diode ROM- EEPROM and UVPROM- static RAM and dynamic RAM- Applications of Flash ROM.

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.

Special Learning Outcomes

Upon completion of the course the student shall be able to

1.0 Understand Number Systems

1.1 Explain Binary, Octal, Hexadecimal number systems.

1.2 Compare the above with Decimal system.

1.3 Convert a given decimal number into Binary, Octal, and Hexadecimal numbers and vice versa.

1.4 Convert a given binary number into octal and hexadecimal number system and vice versa.

1.5 Perform binary addition, subtraction, Multiplication and Division.

1.6 Write 1's complement and 2's complement numbers for a given binary number.

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

1.8 Write Binary equivalent number for a number in 8421, Excess-3 code.

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

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

1.11 State the importance of parity Bit.

2.0 Understand Boolean Algebra and Logic Gates.

2.1 State different postulates in Boolean algebra.

2.2 Explain the basic logic gates AND, OR, NOT gates with truth table.

2.3 Explain the working of universal logic gates (NAND, NOR gates) using truth tables.

2.4 Explain the working of an exclusive – OR gate with truth table.

2.5 State De-Morgan's theorems.

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

2.7 Realize AND, OR, NOT operations using NAND, NOR gates.

2.8 Realize exclusive – OR gate using basic gates.

2.9 Realize exclusive – OR gate using NAND, NOR gates.

2.10 Explain standard representations for logical functions (SOP and POS form)

2.11 Simplify Boolean Expression (up to 4 variables only) in SOP form using Karnaugh map.

2.12 Simplify Boolean Expression (up to 4 variables only) in POS form using Karnaugh map.

3.0 Understand the working of combinational logic circuits and adder circuits.

3.1 Define combinational logic circuit.

3.2 Define half adder circuit and write its truth table.

3.3 Write the output expression and draw half adder circuit using basic gates.

3.4 Realize a Half-adder using i) NAND gates only and ii) NOR gates only.

3.5 Explain the operation of full adder circuit with truth table.

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

3.7 Write truth table for the above circuit.

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

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

3.10 Explain the working of a serial adder circuit.

3.11 Compare the performance of serial and parallel adder.

4.0 Understand the working of MUX, DE-MUX, Encoder and Decoder circuits.

4.1 Define multiplexer and de-multiplexer.

4.2 Write the truth table of 4 X 1 Multiplexer and draw its circuit.

4.3 Mention any 3 applications of multiplexer circuit.

4.4 Write the truth table of 1 to 4 de- Multiplexer and draw its circuit.

4.5 Mention any 3 applications of De-multiplexer.

4.6 Explain 3 X 8 decoder circuit.

4.7 List the applications of decoder.

4.8 Explain the working of BCD to decimal decoder circuit.

4.9 Explain the working of Decimal to BCD encoder circuit.

4.10 State the need for a tri-state buffer.

4.11 List the two types of tri-state buffers.

4.12 Explain 2 bit digital comparator circuit.

5.0 Understand the working of Flip Flops and Registers.

5.1 Define Positive and Negative Logic Levels

5.2 Define Sequential logic circuit.

5.3 State the necessity of clock.

5.4 Define level and edge triggering.

5.5 Define latch and flip-flop.

5.6 Differentiate between latch and flip-flops.

5.7 Explain NAND and NOR latch.

5.8 Explain clocked SR flip flop circuit using NAND gates.

5.9 State the need for preset and clear inputs.

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

5.11 Describe race around condition in JK flip-flop.

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

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

5.14 Draw the symbols of above Flip Flops.

5.15 Give the truth tables of edge triggered D and T flip flops.

5.16 List the applications of flip flops.

5.17 State the need for a Register

5.18 List the four types of registers.

5.19 Explain the working of 4 bit shift left with a circuit and timing diagram.

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

5.21 List the common applications of shift registers.

5.22 Distinguish between combinational and sequential circuits.

6.0 Understand working of Counters and Semiconductor memories

6.1 Define a counter and modulus of a counter.

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

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

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

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

6.6 Distinguish between synchronous and asynchronous counters.

6.7 Explain the working of 4 bit- ring counter.

6.8 List the applications for counters.

6.9 State the need for memory in digital circuits.

6.10 Define the terms memory read operation, write operation, access time.

6.11 Classify various types of memories based on principle of operation, physical characteristics, accessing modes and fabrication technology.

6.12 Differentiate between ROM and RAM.

6.13 Distinguish between EEPROM and UVPROM.

6.14 Compare static RAM and dynamic RAM.

6.15 State the need for Flash ROM.

6.16 List the applications of FlashROM.

Suggested Student Activities

Student activity like mini-project, group discussions, 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. Students should be given problems to solve Boolean expressions
3. Design circuits for Boolean expressions using minimum number of logic gates.
4. Explore and analyse topics to improve the level of creativity and analytical skill by taking Quiz/ tests/ assignments. Documents have to be maintained as a record.
5. 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.
6. Visit different sites relevant to topics. Listen to the lectures and submit a handwritten report.

FORMAT FOR STUDENT ACTIVITY ASSESSMENT

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 5	Exemplary 6	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 the topic	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 little duties	Performs nearly all duties	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 does the assigned work; 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 most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and 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.

Suggested E-learning references

1. **https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/**
2. **http://195.134.76.37/applets/AppletGates/Appl_Gates2.html**
3. **https://www.tutorialspoint.com/digital_circuits/**

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Use various number system, codes.	**R, U, A**	**1,2,3,4,10**	**10**
CO2	Use various Logic Gates	**R, U, A**	**1,2,3,4,10**	**10**
CO3	Demonstrate different types of combinational logic circuits.	**R, U, A**	**1,2,3,4,10**	**10**
CO4	Develop Combinational logic circuits like MUX , De-mux, encoder, decoder and comparator circuits.	**R, U, A**	**1,2,3,4,10**	**8**
CO5	Identify the need of sequential circuits and design registers using flip-flops.	**R, U, A**	**1,2,3,4,10**	**12**
CO6	Design counter circuits and Compare different types of memories.	**R, U, A**	**1,2,3,4,10**	**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-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) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI		7,8	10(b) 12(a) 12(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

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER I EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM302C – DIGITAL ELECTRONICS

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART-A ***MARKS: 4 X 1=4***

Instructions: 1) Answer all questions
2) Each question carries one marks.

1. State the importance of parity Bit.
2. State different postulates in Boolean algebra.
3. Define propagation delay and Noise margin
4. Draw the diagram of basic logic gates AND, OR, NOT gates.

PART-B ***MARKS: 2 X 3=6***

Instructions: 1) Answer all questions
2) Each question carries Three marks.

5(a). Explain the use of alphanumeric codes (ASCII & EBCDIC).

(Or)

5(b). Explain Binary, Octal, Hexadecimal number systems.

6(a). Explain the working of universal logic gates (NAND, NOR gates) using truth tables.

(Or)

6(b). Explain the working of NAND gate with a circuit diagram.

PART-C ***MARKS: 2 X 5=10***

Instructions: 1) Answer all questions
2) Each question carries Five marks.

7(a). Convert the 1486_{10} to Octal and hexa decimal numbers.

(Or)

7(b). Simplify Boolean expression $(A+B)(\overline{A}+B)\overline{B}$.

8(a). Simplify F(P,Q,R,S)=∑(0,2,5,7,8,10,13,15) using Karnaugh Map in SOP form.

(Or)

8(b). Simplify F(A,B,C,D)=π(3,5,7,8,10,11,12,13) using Karnaugh Map in POS form

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER II EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM302C – DIGITAL ELECTRONICS

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART-A ***MARKS: 4 X 1=4***

Instructions: 1) Answer all questions
2) Each question carries one marks.

1. Define combinational logic circuit.
2. Draw the half adder circuit.
3. Define multiplexer.
4. State the need for a tri-state buffer.

PART-B ***MARKS: 2 X 3=6***

Instructions: 1) Answer all questions
2) Each question carries Three marks.

5(a). Realize a Half-adder using i) NAND gates only and ii) NOR gates only.

(Or)

5(b). Explain the working of a serial adder circuit.

6(a). Explain 4 X 1 demultiplexer with truth table and circuit diagram.

(Or)

6(b). Write the truth table of 2 bit digital comparator and draw its circuit.

PART-C ***MARKS: 2 X 5=10***

Instructions: 1) Answer all questions
2) Each question carries Five marks.

7(a). Draw full-adder using two Half-adders and an OR – gate.

(Or)

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

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

(Or)

8(b). Explain 2 bit digital comparator with truth table and draw its circuit.

MODEL QUESTION PAPER
BOARD DIPLOMA END-SEMESTER EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM302C – DIGITAL ELECTRONICS

TIME: 2 HOURS **MAXIMUM MARKS: 40**

PART-A

MARKS: 8 X1=8

NOTE: Answer all questions. Each question carries one marks.

1. State different postulates in Boolean algebra.
2. Define combinational logic circuit.
3. Define counter.
4. Define propagation delay.
5. State the necessity of clock.
6. List the four types of registers.
7. List any three applications for counters.
8. State the need for Flash ROM.

PART-B

MARKS: 4 X 3=12

Instructions: 1) Answer all questions
2) Each question carries Three marks.

9(a). Explain Binary, Octal, Hexadecimal number systems.
(Or)
9(b). What is race around condition in JK flip-flop?

10(a). Explain the working of a serial adder circuit.
(Or)
10(b). Distinguish between synchronous and asynchronous counters.

11(a). What is level and edge triggering?
(Or)
11(b). Distinguish between combinational and sequential circuits.

12(a). Compare static RAM and dynamic RAM.
(Or)
12(b). Distinguish between synchronous and asynchronous counters.

PART-C

MARKS: 4 X 5=20

Instructions: 1) Answer all questions
2) Each question carries Five marks.

13(a). Simplify $F(P,Q,R,S)=\sum(0,2,5,7,8,10,13,15)$ using Karnaugh Map in SOP form.
(Or)
13(b). Draw the clocked SR flip flop circuit using NAND gates.

14(a). Draw full-adder using two Half-adders and an OR – gate.
(Or)
14(b). Explain the working of 4-bit asynchronous up counter with a circuit diagram.

15(a). Explain the working of master slave JK flip flop circuit with necessary diagrams.
(Or)
15(b). Explain the working of 4 bit shift left with a circuit and timing diagram.

16(a). Explain the working of decade counter with a circuit and Timing diagram.
(Or)
16(b). Explain the working of ring counter with a circuit diagram.

COMPUTER ARCHITECTURE

Course Title **: Computer Architecture.**	Course Code **:18CM-303C**
Semester **: III**	Course Group **:Core**
Teaching Scheme in Periods (L:T:P) **: 45:15:0**	Credits **:3**
Type of course **: Lecture + Assignments**	Total Contact Hours **:60 Periods**
CIE **:60 Marks**	SEE **:40 Marks**

Prerequisites

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: 8 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: 12 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: 10 Periods**

Peripheral devices - Need for an interface - Three modes of date 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: 10 Periods**

Principle of Parallel processing - Flynn's classification of Parallel processing - Principle 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 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 Seventh Edition, PHI/Pearson, 2006.
4. Computer Architecture and Organization – John P. Hayes, Mc Graw Hill 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

- 2.5.1 (r-1)'s Complement
- 2.5.2 (r)'s Complement

2.6 Instruction format

2.7 Define Operand, Opcode and address.

2.8 Explain zero address, one address, two address and three address instructions with simple examples.

2.9 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

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

1. 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
2. Each group should conduct different activity and no repeating should occur.
3. Visit different sites relevant to topics. Listen to the lectures and submit a handwritten report.
4. 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.
5. 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.
6. A Case study on Moore's Law about the processors and submits a report.
7. Conduct a survey on types of memories and also about the cost and speed of various memories with comparison.

FORMAT FOR STUDENT ACTIVITY ASSESSMENT

DIMENSION	**Unsatisfactory 1**	**Developing 2**	**Satisfactory 3**	**Good 4**	**Exemplary 5**	**Score Example**
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 the topic	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 little duties	Performs nearly all duties	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 does the assigned work; 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 most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	2
					Total	10/4=2.5

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

Suggested E-learning references
https://www.studytonight.com/computer-architecture/
https://www.phy.ornl.gov/csep/ca/node2.html
https://nptel.ac.in/courses/106102062/

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Recognize and explain the functional units of computers	**R,U**	**1,2,3,4,8,9,10**	**8**
CO2	Categorize instruction formats and addressing modes	**R,U**	**1,2,3,4,8,9,10**	**10**
CO3	Develop fixed point, floating point arithmetic algorithms	**R,U**	**1,2,3,4,8,9,10**	**10**
CO4	Demonstrate about computer memory system.	**R,U**	**1,2,3,4,8,9,10**	**12**
CO5	Utilize input and output units efficiently.	**R,U**	**1,2,3,4,8,9,10**	**10**
CO6	Contrast vector and pipeline processing , RISC and CISC	**R,U**	**1,2,3,4,8,9,10**	**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-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) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI		7,8	10(b) 12(a) 12(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

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEM-I EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM303C – COMPUTER ARCHITECTURE

TIME: 01 HOUR **MAXIMUM MARKS: 20**

PART-A ***MARKS: 4 X 1=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 X 3=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 X 5=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)

7. b). Describe the sequential execution of a program stored in memory by the CPU

8.a) Explain zero address, one address, two address and three address instructions with simple examples.

(OR)

8. b) Explain any five addressing modes.

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEM-II EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM303C – COMPUTER ARCHITECTURE

TIME: 01 HOUR **MAXIMUM MARKS:20**

PART-A ***MARKS: 4 X 1=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 X 3=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.

6. a) Draw the flow chart of fixed point multiplication.

(OR)

5. b) Draw the flow chart of floating point multiplication.

7. a) Compare main memory and auxiliary memory.

(OR)

6. b) Explain the need for memory hierarchy in a computer.

PART-C ***MARKS: 2 X 5=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

MODEL QUESTION PAPER
BOARD DIPLOMA SEMESTER END EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM303C – COMPUTER ARCHITECTURE

TIME: 02 HOURS **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, 11 and 12. ***MARKS: 4 X 3=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

NOTE: 1. Answer one question each from 13, 14, 15 and 16 ***MARKS: 4 X 5=20***

2. Each question is of internal choice type

3. Each question carries five marks.

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.

DATA STRUCTURES THROUGH C

Course Title : **DATA STRUCTURES THROUGH C**	Course Code : **18CM-304C**
Semester : **III**	Course Group : **Core**
Teaching Scheme in Periods (L:T:P) : **45:15:0**	Credits : **3**
Type of course **: Lecture + Assignments**	Total Contact Hours :**60 Periods**
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	Develop programs using the concepts of pointers and dynamic memory allocation.
CO2	Describe Data structures and implement space and time complexity of the algorithms.
CO3	Develop programs in C language using Sorting techniques.
CO4	Develop programs in C language using Searching techniques.
CO5	Describe different types of linked list and develop programs using C language. Construct stacks and queues using the concept of Arrays and Linked lists.
CO6	Use of Binary Trees and its Applications

Course Contents

1. **Pointers and Dynamic Memory allocation** **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.

2. **Introduction to Data structures** **Duration: 10 Periods**

   Data structures – Linear & non linear, data types and abstract data types, algorithm analysis for time and space requirements.

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

3. **Sorting** **Duration: 10 Periods**

   Introduction to different sorting techniques – selection sort program and algorithm analysis for its time complexity, insertion sort program and algorithm analysis for time complexity, bubble 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.

4. **Searching** **Duration: 06 Periods**

Introduction to different searching techniques – sequential search example, program and algorithm analysis for its time complexity and binary search example, program and algorithm analysis for its time complexity.

5. **Linear data structures** **Duration: 14 Periods**

Linked Lists – Singly linked lists – Create, insert, delete, sort, search and replace an element in a linked list – Reverse, Create singly circular linked list. Doubly linked list – Create, insert, delete elements in doubly linked list - Create doubly linked circular list. **Queues and stacks** - Implementation of stacks, application of stacks, converting infix to postfix expression and evaluation – Applications & Implementation of queues, Circular queues, Priority queue – sparse matrix

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. Data Structures: A Pseudocode Approach with C++ - Gilberg / Forouzan
2. Data Structures using C & C++ - Tanenbaum, Langsam and Augenstein (PHI).
3. Data structures through C- YashwanthKanetkar
4. An Introduction to data structures with applications - Tremblay & Sorenson

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 and de-referencing operators.

1.6 Discuss about pointer arithmetic.

1.7 Illustrate precedence of address 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 Define data structure and classify them

2.2 Explain linear data structures

2.3 Describe nonlinear data structures

2.4 Explain data types and abstract data types

2.5 State algorithm analysis for time requirements

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

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 two sorted lists

3.15 Discuss the program to implement merge sort on two sorted lists

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

5.0 Linear Data structures

5.1 List advantages of linked lists

5.2 State the purpose of dummy header

5.3 Create a singly linked list and display it

5.4 Perform insertion and deletion operation on a singly linked list

5.5 Know how to search and replace an element in a linked list

5.6 Know to reverse a singly linked list

5.7 Create a singly circular linked list

5.8 Create a doubly linked list

5.9 Insert and delete elements in a doubly linked list

5.10 Understand Queues and Stacks

5.11 Define stack

5.12 Explain the two operations of a stack

5.13 Implementation of stacks

5.14 List applications of stacks

5.15 Convert infix to postfix expression

5.16 Evaluate postfix expression

5.17 Define queue

5.18 Explain the operations on queues

5.19 Discuss application of queues

5.20 Explain array implementation of queue

5.21 Implement circular queues

5.22 Explain priority queues

5.23 Definition of sparse matrix – converting ordinary matrix to sparse matrix transpose of sparse matrix

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 programme 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	Develop programs using the concepts of pointers and dynamic memory allocation.	**R, U, A**	**1,2,3,10**	**10**
CO2	Describe Data structures and implement space and time complexity of the algorithms.	**R, U, A**	**1,2,3,10**	**10**
CO3	Develop programs in C language using Sorting techniques.	**R, U, A**	**1,2,3,10**	**14**
CO4	Develop programs in C language using Searching techniques.	**R, U, A**	**1,2,3,10**	**06**
CO5	Describe different types of linked list and develop programs using C language. Construct stacks and queues using the concept of Arrays and Linked lists.	**R, U, A**	**1,2,3,10**	**12**
CO6	Use of Binary Trees and its Applications	**R, U, A**	**1,2,3,10**	**08**

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) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI		7,8	10(b) 12(a) 12(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

FORMAT FOR STUDENT ACTIVITY ASSESSMENT

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 5	Exemplary 6	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 the topic	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 little duties	Performs nearly all duties	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 does the assigned work; 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 most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	2
					TOTAL	10/4= 2.5

NOTE : This is only an example. Appropriate rubrics may be devised by the concerned course coordinator for assessing the given activity.

18CM304C, III Semester

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

18CM304C, III Data Structures 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. 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 nonlinear 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( )

18CM304C, III Semester

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

18CM304C, 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- 18CM304C, 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

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). 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

RELATIONAL DATABASE MANAGEMENT SYSTEMS

Course Title **: Relational Database Management Systems**	Course Code **: 18CM-305C**
Semester **: III**	Course Group **: Core**
Teaching Scheme in Periods (L:T:P) **: 45:15:0**	Credits **: 3**
Type of course **: Lecture + Assignments**	Total Contact Hours **: 60 Periods**
CIE **: 60 Marks**	SEE **: 40 Marks**

Prerequisites

Knowledge of programming language.

Course Outcomes

Upon completion of the course the student shall be able to

	Course Outcome
CO1	Describe the characteristics of database, architecture and languages of Database system.
CO2	Implement Entity-Relationship diagrams.
CO3	Apply relational model concepts and constraints.
CO4	Apply normalization techniques for relational databases and familiarize with transaction processing.
CO5	Use Structured Query Language (SQL), frame queries to any database and managing schema objects.
CO6	Develop programs using PL/SQL.

Course Contents

1. Concepts of Databases: **Duration: 10 Periods**

Introduction - An Example - Characteristics of the database approach - Advantages of using the DBMS Approach - A Brief History of Database Applications.
Database System Concepts and Architecture - Data Models – Schemas and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client /Server Architectures for DBMSs - Classification of database Management System.

2. Data Modeling Using the Entity-Relationship(ER) Model Duration: 08 Periods

Using High Level Conceptual Data Models for Database Design - An example Database Application - Entity Types - Entity Sets - attributes and keys - Relation Types - Relationship Sets - roles and structural constraints - ER Diagrams, naming conventions and design issues - Relationship Types of Degree Higher than Two.

3. Relational Data Model and Relational Data Base Constraints Duration: 06 Periods

Relational Model concepts - Relational Model Constraints and relational database schemas - Update operation and Dealing with constraints violations - Transaction

4. Normalization and fundamentals of Data Base Transaction Processing Duration: 10 Periods

Informal Design guidelines for relation schemas - Functional dependencies - Normal forms based on primary keys - General Definition of first, second and third normal forms, Boyce-codd

Normal form. Introduction to transaction processing - transaction and system concepts - desirable properties of transactions – Serializability - States of Transactions.

5. Concept of SQL and management of schema objects. Duration: 14 Periods

SQL Data Definition and data types – various operators in SQL – DDL statements in SQL - DML statements in SQL – Basic queries in SQL - specifying constraints in SQL - various functions in SQL - SQL sub queries and JOIN statements.
Management of Schema objects —indexes – sequences - synonyms - views.

6. PL/SQL Duration: 12 Periods

Introduction- Data types- Naming Conventions – control statements - sequential control GOTO and NULL statements - Subprograms – Procedures -Functions RETURN statement– Recursion - Stored Procedures - Exceptions – Cursors - Triggers – Packages.

Specific Learning Outcomes:

Upon completion of the course the student shall be able to

1. Concepts of Databases

1.1 Familiarize with Database.
1.2 Illustrate the evolution of DBMS.
1.3 Describe the characteristics of the database approach.
1.4 Discuss about the applications of DBMS.
1.5 Explain different types of Data Models.
1.6 Define Schemas, instances.
1.7 Demonstrate Three-Schema Architecture.
1.8 Define Data Independence.
1.9 Familiarize Database Languages and Interfaces.
1.10 Illustrate Database System Environment.
1.11 Explain Centralized and Client /Server Architectures for DBMSs.
1.12 Classify different types of Database Management System.

2. Data Modeling Using the Entity-Relationship(ER) Model

2.1 Describe how to use High-Level Conceptual Data Models for Database Design.
2.2 Familiarize a Database Application and list some Database applications.
2.3 Describe Entity Types.
2.4 Demonstrate Entity Sets, Weak Entity Sets.
2.5 Illustrate attributes and keys.
2.6 Describe Relation Types.
2.7 Describe Relation sets.
2.8 Explain roles and structural constraints.
2.9 Demonstrate ER Diagrams, naming conventions, design issues.
2.10 Explain Relationship Types of Degree Higher Than Two.

3. Relational Data Model and Relational Data Base Constraints

3.1 Use Relational Model concepts.
3.2 Describe Relational Model Constraints.
3.3 Illustrate relational database schema.
3.4 Describe Update operation and dealing with constraints violations.
3.5 Define Transaction.

4. Normalization for relational databases, Fundamentals of Data Base Transaction Processing

4.1 Explain Informal Design guidelines for relation schemas.
4.2 Define Functional dependencies.

4.3 List Normal forms based on primary keys.
4.4 Explain General Definition of first, second and third normal forms, Boyce-codd Normal form with examples.
4.5 Define Transaction in DBMS.
4.6 Illustrate the ACID Properties of Transactions.
4.7 Describe about desirable Properties of Transactions.
4.8 Illustrate Commit, Rollback, and Save Point.
4.9 Explain Serializability.
4.10 Give the States of Transactions.

5. Concept of SQL and management of schema objects

5.1 Familiarize with SQL.
- 5.1.1 List the features of SQL
- 5.1.2 List the benefits of SQL
- 5.1.3 List the components of SQL
- 5.1.4 Give some pseudo columns in SQL

5.2 Describe various data types in SQL.
5.3 Describe various operators in SQL.
5.4 Explain Data Definition Language statements in SQL.
5.5 Explain Data Modification Language statements in SQL.
5.6 Implement some basic queries with examples in SQL.
5.7 Explain the process of specifying constraints in SQL.
5.8 Explain different categories of SQL functions like numeric functions, aggregate functions, scalar functions, date functions and string functions in SQL.
5.9 Implement sub queries and JOIN statements with examples in SQL.
5.10 Explain the management of schema objects.
- 5.10.1 Describe steps of managing indexes.
- 5.10.2 Explain the management of sequences like creating altering, dropping etc.
- 5.10.3 Explain the various synonyms management like creating, dropping etc.
- 5.10.4 Explain views and illustrate the creation of views from multiple tables.

6. PL/SQL

6.1 Familiarize with PL/SQL.
6.2 Describe various data types in PL/SQL.
6.3 Explain various control statements in PL/SQL with examples.
6.4 List sequential control GOTO and NULL statements.
6.5 Define subprograms.
6.6 Develop PL/SQL programs using procedures.
6.7 Develop PL/SQL programs using functions.
6.8 Define recursion and explain recursion with example.
6.9 Describe about Stored Procedures.
6.10 Develop PL/SQL programs to handle exceptions.
6.11 Define Cursor and explain Cursors with examples.
6.12 Define Triggers and explain Triggers with examples.
6.13 Define Package and explain Packages with examples.

Suggested list of Student Activities

Note: The following activities or similar activities for assessing 2.5 credits (Any one)

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

- 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 programme co-coordinator.
- Each group should conduct different activity and no repeating should occur.

1. Visit Library to refer to standard Books on Database Management Systems, collect related material and prepare notes.
2. Refer to online content and videos to get more knowledge on database concepts.
3. Study different types of databases in the industries and prepare a Power Point Presentation (PPT).
4. Write assignments given by course coordinator.
5. Read all the course contents and should be able to write slip tests and surprise tests.
6. Prepare a seminar on a specific topic that is related to latest technologies in the database field and present to all the peers.
7. Design a simple project using any one database.
8. Study IEEE papers on Bigdata, Datascience, DataMining topics and submit a report.
9. Prepare quiz on database related questions and conduct.
10. Participate in state level or national level technical conferences.

Format for Student Activity Assessment

DIMENSION	**Unsatisfactory 1**	**Developing 2**	**Satisfactory 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 the topic	Collects a great deal of information ; all refer to the topic	3
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	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 does the assigned work; 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	3

					reminded and on given time frame	
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					Average score	**13/4 = 3.25**

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

Note: If Average score>1, then 2.5 credits are awarded otherwise 0(zero) credits are awarded.

Recommended Books

1. "An Introduction to Database Systems" 8th edition by C J Date.
2. "DATABASE SYSTEM CONCEPTS" 6th edition by Abraham Silberschatz *Yale University*, Henry F. Korth *Lehigh University*, S. Sudarshan *Indian Institute of Technology*, *Bombay*.
3. "Fundamentals of Database Systems" Sixth edition, 2014, RamezElmasri, Shamkan B. Navathe, Pearson Education, ISBN- 9788131792476.
4. "Database Managemet Systems" Raghu Ramakrishnan and Johannes Gehrke-3rd Edition, McGraw-Hill, 2003.
5. "DBMS a practical approach" by E R Rajiv Chopra, S Chand publications.
6. "Database Systems: Design, Implementation, and Management", Eighth Edition by Peter Rob and Carlos Coronel.
7. "Database Systems *A Practical Approach to Design, Implementation, and Management"* 6th edition
   By Thomas Connolly, Carolyn Begg.

Suggested E-learning references.

1. https://www.w3schools.in/.
2. https://www.tutorialspoint.com/dbms
3. https://beginner-sql-tutorial.com/sql.htm.
4. www.nptel.ac.in.
5. http://www.sql-tutorial.net/

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Describe the characteristics of database, architecture and languages of Database system.	**R,U, A**	**1,2,6,7,8,9,10**	**10**
CO2	Implement Entity-Relationship diagrams.	**R,U, A**	**1,2,3,4,5,6,7,8,9,10**	**06**
CO3	Apply relational model concepts and constraints.	**R,U, A**	**1,2,3,4,5,6,7,8,9,10**	**08**
CO4	Apply normalization techniques for relational databases and familiarize with transaction processing.	**R,U, A**	**1,2,3,4,5,6,7,8,9,10**	**10**
CO5	Use Structured Query Language (SQL), frame queries to any database and managing schema objects.	**U, A**	**1,2,3,4,5,6,7,8,9,10**	**14**
CO6	Develop programs using PL/SQL.	**R,U, A**	**1,2,3,4,5,6,7,8,9,10**	**12**
		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-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) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI		7,8	10(b) 12(a) 12(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

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER-I EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM305C – RELATIONAL DATABASE MANAGEMENT SYSTEMS

TIME: 1 HOURS **MAXIMUM MARKS: 20**

PART-A ***MARKS: 4 X 1=4***

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

1. Define DBMS and list 3 applications of DBMS
2. Define Data Independence.
3. List some structural constraints.
4. Define Weak entity types.

PART-B ***MARKS: 2 X 3=6***

NOTE: 1. Answer any one question from 5 and 6.
2. Each question carries three marks.

5. (A) Describe Three-Schema Architecture.
   or
   (B) List some Database Models.

6. (A) Describe how to use High-Level Conceptual Data Models for Database Design.
   or
   (B) List different types of attributes and keys.

PART-C ***MARKS: 2 X 5=10***

NOTE: 1. Answer any one question from 7 and 8.
2. Each question carries five marks.

7. (A) List and explain, Database Languages and Interfaces
   or
   (B) Explain the Centralized and Client /Server Architectures for DBMSs.

8. (A) Explain a Database Application and list some Database applications.
   or
   (B) Demonstrate ER Diagram for University with a neat sketch.

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER-II EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM305C – RELATIONAL DATABASE MANAGEMENT SYSTEMS

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART-A ***MARKS: 4 X 1=4***

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

1. List some relational model concepts.
2. Define update operation.
3. Define Functional dependency.
4. List the states of transactions.

PART-B ***MARKS: 2 X 3=6***

NOTE: 1. Answer any one question from 5 and 6.
2. Each question carries three marks.

5. (A) Describe Relational Database Schema.
   or
   (B) Describe about transactions.

6. (A) List Normal forms based on primary keys
   or
   (B) List the ACID Properties of Transactions.

PART-C ***MARKS: 2 X 5=10***

NOTE: 1. Answer any one question from 7 and 8.
2. Each question carries five marks.

7. (A) Implement Relational Model Constraints.
   or
   (B) Implement the Update operation and dealing with constraints violations.

8. (A) Explain Serializability with examples.
   or
   (B) Illustrate Commit, Rollback, and Save Point.

MODEL QUESTION PAPER
BOARD DIPLOMA SEMESTER END EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM305C – RELATIONAL DATABASE MANAGEMENT SYSTEMS

TIME: 2 HOURS **MAXIMUM MARKS: 40**

PART-A ***MARKS: 8 X 1=8***

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

1. Define Schemas, instances.
2. Define Update operation.
3. List the benefits of SQL.
4. List ACID properties.
5. List 3 data types in SQL.
6. Write the syntax to create a table in SQL.
7. List the types of subprograms in PL/SQL.
8. Define cursor.

PART-B

NOTE: 1. Answer any one question from 9, 10, 11 and 12. ***MARKS: 4 X 3=12***
2. Each question carries three marks.

9. (A) List different types of data models.
   or
   (B) List some operators in SQL.

10. (A) Describe relational database schema.
    or
    (B) List control statements in PL/SQL.

11. (A) List the types of schema objects.
    or
    (B) Write about managing indexes.

12. (A) Write about the features and benefits of PL/SQL.
    or
    (B) Write about sequential control GOTO and NULL statements in PL/SQL.

PART-C

NOTE: 1. Answer any one question from 13, 14, 15 and 16 ***MARKS: 4 X 5=20***
2. Each question carries five marks.

13. (A) List and explain Relation types.
    or
    (B) Implement DDL statements in SQL with examples.

14. (A) Implement different types of Normal Forms with examples.

or

(B) Develop PL/SQL program using recursive functions with an example.

15. (A) Implement the aggregate functions and string functions in SQL.

or

(B) Illustrate the creation of views from multiple tables with examples.

16. (A) Develop the concept of handling exceptions in PL/SQL with example program.

or

(B) Explain about numeric and date functions in PL/SQL with examples.

DIGITAL ELECTRONICS LAB

Course Title :	**DIGITAL ELECTRONICS LAB**	**Course Code**	**18CM306P**
Semester	**III**	**Course Group**	**Core**
Teaching Scheme in Hrs(L:T:P)	**15:00:30**	**Credits**	**1.5**
Methodology	**Lecture + Practical**	**Total Contact Hours**	**45Pds**
CIE	**60 Marks**	**SEE**	**40 Marks**

Prerequisites

Knowledge of basic electronics.

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Periods
1.	Basics of Digital Electronics	**5**
2.	Digital IC logic families	**5**
3.	Combinational logic circuits and adder circuits.	**5**
4.	MUX, DE-MUX, Encoder and Decoder circuits.	**8**
5.	Sequential logic circuits	**10**
6.	Counters and Semiconductor memories	**12**
	Total	**45**

Course Outcomes

Upon completion of the course the student shall be able to

Course Outcome	
CO1	Familiarize various number systems and codes.
CO2	Simplify Boolean expressions using various Logic Gates
CO3	Demonstrate different types of combinational logic circuits.
CO4	Develop Combinational logic circuits.
CO5	Design registers using flip-flops.
CO6	Design counter circuits.

Reference

1. Digital Fundamentals, Thomas L. Floyd, Pearson Education, ISBN:9788131734483

2. Digital Principles and Applications, Malvino and Leach, TMH

E-Resources

1. http://www.vlab.co.in/

2. http://www.asic-world.com/

3. http://electrical4u.com/

4. http://www.electronics-tutorials.ws

CO-PO Mapping

Course Outcome		Linked PO	Hrs
CO1	Make use of various gates.	**1,2,3,4,10**	**5**
CO2	Identify various digital IC logic families by their characteristics.	**1,2,3,4,10**	**5**
CO3	Construct different types of combinational logic circuits.	**1,2,3,4,10**	**5**
CO4	Develop Combinational logic circuits like MUX , De-mux, encoder, decoder and comparator circuits.	**1,2,3,4,10**	**8**
CO5	Build sequential circuits and design registers using flip-flops.	**1,2,3,4,10**	**10**
CO6	Design counter circuits and Compare different types of memories.	**1,2,3,4,10**	**12**

Course-PO Attainment Matrix

Course	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
DIGITAL ELECTRONICS LAB	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**3**		**3**

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

FORMAT FOR STUDENT ACTIVITY ASSESSMENT

DIMENSION	**Unsatisfactory 1**	**Developing 2**	**Satisfactory 3**	**Good 5**	**Exemplary 6**	**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 the topic	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 little duties	Performs nearly all duties	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 does the assigned work; 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 most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and 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.

LIST OF EXPERIMENTS

1. Verify the truth tables of AND, OR, NOT, NAND, NOR and Ex-OR Gates
2. Realize AND, OR, NOT, XOR functions using NAND gate.
3. Realize AND, OR, NOT, XOR functions using NOR gate.
4. Verify Demorgan's Laws using given digital trainer kit.
5. Construct half adder and full adder circuits and verify their functionality
6. Construct clocked Flip Flops using Logic gates/Digital Trainer kits and verify its truth table.
   a) Verify the truth table D flip Flop
   b) Verify the functionality and truth table of RS flip flop with Preset and Clear
   c) Verify the Truth table of JK FF.
   d) Construct T flip flops and verify the truth table.
7. Construct and verify the function of Asynchronous counters
8. Construct and verify the function of decade counter.
9. Construct and verify the function of Synchronous counters
10. Construct and Verify the function of up/down counter
11. Construct and Verify the function of shift register
12. Construct a circuit to verify TT of 8X3 Encoder and 3X8 Decoder.
13. Construct a circuit to verify TT of 4:1 mux
14. Construct a circuit to verify TT 1:4 demux.
15. Construct a circuit of 4-bit magnitude comparator using logic gates

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER I EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM306P – DIGITAL ELECTRONICS LAB

TIME: 1 HOUR **MAXIMUM MARKS: 20**

MARKS: 1 X 20 = 20

Instructions: 1) Answer any One of the following questions
2) Each question carries ten marks.

1. Verify the truth tables of AND, OR, NOT, NAND, NOR and Ex-OR Gates
2. Realize AND, OR, NOT, XOR functions using NAND gate.
3. Realize AND, OR, NOT, XOR functions using NOR gate.
4. Verify Demorgan's Laws using given digital trainer kit.

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER II EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM306P – DIGITAL ELECTRONICS LAB

TIME: 1 HOUR **MAXIMUM MARKS: 20**

MARKS: 1 X 20 = 20

Instructions: 1) Answer any One of the following questions
2) Each question carries ten marks.

1. Construct half adder and full adder circuits and verify their functionality
2. Construct a circuit to verify TT of 8X3 Encoder and 3X8 Decoder.
3. Construct a circuit to verify TT of 4:1 mux
4. Construct a circuit to verify TT 1:4 demux.
5. Construct a circuit of 4-bit magnitude comparator using logic gates

MODEL QUESTION PAPER
BOARD DIPLOMA END-SEMESTER EXAMINATION (C-18)
DCME-III-SEMESTER EXAMINATION
18CM306P – DIGITAL ELECTRONICS LAB

TIME: 1 HOUR **MAXIMUM MARKS: 40**

MARKS: 2 X 20 =40

Instructions: 1) Answer any Two of the following questions
2) Each question carries ten marks.

1. Verify the truth tables of AND, OR, NOT, NAND, NOR and Ex-OR Gates
2. Realize AND, OR, NOT, XOR functions using NAND gate.
3. Realize AND, OR, NOT, XOR functions using NOR gate.
4. Verify Demorgan's Laws using given digital trainer kit.
5. Construct half adder and full adder circuits and verify their functionality
6. Construct clocked Flip Flops using Logic gates/Digital Trainer kits and verify its truth table.

   a) Verify the truth table D flip Flop

   b) Verify the functionality and truth table of RS flip flop with Preset and Clear

   c) Verify the Truth table of JK FF.

   d) Construct T flip flops and verify the truth table.
7. Construct and verify the function of Asynchronous counters
8. Construct and verify the function of decade counter.
9. Construct and verify the function of Synchronous counters
10. Construct and Verify the function of up/down counter
11. Construct and Verify the function of shift register
12. Construct a circuit to verify TT of 8X3 Encoder and 3X8 Decoder.
13. Construct a circuit to verify TT of 4:1 mux
14. Construct a circuit to verify TT 1:4 demux.
15. Construct a circuit of 4-bit magnitude comparator using logic gates

Data structures through C lab practice

Course Title :	**Data structures through C lab practice**	Course Code	**18CM-307P**
Semester	**III**	Course Group	**Core**
Teaching Scheme in Periods(L:T:P)	**15:0:30**	Credits	**1.5**
Methodology	**Lecture + Practical**	Total Contact Hours :	**45Pds**
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	**6**
2	Sorting and Searching algorithms	**13**
3	Linear data structures	**13**
4	Non Linear data structures	**13**
	Total	**45**

Reference books:

1. Data Structures: A Pseudocode Approach with C++ - Gilberg / Forouzan
2. Data Structures using C & C++ - Tanenbaum, Langsam and Augenstein (PHI).
3. Data structures through C- YashwanthKanetkar
4. An Introduction to data structures with applications - Tremblay & Sorenson

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**	**1,2,3,4,8,9,10**	**6**
CO2	Illustrate sorting and searching techniques using programs	**R, U, A**	**1,2,3,4,8,9,10**	**13**
CO3	Demonstrate linked list, stacks and queues using programs	**R,U, A**	**1,2,3,4,8,9,10**	**13**
CO4	Demonstrate binary tree construction and tree traversals	**R,U, A**	**1,2,3,4,8,9,10**	**13**
			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

RDBMS LAB PRACTICE

Course Title : **RDBMS LAB PRACTICE**	Course Code : **18CM-308P**
Semester : **III**	Course Group : **Core+Practical**
Teaching Scheme in Hrs (L:T:P) :**15:0:30**	Credits : **3**
Type of course **: Tutorial + Practicals**	Total Contact Hours : **45 Periods**
CIE : **60 Marks**	SEE : **40 Marks**

Prerequisites

Knowledge of basics DBMS theoretical concepts.

Course Content

Unit Number	Unit Name	Periods
1	Concepts of Databases	**2**
2	Data Modelling Using the Entity Relationship(ER) Model	**4**
3	Relational Data Model and Relational Data Base Constraints	**6**
4	Normalization and fundamentals of Data Base Transaction Processing	**8**
5	Concept of SQL and management of schema objects.	**13**
6	PL/SQL	**12**
	Total	**45**

Course Objectives

1. Use the concepts of database technologies.
2. Prepare queries to interact with database using SQL DML/DDL commands.
3. Implement Database schema objects for a given problem-domain.
4. Develop programs using PL/SQL.

Course Outcome

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 the concepts of database technologies.	1,2,3,4,5	**U, A**	**1,2,3,4,5,8,9,10**	**5**
CO2	Prepare queries to interact	6,7,8,9,10,11,12	**U, A**	**1,2,3,4,5,8,9,10**	**15**

	with database using SQL DML/DDL commands				
CO3	Implement Database schema objects for a given problem-domain.	13,14,15,16,17,18	**U, A**	**1,2,3,4,5,8,9,10**	**10**
CO4	Develop programs using PL/SQL.	19,20,21,22,23,24, 25	**U,A**	**1,2,3,4,5,8,9,10**	**15**
					45

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

Course-PO Attainment Matrix

Course	**Program Outcomes**									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
RDBMS LAB	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**

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

References

1. "An Introduction to Database Systems" 8th edition by C J Date.
2. "DATABASE SYSTEM CONCEPTS" 6th edition by Abraham Silberschatz *Yale University*, Henry F. Korth *Lehigh University*, S. Sudarshan *Indian Institute of Technology, Bombay.*
3. "Fundamentals of Database Systems" Sixth edition, 2014, RamezElmasri, Shamkan B. Navathe, Pearson Education, ISBN- 9788131792476.
4. "Database Managemet Systems" Raghu Ramakrishnan and Johannes Gehrke-3rd Edition, McGraw-Hill, 2003.
5. https://www.w3schools.in/.
6. https://www.tutorialspoint.com/dbms
7. https://beginner-sql-tutorial.com/sql.htm.
8. www.nptel.ac.in.
9. http://www.sql-tutorial.net/

Course Delivery

The course will be delivered through Demonstration and Practices.

List of Exercises:

1. Install Oracle database.
2. Prepare queries to create tables.
3. Prepare queries to insert records into tables.
4. Prepare queries to update records in a table.
5. Prepare queries to modify the structure of the table.
6. Prepare queries to retrieve data from database using SELECT command.
7. Prepare queries using clauses like WHERE, ORDER, IN, LIKE, AND, OR, NOT.
8. Develop queries using numeric functions.
9. Develop queries using string functions.

10. Develop queries using date functions.
11. Develop queries using aggregate functions.
12. Develop queries using scalar functions.
13. Prepare queries using set operators.
14. Develop sub queries.
15. Prepare queries using SQL joins.
16. Create tables using integrity constraints.
17. Implement Sequences.
18. Implement Synonyms.
19. Implement creating and deleting indexes.
20. Implement Clusters.
21. Implement Views.
22. Develop programs using PL/SQL control statements.
23. Develop programs using PL/SQL Procedures.
24. Develop programs using PL/SQL Functions.
25. Develop programs using PL/SQL Recursion.
26. Develop programs using PL/SQL to handle exceptions.
27. Implement Triggers.
28. Implement Packages.

MULTIMEDIA LAB PRACTICE

Course Title	: **Multimedia Lab Practice**	Course Code	:**18CM-309P**
Semester	: **III**	Course Group	: **Practical**
Teaching Scheme in Hrs (L:T:P) :15**:0:30**		Credits	: **3**
Type of course	**: Practical**	Total Contact Hours	: **45 Pds**
CIE	: **60 Marks**	SEE	: **40 Marks**

Prerequisites

Basic computer knowledge and creative ideas.

Course Objective

Learn the various photo editing animation techniques and demonstrate proficiency in developing the multimedia presentations.

Course Outcome

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

Course Outcome	
CO1	Apply basic elements and principles of photo editing software to achieve a great photo effect by applying effects like color, shadows, alteration of backgrounds, cropping and collage making
CO2	Create simple shapes using animation editing software and design simple animation by applying shape tweens and motion tweens.

Legends: R = Remember U= Understand; A= Apply

Course Contents

UNIT – I

Using suitable Photo Editing Software, perform the following exercises:

1. **Designing Visiting card:** Create a visiting Card containing at least one graphic and text information.

2. **Extracting of image:** You are given a picture of a garden as background. Extract the image of a butterfly from another picture and organize it on the background.

3. **Creating duplicate copies of image:** Given a picture, make three copies of this picture. On one of these pictures, adjust the brightness and contrast, so that it gives an elegant look. On the second picture, change it to grayscale and the third is the original one.
4. **Converting Image into object:** Convert the given image to a pencil sketch.
5. **Masking of Image:** Mask the background image given through your name.
6. **Editing Image:** Import two pictures, one that of sea and another of clouds. Morph, Merge and Overlap the images.

Unit II

Using suitable animation software, solve the following projects:

7. **Shape Distortion:** Create a square and gradually convert it into a circle.
8. **Spotlight:** Create a text on one layer; format the text with suitable size, color and style. With the help of another layer, position a spotlight on the text and move the spotlight from left to right.
9. **Virtual Drumbeat:** Draw a circle to represent a drum and edit as required on one layer. Insert another layer, draw suitable drum sticks and position them appropriately. Give visual effects. Also provide audio effect by selecting the sound item from Flash library Sounds.fla, so as to integrate audio and video clips.
10. **Simulation of a Raindrop:** In the first layer, draw a raindrop that falls on the ground. Show the splash effect, when it touches the ground on another layer.
11. **Sunset:** Create a suitable background with clouds and mountains on one layer. Draw the Sun on another layer. On the third layer draw birds. Provide animation to show the birds flying across the Sun that keeps fading.
12. **Stickman Walk:** Draw a walking track on one layer. On another layer draw a stickman, with animation show the man walking over the track from left to right.

Text 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. Comdex Multimedia and Web Design Course Kit, DreamTech, Vikas Gupta, SBN 13: 788177229196
4. http://design.tutsplus.com/articles/50-great-photoshop-tutorials-for-clever-beginners--psd-785

Suggested E-Learning References

1. http://www.coursestuff.co.uk/DESI1182/docs/Flash%20tutorials.pdf
2. http://w3.id.tue.nl/fileadmin/id/objects/Etelier/Phidgets/Software/Flash/fl8_tutorials.pdf
3. http://nptel.ac.in
4. http://www.tutorialspoint.com
5. https://www.geeksforgeeks.org/
6. https://www.studytonight.com/

Mapping Course Outcomes with Program Outcomes:

Course Outcome		Experiment Linked	CL	Linked PO	Lab Sessions
CO1	Apply basic elements and principles of photo editing software to achieve a great photo effect by applying effects like color, shadows, alteration of backgrounds, cropping and collage making	1,2,3,4,5,6,	**R,U,A**	**1,2,3,4,7,8,9,10**	**20**
CO2	Create simple shapes using animation editing software and design simple animation by applying shape tweens and motion tweens	7,8,9,10,11,12	**R,U,A**	**1,2,3,4,8,9,10**	**25**

U-Understanding; A-application/ Analysis; App-Application

List of Experiments:

1. Using photo editing software, design a visiting card containing at least one graphic and text information.

2. You are given a picture of a garden as background. Extract the image of a butterfly from another picture and organize it on the background. Use photo editing software,

3. Using photo editing software, make three copies of .jpeg picture. On one of these pictures, adjust the brightness and contrast, so that it gives an elegant look. On the second picture, change it to grayscale and the third is the original one.

4. Using photo editing software convert an image imported from My Pictures, to a pencil sketch.

5. Using photo editing software, Mask the background image given through your name.

6. Using photo editing software, import two pictures, one that of sea and another of clouds. Morph, merge and overlap these images.

7. Using animation software show the gradual conversion of a square to a circle.

8. Using animation software, highlight a neatly formatted text by a spotlight from left to right.

9. Using animation software, show the effect of a Virtual Drumbeat with suitable audio and visual effects.

10. Using animation software, Simulate a Raindrop with a splash effect.
11. Using animation software, show the sunset event with a bird flying across while the sun keeps fading.
12. Using animation software, design a stickman walking over a track from left to right.

Communication Skills and Life Skills

Course Title	**Communication Skills and Life Skills**	Course Code	**18 Common 310 P**
Semester	**III**	Course Group	**Foundation**
Teaching Scheme in Periods- L: T:P	**15:0:30**	Credits	**1.5**
Methodology	**Lecture + Practical**	Total Contact Hours	**45 Periods (3 Periods per Week)**
CIE	**60 Marks**	SEE	**40 Marks**

Rationale:

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

Prerequisites:

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

Course Outcomes:

	At the end of the course the students will have the ability to:
Listening Skills	Identify the main or the central idea. Listen for specific details. Learn the pronunciation.
Communication Skills – I	Learn relevant vocabulary to make introductions. Learn to introduce oneself in formal and informal situations. Learn vocabulary and expressions useful for describing objects Describe objects
Communication Skills – II	Learn vocabulary to talk about the past Describe the incidents that happened in the past Learn the techniques of organising the matter / content for one-minute speech. Speak fluently and accurately using appropriate body language.
Life Skills – I	Think positively. Develop positive attitude. Overcome negative attitude. Know the importance of setting goals. Set goals using SMART features.

Life Skills – II	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'. Learn to be creative. Think innovatively. Think critically.
Life Skills – III	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. Manage time effectively. Learn various time management techniques. Learn the importance of prioritisation.

CO-PO Matrix

	Course Outcome		**Linked PO**
CO 1	Listening for main idea and specific details	**R/U/A**	**1, 2, 3, 4, 5,7,8, 9,10**
CO 2	Introduce oneself and Describe Objects	**R/U/A**	**1,2,3,8,9,10**
CO 3	Talk about the past and speak fluently for one minute	**R/U/A**	**1,2,3,7,8.9,10**
CO 4	Develop positive attitude and set short term and long term goals	**R/U/A**	**1,2,3,7,8,9,10**
CO 5	Learn to solve a problem, make decisions and think innovatively	**R/U/A**	**1,2,3,7,8,9,10**
CO6	Learn to become a good team member and leader	**R/U/A**	**1,2,3,7,8,9,10**

Course Contents:

I. Listening Skills **Duration: 9**

1. Listening – I
    - Digital Camera
    - A Dialogue
    - Wild Animal / Human conflict
2. Listening – II
    - A Recipe
    - A Telephone conversation
    - An Interview

II. Communication Skills – I **Duration:6**

3. Introducing Oneself
4. Describing Objects

III. Communication Skills – II **Duration:6**

5. Talking About the Past
6. Just A Minute

IV. Life Skills – I **Duration:6**

7. Attitude
8. Goal Setting

V. Life Skills – II **Duration:9**

9. Problem Solving and Decision-Making Skills
10. Critical Thinking & Creativity

VI. Life Skills – III **Duration:9**

11. Leadership and Teamwork
12. Time Management

Suggested Student Activities:

- Listening Comprehension
- Seminars
- Paper Presentations
- Line ups for introducing oneself
- Describing persons / places / things
- Picture description
- Role Plays
- Dumb charades
- What is in the bag? (Identify the objects)
- Games using Online Dictionaries
- Sharing the information using emails, chats and groups
- Just A Minute
- Writing diary events
- 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

Evaluation Pattern:

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

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

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

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. JAM or Role plays: 15 Marks
c. *Viva Voce* on any life skills topic : 15 Marks

References:

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

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

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

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E-Learning Resources:

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

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

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

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

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

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

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

BOARD DIPLOMA EXAMINATION (C-18)

THIRD SEMESTER 18 COMMON-310P

COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - I

Time : 1 Hour **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)

Florence Nightingale was an English social reformer and a statistician, and the founder of modern nursing. She was born in Florence, Italy, on May 12, 1820. Part of a wealthy family, Nightingale defied the expectations of the time and pursued what she saw as her God-given calling of nursing during the Crimean War. She and a team of nurses improved the unsanitary conditions at a British base hospital, greatly reducing the death count. Her writings sparked worldwide health care reform, and in 1860 she established St. Thomas' Hospital and the Nightingale Training School for Nurses. A revered hero of her time, she died on August 13, 1910, in London. Nightingale came to prominence while serving as a manager and trainer of nurses during the Crimean War, in which she organized care for wounded soldiers. She gave nursing a favourable reputation and became an icon of Victorian culture, especially in the persona of "The Lady with the Lamp" making rounds of wounded soldiers at night.

Questions:

1. Who was Florence Nightingale?
2. When and where was she born?
3. What does the passage convey?
4. When did she pass away?
5. Where did she establish nursing school?

PART- B **10 Marks**

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

2. How do you introduce yourself formally in an interview?
3. Describe your polytechnic.

BOARD DIPLOMA EXAMINATION (C-18)

THIRD SEMESTER 18 COMMON-310P

COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - II

Time : 1 Hour **Total Marks: 20 Marks**

Part – A **10 marks**

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

1. Describe how you have spent your summer vacation.

2. What are the features of good JAM presentation? What precautions do you before speaking for one minute on the given topic?

Part – B **10 marks**

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

3. What is positive attitude? Give examples of positive attitude from your life.

4. Mention your long term goal with SMART features. How do you achieve it?

BOARD DIPLOMA EXAMINATION (C-18)
THIRD SEMESTER 18 COMMON-310P
COMMUNICATION SKILLS AND LIFE SKILLS
SEMESTER END EXAM

Time : 3 Hours **Total Marks: 40 Marks**

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)

Answer the following questions after teacher reads the following paragraph.

Prof. Jayashankar was born to Mahalaxmi and Laxmi Kantha Rao on 6th August 1934 in Akkampet village, Warangal District. He was a Doctorate in Economics. He worked as a Vice-Chancellor of Kakatiya University. He worked in many capacities. He was popularly known as "Pedda Sir." He inspired many a people to fight for the cause of Telangana Statehood.

At the age of twelve, Jayashankar refused to sing songs in praise of the Nizam and insisted on singing Vande Mataram instead. As an intermediate student, in 1952, he protested against State Reorganization Committee plan to merge with the Andhra Rashtra. He took an active part in the agitations of "Non – Mulki go back" and " Idli Sambar go back." He took an active part in Telangana separate statehood agitation in 1969 too. In 1999, Prof. Jayashankar started the Telangana Development Forum in the USA which helped to propagate the injustice, discrimination and exploitation meted out to Telangana region and people in the aspects of employment, funds and water resources. He relentlessly put his efforts to end the struggle of Telangana people. He passed away on June 21, 2011. He was 76 years old at the time of his death.

Questions:

1. Where was Prof. Jayashankar born?
2. Why didn't he sing songs in praise of the Nizam?
3. Why did Jayashankar start the Telangana Development Forum in USA?
4. What are the two agitations in which he took an active part?
5. What is the meaning of 'relentlessly'?

Part – B **15 marks**

2. JAM / Role Plays

Part – C **15 marks**

3. Viva Voce on Life Skills topics