C21_ Curriculum

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

OFFERED BY

STATE BOARD OF TECHNICAL EDUCATION & TRAINING,

TELANGANA: HYDERABAD

III SEMESTER

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

SC-301 - APPLIED ENGINEERING MATHEMATICS

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

Pre requisites

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

Course Outcomes: COs

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

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

Course Content:

Unit-I

Duration: 14 Periods (L: 11 – T:3)

Indefinite Integration-I

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

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

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

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

Unit – II

Duration: 10 Periods (L: 8 – T:2)

Indefinite Integration-II

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

Unit-III

Duration: 10 Periods (L: 8 – T: 2)

Definite Integral and its Properties:

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

Unit – IV

Duration: 12 Periods (L: 10 – T: 2)

Applications of Definite Integrals:

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

Unit – V

Duration: 10 Periods (L: 8 – T: 2)

Mean , RMS values and Numerical Integration:

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

Unit – VI

Duration: 19 Periods (L: 15 – T: 4)

Differential Equations of First Order:

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

Reference Books:

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

Suggested E-Learning references

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

Suggested Learning Outcomes

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

Unit-I

1.0 Use Indefinite Integration to solve engineering problems

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

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

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

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

- *(i)* $\int f(ax + b)\, dx$ *where* $f(x)\, dx$ is in standard form.
- *(ii)* $\int [f(x)]^n f'(x)\, dx$
- *(iii)* $\int f'(x)/[f(x)]\, dx$
- *(iv)* $\int f\{g(x)\}\, g'(x)\, dx$

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

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

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

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

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

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

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

1.9 Evaluate the integrals of the type :

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

Unit-II

2.0 Use Indefinite Integration to solve engineering problems

2.1 Evaluate integrals using decomposition method.

2.2 Evaluate integrals using integration by parts with examples.

2.3 Apply the Bernoulli's rule for evaluating the integrals of the form $\int u.v\, dx$.

2.4 Evaluate the integrals of the form $\int e^x [f(x) + f'(x)]\, dx$.

Unit-III

3.0 Understand definite integral and use it in engineering applications

3.1 Use the fundamental theorem of integral calculus in solving problems

3.2 Calculate the definite integral over an interval.

3.3 Apply various properties of definite integrals in engineering problems.

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

3.5 Find definite integral as a limit of sum by considering an area.

Unit –IV

4.0 Understand definite integral and use it in Engineering applications

4.1 Find the Areas under plane curves and area enclosed between two curves using Integration.

4.2 Obtain the Volumes of solids of revolution and solve problems.

Unit –V

5.0 Understand Mean, RMS values and Numerical Methods

5.1 Obtain the Mean value and Root Mean Square (RMS) value of the functions in any given Interval.

5.2 Apply the Trapezoidal rule, Simpson's 1/3 rules for approximation of definite integrals and solve some problems.

Unit –VI

6.0 Solve Differential Equations in engineering problems.

6.1 Identify a Differential equation and find its order and degree

6.2 Form a differential equation by eliminating arbitrary constants.

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

(i) Variables Separable.

(ii) Homogeneous Equations.

(iii) Exact Differential Equations

(iv) Linear Differential equation of the form $\frac{dy}{dx}$+ Py = Q,
Where P and Q are functions of x or constants.

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

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

Suggested Student Activities

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

CO / PO - MAPPING

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

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

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

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

BOARD DIPLOMA EXAMINATIONS (C21)

MID SEM –I, III SEMESTER

SC-301- 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 (e^x – Sin x + x^4) with respect to x
2. Find $\int \frac{dx}{5x+7}$ dx
3. Write Bernoulli's rule of integration
4. Find $\int$ x logx dx

PART-B

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

2. Each question carries **THREE** marks

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

OR

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

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

OR

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

PART- C

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

2. Each question carries **FIVE** marks

7 a) Evaluate $\int \sqrt{x^2 + 2x + 5}$ dx

OR

7 b) Evaluate: $\int cosx\, cos2x dx$.

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

OR

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

BOARD DIPLOMA EXAMINATIONS (C21)
MID SEM –II, III SEMESTER
SC-301-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. Find $\int_0^1 (x^4 + 1)\, dx$
2. Evaluate : $\int_0^{\pi} Sin3x dx$
3. Evaluate : $\int_0^1 \frac{1}{1+x^2} dx$
4. Write the formula to find area bounded by the curve y= f(x) , x-axis, between the limits x=a and x =b

PART-B

Instructions: 1. Answer **ALL** questions 02 X 03 = 06
2. Each question carries **THREE** marks

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

OR

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

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

OR

6 b) Find the Volume of the Solid generated by revolving the part of the Circle $x^2 + y^2 = 36$ From x = 0 to x = 4 about x – axis.

PART C

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

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

Or

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

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

Or

8 b) Find the Volume of the Solid generated by the revolution of the area bounded by the Ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, about x- axis.

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

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

PART-A

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

1. Find $\int (x^8 - \frac{5}{x})\, dx$
2. Evaluate $\int_0^1 (x^2 + 1)\, dx$
3. Write the formula to find mean value of y = f(x), in the interval (a, b)
4. Find the Order and Degree of the Differential Equation $x\frac{dy}{dx} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$.
5. Write Trapezoidal Rule to find the approximate value of $\int_a^b f(x)dx$.
6. Write the formula to find RMS value of y = f(x) over the range x=a and x = b.
7. Solve $\frac{dy}{dx} = e^{4x+y}$
8. Write the condition for exactness of the differential equation M(x, y)dx + N(x,y)dy =0

PART-B

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

9.

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

OR

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

10.

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

OR

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

11.

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

OR

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

12.

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

OR

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

PART C

Instructions: 1. Answer **ALL** questions 04 X 05 = 20
2. Each question carries **FIVE** marks

13.

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

OR

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

14.

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

OR

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

15.

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

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

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

OR

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

16.

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

OR

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

EC-302-DIGITAL ELECTRONICS

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

Pre requisites

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

Course Outcomes

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

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

COURSE CONTENT

UNIT 1 –

Basics of Digital Electronics

Duration: 16 Periods (L: 10– T: 6)

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

Number systems –-Conversion from one number system into another – performing arithmetic operations in binary-Use of weighted and Un-weighted codes- importance of parity Bit-Different postulates in Boolean algebra- Basic logic gates with truth table- universal logic gates - exclusive – OR gate with truth table- De-Morgan's theorems- AND, OR, NOT operations using NAND, NOR gates- De-Morgan's theorems related postulates to simplify Boolean expressions (up to three variables)- standard representations for logical functions (SOP and POS form)- Boolean expressions from the given truth table- Karnaugh map to simplify Boolean Expression (up to 4 variables only)

UNIT2 –Digital IC logic families

Duration: 08 Periods (L: 08– T: 0)

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

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

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

Duration: 14 Periods (L: 10– T: 4)

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

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

Duration: 10 Periods (L: 8– T: 2)

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

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

Duration: 14 Periods (L: 10– T: 4)

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

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

Duration: 13 Periods (L: 10– T: 3)

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

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

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

1.0 Understand the basics of Digital Electronics

1.1 Retrieving inter system conversions of Binary, Octal and Hexadecimal number systems.
1.2 Memorizing binary addition, subtraction, Multiplication and Division.
1.3 Perform subtraction of binary numbers in 2's complement method.
1.4 State the use of weighted and Un-weighted codes and list the types.
1.5 Work out 8421, Excess-3 codes.
1.6 Convert a given binary number into Gray code and vice-versa.
1.7 Explain the use of alphanumeric codes (ASCII & EBCDIC)
1.8 State the importance of parity Bit.
1.9 State different postulates in Boolean algebra.
1.10 State and Prove De-Morgan's theorems.
1.11 Interpret the basic logic gates.
1.12 Explain the working of universal logic gates (NAND, NOR gates).

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

1.14 Realize basic gates using NAND, NOR gates.

1.15 Realize Special Purpose gates using NAND / NOR gates.

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

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

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

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

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

2.0 Understand different logic families.

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

2.2 Outline the important characteristics of Digital ICs

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

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

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

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

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

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

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

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

3.0 Understand the working of combinational logic circuits.

3.1 Explain about combinational logic circuit.

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

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

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

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

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

3.7 Explain the working of a serial adder circuit.

3.8 Compare the performance of serial and parallel adder.

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

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

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

3.12 Describe the operation of decoder/ encoder.

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

3.14 Explain the working of BCD to decimal decoder circuit.

3.15 Explain the working of Decimal to BCD encoder circuit.

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

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

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

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

4.0 Understand the working of Sequential logic circuits: Flip Flops

4.1 Explain about Sequential logic circuit.

4.2 Distinguish between combinational and sequential circuits.

4.3 Explain NAND and NOR latches with logic diagrams.

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

4.5 Explain clocked SR flip flop circuit using NAND gates.

4.6 State the need for preset and clear inputs.

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

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

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

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

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

4.12 List two applications for each type of flip flop.

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

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

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

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

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

5.5 List any four common applications of shift registers.

5.6 Define a counter and modulus of a counter.

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

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

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

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

5.11 Distinguish between synchronous and asynchronous counters.

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

5.13 Explain the working of ring counter.

5.14 List any three applications for counters and ring counter.

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

6.1. Discuss the need of memory .

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

6.3. Classify various types of memories.

6.4. Explain the working of diode ROM.

6.5. Compare static RAM and dynamic RAM.

6.6. Compare RAM and dynamic ROM.

6.7. State the need for Flash ROM.

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

6.9. Explain the OP amp instrumentation amplifier circuit.

6.10. Distinguish between Op amp and instrumentation amplifier.

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

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

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

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

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

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

6.17. Compare the performance of above A/D converters

RECOMMENDED BOOKS

1. Digital Computer Electronics by Malvino and leach. 3rdedition Tata McGraw-Hill Education
2. Modern Digital Electronics By RP JAIN TMH
3. Digital Electronics: Principles & Applications by Roger L. Tokheim -McGraw-Hill Education, 2008
4. Digital Electronics by GK Kharate, Oxford University Press.

e-links

1. www.nptel.com
2. www.electronics4u.com

Suggested student activities.

1. Learn how to Test the digital IC's and submit a report.
2. Propose how to manage the e-waste.
3. Perform trouble shooting of the not working equipment in the lab.
4. Learn the latest CMOS IC equivalents of the TTL IC's.
5. Prepare a simple PCB to perform verification of truth table for basic gates.
6. Prepare a PPT on the day to day application of the gates you have studied.

CO PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1 :	Convert number systems and Solve Boolean expressions using K-map.	R/U	1,2,10	16
CO2 :	Compare various digital IC logic families and identify them by their characteristics.	R/U	1,2,5,6,7	8
CO3 :	Design adders using Combinational logic.	R/U/A	1,2,9	14
CO4 :	Develop Combinational logic circuits like MUX , De-mux, encoder, decoder and comparator circuits.	R/U/A	1,2,5,7	10
CO5 :	Identify the need of sequential circuits and design registers using flip-flops.	R/U/A	1,2,5	14
CO6 :	Compare different types of memories and understand Converters.	R/U/A	1,2,3,7	13

MID SEM EXAMINATIONS

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

SMESTER END EXAMINATIONS

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

C-21 III SEMESTER

EC-302 DIGITAL ELECTRONICS

MODEL PAPER MID- SEM I

IME : 1 HOUR MAX. MARKS : 20

PART-A

Answer ALL questions. 4 x 1= 4M

1. Convert the binary number 1101101 into its decimal equivalent.
2. Draw the logic symbol of AND and OR gates.
3. Define propagation delay with reference to digital IC.
4. Write CMOS IC nos. of AND and NAND gates.

PART – B

Answer ALL questions. 2 x 3 = 6 M

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

OR

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

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

OR

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

PART – C

Answer ALL questions. 2 x 5 = 10 M

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

OR

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

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

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

OR

8(b) Compare the various logic families.

C-21 III SEMESTER

EC-302 DIGITAL ELECTRONICS

MODEL PAPER MID- SEM II

TIME : 1 HOUR MAX. MARKS : 20

PART-A

Answer ALL questions. 4 x 1= 4M

1. Define combinational logic circuit.
2. Draw the circuit of full adder using half adders.
3. Define a multiplexer.
4. Write any 2 IC nos. of multiplexers.

PART – B

Answer ALL questions. 2 x 3 = 6 M

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

OR

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

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

OR

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

PART – C

Answer ALL questions. 2 x 5 = 10 M

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

OR

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

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

OR

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

C-21 III SEMESTER

EC-302 DIGITAL ELECTRONICS

MODEL PAPER - SEMESTER END EXAMINATION

TIME: 2 HOURS MAX. MARKS : 40

PART-A

Answer ALL questions. 8 x 1= 8M

1. State any 2 postulates of Boolean algebra.
2. Define a de-multiplexer.
3. What is edge-triggering with reference to clock.
4. Draw the symbol of D and T flip-flop
5. List any 2 IC numbers of JK flip-flop.
6. Define modulus of a counter.
7. Define memory access time.
8. Define accuracy and resolution of converters.

PART – B

Answer ALL questions. 4 x 3 = 12 M

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

OR

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

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

OR

10(b) Distinguish between synchronous and asynchronous counters.

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

OR

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

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

OR

12(b) Differentiate between ROM and RAM.

PART – C

Answer ALL questions. 2 x 5 = 10

M

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

OR

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

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

OR

14(b) Explain the working of diode ROM.

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

OR

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

16(a) Explain successive approximation method.

OR

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

EC-303-ELECTRONIC DEVICES AND CIRCUITS

Course Title	Electronic Devices and Circuits	Course Code	EC-303
Semester	III	Course Group	Core
Teaching Scheme in Hrs(L:T:P)	4:1:0	Credits	3
Methodology	Lecture + Assignments	Total Contact Hours	75
CIE	60 Marks	SEE	40 Marks

Pre requisites :

This course requires the basic knowledge of Physics and Mathematics at Secondary school level ,and about operation of diode and Transistor

Course Outcomes:

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

	Course Outcome
CO1	Analyze various types of DC power supplies.
CO2	Interpret the various types of small signal amplifiers.
CO3	Construct multi stage and feedback amplifiers using Transistors
CO4	Construct tuned amplifiers and power amplifiers using Transistors
CO5	Understand the concepts of operational amplifiers
CO6	Design wave shaping circuits using Diodes

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

Course Contents

Unit -1: DC Power supplies

Duration: 12 periods

Need for DC power supply- Half wave, Full wave and Bridge rectifiers-RMS value, Average value, Ripple factor, Voltage regulation. Filters: C, LC, and CLC. Zener regulator –IC Regulators

Unit 2 –Small signal and Multistage amplifiers

Duration: 12 Periods (L: 8–T:4)

Classify amplifiers- small signal amplifier- Multistage amplifiers – Need for multistage amplifiers-Different parameters- 2-stage RC coupled amplifier- 2-stage Transformer coupled amplifier- 2-stage Direct coupled amplifier- Darlington pair- Cascode amplifier-

Unit-3: Feedback amplifiers and Oscillators

Duration: 13 Periods (L: 8–T:4)

Feedback Amplifiers:- Concept of feedback- four types of negative feedback amplifiers- Effect of negative feedback- Merits and De-merits of Negative Feedback.

Oscillators: Barkhausen criteria in oscillators- Oscillator circuits- Hartley oscillator- Colpitts oscillator- Crystal Oscillator- Expressions for frequency of oscillation and condition for sustained oscillations of the above circuits- Reasons for instability in oscillator circuits- Remedies for instability in oscillators- Advantages of crystal oscillators- Merits and demerits of RC and LC oscillators.

UNIT -4:Tuned and Power amplifiers

Duration: 13 Periods (L:9–T:4)

Tuned amplifier: Tank circuit-single tuned amplifier-Double tuned amplifier-Stragger tuned amplifier**Power Amplifier**:- Difference between Voltage and Power amplifiers- Classification of power amplifiers- Class A single ended- Push-pull amplifier circuit- Effect of distortion in amplifiers- Choice of Class A , Class B Class AB Amplifier and Class C Amplifiers- Applications of Class C Amplifiers - Efficiencies of different types of power amplifiers(A,B, AB &C)

UNIT- 5: Non Linear Waveshapingcircuits

Duration: 12 Periods (L: 8–T:4)

Clippers and Clampers: Design of simple clippers- Clamper circuits - Applications of clippers and clampers**Time Base generators:** Sweep or Time Base signal-Errors in sweep-Applications of Voltage and current Time basecircuits

UNIT -6:OperationalAmplifier

Duration: 13 Periods (L:9–T:4)

Need for differential amplifier- Differential amplifier- Operation -- differential gain and common mode gain- Function of an operational amplifier- Symbol - Inverting and Non inverting inputs of Op Amp- Important characteristics of ideal operational amplifier- Input impedance, Open loop gain, Slew rate, CMRR, Input offset voltage,InputoffsetCurrent-blockdiagramandpinoutdiagramofIC741-PinconfigurationofIC741-Typical values of Open loop gain, Slew rate, CMRR, Input offset voltage, Input offset Current- Power supply requirements of Operational Amplifier- Concept of virtual ground and Virtual short- Single supply operation of Operational Amplifier- Pin configuration of single supply Op Amps such as CA 3011 ,LM324 - Features of above ICs.

Suggested Learning Outcomes:

After completing this course the student will be able to

1.0 **Analyze the working of DC Power Supplies.**

1.1 Explain the necessity of D.C. power supply in electronic circuits

1.2 Explain the working of Half Wave, Full Wave and Bridge rectifier circuits with wave forms.

1.3 Define the terms RMS value, average value, ripple factor and efficiency and give their expressions for the above circuits.

1.4 Define Voltage Regulation.

1.5 Explain the need for a filter circuit in power supplies.

1.6 Explain the operation of a rectifier circuit using Capacitor filter

1.7 Draw the input/output waveform of Rectifier with C Filter

1.8 Give the reasons for connecting a Bleeder Resistor across capacitor

1.9 Explain the working of LC Filter

1.10 Explain the working of CLC filters Circuit

1.11 List the applications where CLC filters are used

1.12 State the need for a regulated power supply

1.13 List important specifications of Regulated power supply

1.14 Draw the circuit of a simple Zener regulated DC Power supply.

1.15 Explain the working of Zener regulated power supply

1.16 Determine the Resistance value and wattage of Series Resistor for a given Input voltage, load voltage and load current in Zener Regulator circuit.

1.17 Compare positive and negative IC Regulators, Pin configurations and voltage levels.

2.0 Explain the working of Small signal and Multi-stage amplifiers

2.1 Classify amplifiers based on coupling, feedback and frequency

2.2 State the need for multi-stage amplifiers

2.3 Define gain, frequency response and bandwidth of multi-stage amplifier

2.4 Give the expressions for gain, frequency response and bandwidth of multi-stage amplifier

2.5 Solve simple problems on overall gain, overall frequency response and overall bandwidth of multi-stage amplifiers

2.6 Draw2-stage RC coupled amplifier circuit.

2.7 Explain the operation of 2-stage RC coupled amplifier.

2.8 Explain the frequency response of the above circuit.

2.9 Draw2-stage Transformer coupled amplifier circuit.

2.10 Explain the operation of 2-stage Transformer coupled amplifier

2.11 Explain the frequency response of the above circuit.

2.12 Draw 2-stage Direct coupled amplifier circuit.

2.13 Explain the operation of 2-stage Direct coupled amplifier

2.14 Draw Darlington paircircuit.

2.15 Explain the operation of Darlington pair circuit.

2.16 Give the expression for current gain of Darlington pair circuit

2.17 Explain high current gain amplifier using Darlington pair

2.18 Draw and explain Cascode amplifier.

3.0 Explain the working of Feedback amplifiers and Oscillators

3.1 Draw the basic block diagram of a feedback amplifier.

3.2 Derive the expression for gain in a feedback amplifier.

3.3 Compare negative and positive feedback.

3.4 Draw the block diagram of voltage series feedback amplifier.

3.5 Draw the block diagram of voltage shunt feedback amplifier

3.6 Draw the block diagram of current series feedback amplifier

3.7 Draw the block diagram of current shunt feedback amplifier

3.8 State the effect of negative feedback on gain

3.9 State the effect of negative feedback on bandwidth

3.10 State the effect of negative feedback on input impedance

3.11 State the effect of negative feedback on output impedance

3.12 List the advantages of negative feedback amplifiers.

3.13 Solve simple problems on effect of negative feedback on gain, bandwidth, Zi and Zo

3.14 State the condition for an amplifier to work as oscillator.

3.15 Mention the requisites of an oscillator.

3.16 State Barkhausen criteria in oscillators.

3.17 Classify oscillator circuits.

3.18 Draw the Hartley oscillator circuit.

3.19 Explain the working of Hartley oscillator circuit

3.20 Mention the condition for sustained oscillations in Hartley Oscillator

3.21 Give the expression for frequency of oscillations in Hartley Oscillator

3.22 Draw the Colpitts oscillator circuit.

3.23 Explain the working of Colpitts oscillator circuit

3.24 Mention the condition for sustained oscillations in Colpitts Oscillator

3.25 Give the expression for frequency of oscillations in Colpitts Oscillator

3.26 Draw the equivalent circuit of crystal and explain.

3.27 Draw the transistor crystal oscillator circuit.

3.28 Explain the working of transistor crystal oscillator circuit

3.29 List the advantages of crystal oscillator

3.30 State the reasons for instability in oscillator.

3.31 Mention the remedies to avoid instability in oscillators.

3.32 Compare the LC and RC oscillators

4.0 Analyze Tuned and Power amplifiers

4.1 Draw and explain double tuned amplifier circuit

4.2 Draw class C tuned amplifier circuit.

4.3 Explain class C tuned amplifier circuit with waveforms

4.4 List applications of tuned circuits

4.5 State the need for a power amplifier.

4.6 Distinguish between voltage and power amplifiers.

4.7 Classify power amplifier based on conduction.

4.8 Define Conversion efficiency

4.9 Define distortion in power amplifier

4.10 Draw the circuit of class A amplifier with resistor load.

4.11 Explain operation of class A amplifier with resistive load

4.12 Derive the expression for efficiency of the above circuit.

4.13 Draw the circuit of class A amplifier with transformer load.

4.14 Explain the operation of class A amplifier with transformer load.

4.15 Derive the expression for efficiency of the above circuit.

4.16 Draw the circuit of class – B push-pull amplifier.

4.17 Explain the operation of class-B push-pull amplifier

4.18 Derive the expression for efficiency of class-B push-pull amplifier.

4.19 List the advantages & disadvantages of push-pull amplifier.

4.20 Draw the circuit of complementary symmetry push-pull amplifier.

4.21 Explain the operation of complementary symmetry push-pull amplifier

4.22 List the conditions to avoid thermal run away in a power transistor

4.23 State the necessity of heat sink for a power transistor.

4.24 List different types of heat sinks and mounting methods.

5.0 Explain the working of Operational amplifier

5.1 State the need for differential amplifier

5.2 Draw and explain the circuit diagram of differential amplifier

5.3 Give reasons for not implementing differential amplifier with discrete components.

5.4 Define the terms differential gain and common mode gain

5.5 State the function of an operational amplifier.

5.6 Draw the symbol of an operational amplifier.

5.7 Explain inverting and Non inverting inputs of Op Amp

5.8 State the important characteristics of ideal operational amplifier with practical values.

5.9 Define Input impedance, Open loop gain, Slew rate, CMRR, Input offset voltage and current.

5.10 Draw and explain the Pin configuration of IC741

5.11 Give typical values of Open loop gain, Slew rate, CMRR, Input offset voltage and current.

5.12 Explain the power supply requirements of Operational Amplifier

5.13 Explain the concept of virtual ground and Virtual short

5.14 Give the pin configuration of single supply op-amps such as CA 3011,LM324

5.15 List 6 important features of above ICs

5.16 Explain the operation of adjustable voltage regulator(LM317)

5.17 Give the formula for output voltage of adjustable regulators

6.0 Non Linear Wave shaping Circuits and Sweep Generators

6.1 List the different types of clippers.

6.2 Explain the unbiased and biased clippers with waveforms

6.3 Explain the double ended clipper with waveforms

6.4 Explain the principle of clamper circuit with waveforms

6.5 Mention the applications of clippers and clampers

6.6 Design simple clippers and clampers for a given input and output waveform

6.7 Define Sweep Voltage.

6.8 State the fundamental consideration of sweep waveform.

6.9 Distinguish between voltage and current time-base generation

6.10 List errors in sweep signal

6.11 Draw simple voltage time base generator

6.12 Explain the operation of voltage time base generator

6.13 Draw simple current time base generator

6.14 Explain the operation of current time base generator

6.15 Draw the Bootstrap sweep circuit

6.16 Explain the operation of Bootstrap sweep circuit

6.17 Draw the Miller sweep circuit

6.18 Explain the operation of Miller sweep circuit

6.19 List the applications of Voltage and current Time base circuits.

References

RECOMMENDED BOOKS:

1. Electronic Devices and Circuits by JB Gupta
2. Electronic Devices and Circuits by Salivahana and Vallava raj
3. Electronic Devices and Circuit theory and applications by Robert Boylested
4. Principles of Electronics by VK Mehta
5. Electronic devices and applications by B. Somanathan Nair,PHI.
6. Electronic Devices an dCircuits by David A. Bell Prentice hall
7. Operational Amplifiers by Ramakanth Gaykward
8. Linear integrated circuits by Roy Choudary

MID SEM EXAMINATIONS

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

SEMESTER END EXAMINATION

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

BOARD DIPLOMA EXAMINATIONS

III SEMESTER, MIDSEM – I

EC-303 ELECTRONIC DEVICES AND CIRCUITS.

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

PART – A

Instructions: Answer **all** questions. Each question carries **one** mark.

4 X 1 = 4 marks

1. Define RMS and average value.
2. Define voltage regulation.
3. List amplifiers based on coupling only.
4. Define gain and frequency response of an amplifier.

PART – B

Instructions: Answer **the following** questions. Each question carries **three** marks

1 x 3 =6 Marks

5a. Explain the need for a filter in power supply.

(OR)

b. State the need for regulated power supply.

6a. Draw the circuit of 2-stage RC coupled amplifier circuit.

(OR)

bDraw the circuit of 2-stage transformer coupled amplifier circuit.

PART – C

Instructions: Answer **the following** questions. Each question carries **five** marks

2x 5 =10 Marks

7a. Explain the working of zener regulated power supply.

(OR)

b. Explain the working of HWR with waveforms.

8a. Explain the operation of Darlington pair circuit with a neat fig.

(OR)

b. Explain the frequency response of RC coupled amplifier.

BOARD DIPLOMA EXAMINATIONS

III SEMESTER, MIDSEM – II

EC-303 ELECTRONIC DEVICES AND CIRCUITS.

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

PART – A

Instructions: i. Answer **all** questions. Each question carries **one** mark.

4 X 1 = 4 marks

1. What is positive feedback?
2. List any 2 advantages of negative feedback.
3. List any 2 applications of tuned circuits.
4. Define conversion efficiency.

PART – B

Instructions: Answer **the following** questions. Each question carries **three** marks

3x 3 =6 Marks

5a. Classify oscillator circuits,

(OR)

b. Mention the conditions for sustained oscillations in Hartley oscillator.

6a. Classify power amplifiers based on conduction.

(OR)

b. Draw the circuit of class B push-pull amplifier.

PART – C

Instructions: Answer **the following** questions. Each question carries **five** marks

2 x 5 =10 Marks

7a. Compare positive and negative feedback.

(OR)

b. Draw and explain Colpitts oscillator circuit.

8a. Explain the operation of Class A amplifier with transformer load.

(OR)

b. Explain the operation of complementary symmetry push pull amplifier.

BOARD DIPLOMA EXAMINATIONS

III SEMESTER END EXAMINATION

EC-303 ELECTRONIC DEVICES AND CIRCUITS.

Time: 2 Hours **Max. Marks: 40**

PART-A

Instructions: Answer **all** questions. Each question carries **one** mark.

8 X 1 = 8 marks

1. Define RMS and average value.
2. What is negative feedback?
3. Define sweep voltage.
4. State the function of operational amplifier.
5. State the need for a differential amplifier.
6. What is inverting and non-inverting input of op-amp.
7. List the errors in sweep signal.
8. Draw the circuit of series unbiased clipper.

PART – B

Instructions: Answer **the following** questions. Each question carries **three** marks 4 x 3 =12 Marks

9 a. Draw the input and output waveforms of rectifier with C filter.

(OR)

b. List the ideal characteristics of an ideal OP-amp.

10 a. Compare LC and RC oscillators.

(OR)

b. Draw the equivalent circuit of crystal and explain.

11 a. Draw and Pin configuration of IC741

OR

b. Define input impedance and slew rate.

12a. Explain double – ended clipper circuit with waveforms.

OR

b. List the applications of voltage and current time base generators.

PART – C

Instructions: Answer **the following** questions. Each question carries **five** marks 4 x 5 =20 Marks

13a. Explain the working of FWR with waveforms.

(OR)

b. Draw and explain the PIN diagram of OP-amp.

14 a. Draw the block diagram of voltage shunt feedback amplifier

(OR)

b. Explain the working of bootstrap voltage time base generator.

15 a. State the important characteristics of ideal operational amplifier with practical values.

(OR)

b. Explain the working of variable voltage regulator circuit.

16 a. Explain the operation of Miller sweep circuit.

(OR)

b. Draw and explain the circuit of shunt biased clipper with waveforms.

EE-304-ELECTRICAL AND ELECTRONIC MEASURING INSTRUMENTS

Course Title	Electrical and Electronic Measuring Instruments	Course Code	EE-304
Semester	III	Course Group:	Core
Teaching Scheme in periods. (L : T : P)	4 : 1 : 0	Credits :	3
Methodology :	Lecture + Tutorial	Total Contact Periods :	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the knowledge of basic principles of electricity and simple mechanical terms.

Course Outcomes

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

CO 1	Classify measuring instruments
CO 2	Select suitable meter depending on the type of application
CO 3	Measure various electrical parameters using electromechanical measuring instruments
CO 4	Measure R, L, C parameters
CO 5	Describe various transducers and sensors
CO 6	Compare various electronic and digital instruments

BLUE PRINT OF MARKS FOR SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Basics of Measuring Instruments	10	4	1		9(a)	13(a)
2	Voltage and Current Measuring Instruments	15					
3	Power and Energy Measuring Instruments	15		2		10(a)	14(a)
4	Measurement of Basic Circuit Elements	10					
5	Transducers and Sensors	12		3	5,6	9(b), 11(a), 11(b)	13(b), 15(a), 15(b)
6	Electronic & Digital Instruments	13			7,8	10(b), 12(a), 12(b)	14(b), 16(a), 16(b)
	Total	75	8			8	8

Course Contents

UNIT 1 - Basics of Measuring Instruments

Duration: 10 Periods (L:8- T: 2)

Definitions of accuracy, precision, error, resolution and sensitivity - important electrical quantities to be measured - their units -names of instruments to measure them - classification of instruments -different types of torques (deflection, controlling and damping torques) in the indicating instruments - types of errors.

UNIT 2 – Voltage and Current Measuring Instruments

Duration: 15 Periods (L:12 – T:3)

M.C. and M.I types of ammeters and voltmeters - their construction and working – errors – remedies – comparison - shunts and multipliers for M.C instruments – problems on shunts and multipliers for M.C instruments - Dynamometer type ammeter, voltmeter and wattmeter– construction, working, and errors in them.

UNIT 3 – Power and Energy Measuring Instruments

Duration: 15 Periods (L:12 – T:3)

Need for instrument transformers - applications of instrument transformers - measurement of power - measurement of energy – single phase induction type energy meter -construction and working, error and adjustments –construction and connections of a three - phase energy meter - construction and working of Westonsynchroscope.

UNIT 4 – Measurement of Basic Circuit Elements

Duration: 10Periods (L: 8– T:2)

Classification of resistance -methods of resistance measurement -basic Ohmmeter circuit– difference in series and shunt type ohmmeters - construction and working of megger– measuring earth resistance using Megger – working principle, construction and applications of potentiometer - measurement of inductance – measurement of capacitance.

UNIT 5 – Transducers and Sensors

Duration: 12 Periods (L: 9 – T:3)

Definition of transducer - need of transducer - classification of transducers - factors influencing selection of transducer - applications of transducers– thermocouple - thermister - working principle and use of strain gauge - construction, working and use of LVDT -basic concept of sensors and its applications– semiconductor sensors.

UNIT 6 – Electronic & Digital Instruments

Duration:13Periods (L:10 – T:3)

Basic components of analog electronic instruments - working of rectifier type voltmeter and ammeter -basic components of digital (digital electronic) instruments - advantages of digital instruments over analog instruments - types of digital voltmeters -specifications of digital voltmeter - working of digital multimeter and its specifications -working of single phase digital energy meter with block diagram - working of three phase digital energy meter with block diagram - working of digital frequency meter with block diagram - use of tongtester (clamp meter) – comparison between digital and electromechanical measuring instruments.

Recommended Books

1. A.K.Sawhney - Electrical and Electronic measuring instruments –Dhanpat Rai & Sons.
2. E.W.Golding and F.C.Widdis – Electrical Measurements and measuring instruments– Wheeler publishers.
3. David A Bell - Electronic Instrumentation and Measurements–Oxford.
4. B.L.Theraja- Electrical Technology -S.Chand& Co.
5. Khandpur - Modern Electronic Equipment
6. J.B.Gupta- Electrical and Electronic measuring instruments.
7. Harris - Electrical measurements
8. K.B.Bhatia- Study of Electrical Appliances and Devices– Khanna Publishers

Suggested E-learning references

1. http://electrical4u.com/
2. www.nptel.ac.in
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/
4. https://nptel.ac.in/courses/108105053/

Suggested Learning Outcomes

After completion of the subject, the student shall be able to

1.1. Define the following terms related to measuring instruments
   i. accuracy ii)precision iii)error iv)resolution v) sensitivity

1.2. List any six important electrical quantities to be measured by giving their units

1.3. Mention the names of instruments to measure the various electrical quantities.

1.4. Classify instruments on the basis of construction and output as analog and digital instruments.

1.5. Classify the electro mechanical instruments according to principle of working.

1.6. Classify the instruments on basis of method of measuring thevalue as absolute and secondary instruments.

1.7. Distinguish between absolute and secondary instruments

1.8. State the types of secondary instruments (indicating, integrating and recording) by giving suitable examples.

1.9. State the purpose of obtaining deflecting, controlling and damping torques in indicating instruments.

1.10. Explain the methods of obtaining i) deflecting torque ii) controlling torque and iii) damping torque in indicating instruments.

1.11. Classify the errors according to its source (gross, systematic and random)

2.1 Describe the construction of permanent magnet moving coil instrument.

2.2 Explain the working of permanent magnet moving coil instrument (voltmeter/ammeter).

2.3 Solve simple problems on deflecting torque Td=NBIA

2.4 List the three types of errors commonly occurring in moving coil (M.C.) instruments.

2.5 Mention the remedies for the commonly occurring errors in M.C instruments.

2.6 State advantages and disadvantages of M.C instruments.

2.7 List the applications of M.C instruments.

2.8 Describe the construction and working of moving iron (M.I) i) Attraction type Instrument ii) Repulsion type Instrument.

2.9 List the errors commonly occurring in M.I. Instruments.

2.10 State the advantages and disadvantages of M.I. instruments.

2.11 Compare M.C. and M.I instruments.

2.12 Describe the method of extending the range of moving coil ammeter with the help of shunt.

2.13 Describe the method of extending the range of moving coil voltmeter with the help of multiplier.

2.14 Solve the problems on shunts and multipliers used for moving coil instruments.

2.15 Describe the construction of dynamometer type instruments

2.16 Explain the working of dynamometer type instruments

2.17 List the common errors in the dynamometer instruments.

2.18 List the advantages and disadvantages of dynamometer instruments.

3.1 State the need for instrument transformers (current transformer–CT and potential transformers -PT).

3.2 List the applications of CT and PT.

3.3 State the precautions when using CT.

3.4 Draw the circuit diagram for measuring power with wattmeter in single– phase circuit in conjunction with instrument transformers.

3.5 Draw the circuit diagram and explain the methods of measuring power and power factor in 3– phase circuit using single, two and three wattmeters

3.6 Describe the construction of a 1-phase induction type energy meter.

3.7 Explain the working of a 1-phase induction type energy meter.

3.8 Define meter constant.

3.9 State the common errors and their remedies in 1-phase energy meter.

3.10 Describe construction and connections of a 3-phase energy meter.

3.11 Describe the construction of Weston synchroscope.

3.12 Explain the working of Weston synchroscope.

4.1. Classify the resistance into low, medium and high values giving examples for each.

4.2. List the methods of measurement of i) low resistance ii) medium resistance and iii) high resistance

4.3. Draw the circuit diagram of basic ohm-meter.

4.4. Explain the working of basic ohm-meter.

4.5. Describe series type ohm-meter.

4.6. Describe shunt type ohm-meter.

4.7. Distinguish between shunt and series ohm-meters.

4.8. Describe the construction of megger.

4.9. Explain the working of megger.

4.10. Explain the method of measurement of earth resistance using earth megger. (construction and working of earth megger is not required).

4.11. Describe the construction of basic potentiometer with a legible sketch.

4.12. Explain the working of basic potentiometer with a legible sketch.

4.13. Explain the measurement of unknown resistance using potentiometer.

4.14. List the applications of potentiometer.

4.15. List various bridges used to measure inductance.

4.16. List various bridges used to measure capacitance.

5.1 Define transducer.

5.2 State the need of transducers in measurement systems.

5.3 Classify transducers

i. based on the principle of transduction ii) as primary and secondary iii) as passive and active iv) as analog and digital v) as transducers and inverse transducers

5.4 Explain the factors influencing the choice of transducer.

5.5 State the applications of transducers.

5.6 Explain the use of thermocouple for the measurement of temperature.

5.7 Explain the measurement of temperature using thermister in a bridge circuit.

5.8 State the working principle of strain gauge.

5.9 Describe the construction of Linear Variable Differential Transformer(LVDT).

5.10 Explain the working of LVDT.

5.11 State the advantages and disadvantages of LVDT.

5.12 Explain the concept of sensor.

5.13 List the applications of sensors.

5.14 Explain semiconductor sensors.

6.1 List the basic components of analog electronic instruments.

6.2 List various analog electronic instruments.

6.3 Explain the working of rectifier type voltmeter and ammeter.

6.4 List the basic components of digital (digital electronic) instruments.

6.5 List the advantages of digital instruments over analog instruments.

6.6 List the types of digital voltmeters.

6.7 Mention the specifications of digital voltmeter.

6.8 Explain the working of digital multimeter by giving its specifications.

6.9 Explain the working of single phase digital energy meter with block diagram.

6.10 Explain the working of three phase digital energy meter with block diagram.

6.11 Explain the working of digital frequency meter with block diagram.

6.12 State the uses of tong tester (clamp meter).

6.13 Compare digital and electromechanical measuring instruments.

Suggested Student Activities

1. Prepare a report on the methods adopted for calibration of digital energy meters in TSSPDCL/TSNPDCL.
2. Prepare a report on various meters used in nearby industries or substations.
3. Visit any nearby factory / industry and prepare a report on applications of various transducers in that industry clearly mentioning the purpose.
4. Using megger, determine the earth resistance of the earth pit at your college and prescribe suitable measures to maintain the earth resistance at optimum value
5. Prepare posters indicating usage of suitable meters/ instruments with circuits to measure current, voltage, power and energy in DC and AC (Single phase) circuits
6. Mini project on measurement methods of Resistance, Inductance and Capacitance
7. Student visits lab to identify the available electrical measuring instruments
8. Visit MRT division Electricity Department to understand the testing and repair of various measuring instruments. Write a report on observations.
9. Visit any Electrical / Electronic Measuring Instrument manufacturing industry to observe and understand the construction and working of various meters. Write a Report on observation.
10. Quiz
11. Group discussion
12. Surprise test
13. Assignment
14. Seminar

CO-PO Mapping Matrix

	Basic and Discipline Specific knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation & Testing	Engineering practices for society, sustainability and environment	Project Management	Lifelong learning	Linked PO
CO\PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7	
CO1	3	-	-	1	-	-	1	1,4,7
CO2	3	-	-	1	-	-	1	1,4,7
CO3	3	-	-	1	-	-	1	1,4,7
CO4	2	-	-	1	-	-	1	1,4,7
CO5	2	-		1	-	-	1	1,4,7
CO6	2	-		1	-	-	1	1,4,7

Continuous Internal Evaluation (CIE)

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

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

MID SEM-II EXAM

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

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

<table>
<tr><td rowspan="2">Unit No</td><td colspan="3">Questions to be set for SEE</td></tr>
<tr><td colspan="2">R</td><td>U</td><td>A</td></tr>
<tr><td>I</td><td rowspan="7">4</td><td colspan="2" rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">13(a)</td></tr>
<tr><td>II</td></tr>
<tr><td>III</td><td colspan="2" rowspan="2">2</td><td rowspan="2">10(a)</td><td rowspan="2">14(a)</td></tr>
<tr><td>IV</td></tr>
<tr><td>V</td><td rowspan="2">3</td><td>5,6</td><td>9(b),
11(a), 11(b)</td><td>13(b),
15(a), 15(b)</td></tr>
<tr><td>VI</td><td>7,8</td><td>10(b),
12(a), 12(b)</td><td>14(b),
16(a), 16(b)</td></tr>
<tr><td>Total Questions</td><td colspan="2">8</td><td>8</td><td>8</td></tr>
</table>

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING,TELANGANA

MODEL QUESTION PAPER

DEEE III SEMESTER MID SEMESTER-I EXAMINATION

Corse Code:EE-304 **Duration:1 Hour**

Course Name: Electrical and Electronic Measuring Instruments

Max.Marks:20

PART-A

Instructions: Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1. Define accuracy related to measuring instruments.
2. Classify errors according to its source.
3. List the three types of errors commonly occurring in moving coil instruments.
4. List the advantages of dynamometer instruments.

PART-B

Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

5. a) List any six important electrical quantities to be measured and mention the meter used to measure.

OR

b) State the purpose of obtaining damping torque in indicating instruments.

6. a) List the applications of moving coil instruments.

OR

b) Compare moving coil and moving iron instruments in any three aspects.

PART-C

Instructions: Answer **two** questions. Each question carries five marks **2x 5 = 10**

Marks

7. a) Explain the methods of obtaining controlling torque in indicating instruments.

OR

b) Distinguish between absolute and secondary instruments.

8. a) Explain the working of permanent magnet moving coil instrument.

OR

b) Describe the method of extending the range of moving coil ammeter with the help of shunt.

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING,TELANGANA

MODEL QUESTION PAPER

DEEE III SEMESTER MID SEMESTER-II EXAMINATION

Corse Code:EE-304 **Duration:1 Hour**

Course Name: Electrical and Electronic Measuring Instruments

Max.Marks:20

PART-A

Instructions: Answer **all** questions, Each Question carries one mark **4x1 = 4 Marks**

1) List the applications of current transformer
2) State the need for instrument transformers
3) List the applications of potentiometer
4) List various bridges used to measure capacitance

PART-B

Instructions: Answer **two** questions. Each question carries three marks **2x 3 = 6 Marks**

5) a) State the precautions when using CT.

OR

b) State the common errors in 1-phase energy meter.

6) a) Draw the circuit diagram of basic ohm-meter.

OR

c) Write various methods of measuring high resistance.

PART-C

Instructions: Answer **two** questions. Each question carries five marks **2x 5 = 10 Marks**

7) a) Describe the construction of Weston synchroscope.

OR

b) Draw the circuit diagram for measuring power with wattmeter in single– phase circuit in conjunction with instrument transformers.

8) a) Explain the working of basic potentiometer with a legible sketch.

OR

b) Distinguish between shunt and series ohm-meters in any five aspects.

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING, TELANGANA

MODEL QUESTION PAPER

DEEE III SEMESTER

SEMESTER END EXAMINATION

Corse Code: EE-304 **Duration:2 hours**

Course Name: Electrical and Electronic Measuring Instruments

Max.Marks:40Marks

PART-A

Answer **all** questions 8**x1 =8 Marks**

1) Define resolution of a measuring instrument.
2) State the need for instrument transformers.
3) Define transducer.
4) List various bridges used to measure inductance.
5) List the applications of sensors.
6) Classify transducers based on the principle of transduction.
7) State the uses of tong tester.
8) List the types of digital voltmeters.

PART-B

Answer **four** questions **4 x 3 = 12 Marks**

9) a) State the types of secondary instruments.

OR

b) State the applications of transducers.

10 a) State the precautions while using current transformer.

OR

b) List the advantages of digital instruments over analog instruments.

11. a) State the disadvantages of Linear Variable Differential Transformer.

OR

b) State the working principle of strain gauge.

12. a)List the basic components of analog electronic instruments.

OR

b) Mention the specifications of digital voltmeter.

PART-C

Answer **four** questions 4 **x 5 = 20 Marks**

13. a) Describe the method of extending the range of moving coil volt meter with the help of multiplier.

OR

b) Explain the use of thermocouple for the measurement of temperature.

14. a) Explain the working of basic ohm-meter.

OR

b) Explain the working of rectifier type voltmeter.

15. a) Describe the construction of Linear Variable Differential Transformer.

OR

b) Explain the factors influencing the choice of transducer.

16. a) Explain the working of digital multimeter.

OR

b) Explain the working of digital frequency meter with block diagram.

EE-305-ELECTRICAL CIRCUITS

Course Title	Electrical Circuits	Course Code	EE-305
Semester	III	Course Group	Core
Teaching Scheme in periods (L : T : P)	4 : 1 : 0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the knowledge of basic electrical engineering.

Course Outcomes

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

CO 1	Apply Kirchhoff's laws and star delta transformations to complex circuits
CO 2	Apply network theorems to solve DC circuits
CO 3	Familiarize the fundamentals of alternating quantities
CO 4	Solve problems on single phase A.C. series circuits
CO 5	Solve problems on single phase A.C. parallel circuits
CO 6	Solve problems on poly phase balanced circuits

Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions to be set for SEE				
			R			U	A
1	Kirchhoff's Laws and Star - Delta Transformation	12	4	1		9(a)	13(a)
2	Network Theorems	13					
3	Fundamentals of A.C	10		2		10(a)	14(a)
4	Single phase A.C. Series Circuits	15					
5	Single phase A.C. Parallel Circuits	14		3	5,6	9(b), 11(a), 11(b)	13(b), 15(a), 15(b)
6	Poly Phase Circuits	11			7,8	10(b), 12(a), 12(b)	14(b), 16(a), 16(b)
Total		75	8			8	8

Course Contents

UNIT 1 - Kirchhoff's Laws and Star - Delta Transformation

Duration: 12 Periods (L: 9 - T:3)

Active and Passive circuits - Junction, branch and loop in circuits -Insufficiency of Ohm's law to solve complex circuits, Kirchhoff's laws – Mesh analysis - Star - Delta configurations, star-delta transformations.

UNIT 2– Network Theorems

Duration: 13 Periods (L: 10 – T: 3)

Ideal Voltage source, Ideal current source- Source transformation technique-Superposition theorem- Thevenin's Theorem -Norton's Theorem- Maximum power transfer theorem with reference to D.C.-Problems on the above.

UNIT 3 – Fundamentals of A.C

Duration: 10 Periods (L: 8 – T: 2)

Definition of Alternating quantity, cycle, time period, frequency, amplitude, instantaneous value and angular velocity - Average value - effective value/R.M.S value – form factor – peak factor - definitions and derivations - calculations of these values for sine wave, half wave rectified sine wave, full wave rectified sine wave, triangular and square wave forms - Representation of alternating quantities by equation, graphs and phasor diagrams - Phase and phase difference–Understanding of `j' notation for alternating quantities ,transformation from polar to rectangular notations and vice-versa.

UNIT 4 - Single phase A.C. Series Circuits

Duration: 15 Periods (L: 12 – T: 3)

Resistance, inductance and capacitance as circuit elements - concept of reactance, Derive the expression for voltage, current, impedance, power including waveforms and phasor diagrams in pure resistive, inductive and capacitive circuits - Derive the impedance, current, phase angle, power and power factor in R-L, R-C, L-C &R-L-C series circuits including phasor diagrams. Impedance triangle, phase angle, power factor, active and reactive components of power in above circuits – Definition of Resonance in series circuits and expression for resonant frequency-Q-factor-Importance of Q- factor- Problems on series circuits and series resonance.

UNIT 5 - Single phase A.C. Parallel Circuits

Duration: 14 Periods (L:11 – T: 3)

Derive the impedance (RMS Values), current (RMS Values), phase angle, power and power factor in R-L, R-C, LC and R-L&C parallel circuits including phasor diagrams. – Solve simple problems on parallel circuits by vector method, Admittance method and by `j' notation –Parallel RLC resonance circuit –Condition for resonance in parallel circuit- Q-factor and resonance frequency-problems

UNIT 6 - Poly phase circuits

Duration: 11 Periods (L:9 – T: 2)

Definition of Poly phase - Generation of 2 phase and 3 phase EMF's - Representation of 2 phase and 3 phase EMF's by equations, waveforms and phasor - phase sequence - Current in neutral in 2 phase and 3 phase system - phasor diagram showing relation between phase and line quantities, Relation between phase and Line values of voltages and currents – 3 phase power equation - Problems on 3 phase balanced circuits –Advantages of poly-phase systems over single-phase systems.

Recommended Books

1. Electrical Technology - Vol - I by B.L. Theraja- S.Chand&co.
2. Introduction to Electrical Engg. by V.K.Mehta
3. Electrical Technology by Hughes.
4. Problems in Electrical Engg. by Parker Smith
5. Engineering Circuit analysis by William Hayt and Jack E,kemmerly-TMH
6. Electrical Circuits by A.Chakraborthy- Dhanapat Rai and Sons
7. Network and Systems by D. Roy Chowdary- New age international publishers
8. Electric Circuit Theory by K. Rajeshwaran-Pearson educations,2004
9. Network Analysis by Van Valkenburg, PHI.
10. Electrical Circuits by Joseph Edminister- Schaum series
11. Fundamentals of Electric circuits – Alexander Sadiku- TMH
12. Electric circuits by Mahmood Nahvi, Joseph A Edminister-TMH.

Suggested E-learning references

1. http://electrical4u.com/
2. www.nptel.ac.in
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/
4. http://www.freeengineeringbooks.com/electrical-books-download/Electrical-Engineering-basics.php
5. https://electrical-engineering-portal.com/theorems-network-reductions#circuit-theorems
6. https://nptel.ac.in/courses/108102042/
7. https://nptel.ac.in/courses/108108076/

Suggested Learning Outcomes
After completion of the subject, the student shall be able to

1.1 Differentiate between active and passive circuits.
1.2 Define junction in circuits
1.3 Define loop in circuits
1.4 Define branch in circuits
1.5 State the limitations of Ohm's law.
1.6 State Kirchhoff's current law
1.7 State Kirchhoff's voltage law.
1.8 Solve problems by applying KVL and KCL
1.9 Explain Mesh analysis
1.10 Solve simple problems on meshanalysis.
1.11 Explain star and delta circuits
1.12 Explain the concept of circuit transformation and equivalent circuits
1.13 Develop transformation formulae for star- delta transformations
1.14 Solve problems on star delta transformation

2.1 Define ideal voltage source
2.2 Define ideal current source
2.3 Explain source transformation technique
2.4 Solve simple problems on source transformation
2.5 State Superposition theorem.
2.6 State Thevenin's theorem.
2.7 State Norton's theorem
2.8 State maximum power transfer theorem.
(All the theorems with reference to D.C only)
2.9 Derive the condition for maximum power transfer
2.10 Solve simple problems on network theorems

3.1 Define alternating quantity
3.2 Define cycle of an alternating quantity
3.3 Define frequency of an alternating quantity
3.4 Define time period of an alternating quantity
3.5 Define amplitude of an alternating quantity
3.6 Define angular velocity of an alternating quantity
3.7 Define the instantaneous value of an alternating quantity
3.8 Define maximum value of an alternating quantity
3.9 Define Average value of an alternating quantity
3.10 Define R.M.S value of an alternating quantity
3.11 Define form factor of an alternating quantity
3.12 Define peak factor of an alternating quantity
3.13 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of sine wave
3.14 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of half wave rectified sine wave
3.15 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of full wave rectified sine wave
3.16 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of triangular wave
3.17 Calculate the maximum value, average value, R.M.S value, form factor and peak factor of square wave
3.18 Define the terms phase and phase difference (No problems).
3.19 Define j operator.
3.20 Convert polar quantities to rectangular quantities and vice-versa.

4.1 Define the terms resistance, inductance and capacitance
4.2 Define reactance
4.3 Define active power, reactive power and apparent power
4.4 Mention the units of active power, reactive power and apparent power
4.5 Draw current, voltage waveforms, phasor diagram of pure resistive circuit
4.6 Derive the expression for voltage, current, impedance, power in pure resistive circuit
4.7 Draw current, voltage waveforms, phasor diagram of pure inductive circuit
4.8 Derive the expression for voltage, current, impedance, power in pure inductive circuit
4.9 Draw current, voltage waveforms, phasor diagram of pure capacitive circuit
4.10 Derive the expression for voltage, current, impedance, power in pure capacitive circuit
4.11 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of R-L series circuit
4.12 Derive the expression for voltage, current, impedance, power and power factor in R-L series circuit
4.13 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of R-C series circuit

4.14 Derive the expression for voltage, current, impedance, power and power factor in R-C series circuit
4.15 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of L-C series circuit
4.16 Derive the expression for voltage, current, impedance, power and power factor in L-C series circuit
4.17 Draw current, voltage waveforms, phasor diagram, power triangle, impedance triangle of R-L-C series circuit
4.18 Derive the expression for voltage, current, impedance, power and power factor in R-L-C series circuit
4.19 Solve simple problems on R-L, R-C, L-C, R-L-C series circuits
4.20 Define resonance in series circuits
4.21 State the condition for resonance in series circuit
4.22 Derive resonant frequency of single-phase series RLC circuit.
4.23 Solve simple problems on series resonance
4.24 Define Q- factor of single-phase series RLC circuit
4.25 State the importance of Q-factor.
4.26 Derive the expression for Q-factor of single-phase series RLC circuit
4.27 Solve simple problems on Q-factor

5.1 Draw phasor diagram of R-L parallel circuit
5.2 Derive the expression (RMS Values) for current, impedance, power and power factor in R-L parallel circuit
5.3 Draw phasor diagram R-C parallel circuit
5.4 Derive the expression (RMS Values) for current, impedance, power and power factor in R-C parallel circuit
5.5 Draw phasor diagram of L-C parallel circuit
5.6 Derive the expression (RMS Values) for current, impedance, power and power factor in L-C parallel circuit
5.7 Draw phasor diagram of R-L&C parallel circuit
5.8 Derive the expression (RMS Values) for current, impedance, power and power factor in R-L&C parallel circuit.
5.9 Solve simple problems on R-L, R-C, L-C, R-L & C parallel circuits
5.10 Solve simple problems on parallel circuits by vector method
5.11 Solve simple problems on parallel circuits by Admittance Method
5.12 Solve simple problems on parallel circuits by j- notation method
5.13 Define resonance in parallel circuits
5.14 State the condition for resonance in parallel circuit
5.15 Derive resonant frequency of single phase parallel RL&C circuit.
5.16 Solve simple problems on parallel resonance
5.17 Define Q- factor of single phase parallel RL&C circuit
5.18 Derive the expression for Q-factor of single phase parallel RL&C circuit
5.19 Solve simple problems on Q-factor

6.1 Define the term `Poly Phase'.
6.2 Explain the method of generation of 2 phase emfs
6.3 Explain the method of generation of 3 phase emfs.
6.4 Write the expressions for Poly phase emfs
6.5 Represent poly phase emfs by phasor diagram
6.6 Represent poly phase emfs by waveforms
6.7 Define phase sequence
6.8 Compute the current flowing neutral conductor in 2-phase system
6.9 Compute the current flowing neutral conductor in 3-phase system
6.10 Derive the relation between line and phase values of current and voltage in 3 phase star circuit
6.11 Derive the relation between line and phase values of current and voltage in 3 phase delta circuits.
6.12 Derive the equation for power in 3 phase circuit.
6.13 Solve simple problems in three-phase system with balanced loads.
6.14 List the advantages of 3 phase system over single phase system.

Suggested Student Activities

1. Prepare a chart on various electrical circuit theorems and their practical applications.
2. Write a report on practical applications of Single phase AC circuits and Three phase AC circuits with their operating voltages and other electrical parameters.
3. Visit nearby Industry to familiarize with single phase and poly phase circuits
4. Quiz
5. Group discussion
6. Surprise test

CO-PO Mapping Matrix

	Basic and Discipline specific knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools	Engineering Practices for society, Sustainability	Project Management	Lifelong learning	Linked PO
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	
CO1	3	3	2	1			3	1,2,3,4,7
CO2	3	3	2	1			3	1,2,3,4,7
CO3	3	3		1			3	1,2,4,7
CO4	3	3		1			3	1,2,4,7
CO5	3	3		1			3	1,2,4,7
CO6	3	3		1			3	1,2,4,7

Continuous Internal Evaluation (CIE)

Test	Units	Marks
Mid Sem 1	1 and 2	20
Mid Sem 2	3 and 4	20
Slip Test 1	1 and 2	5
Slip Test 2	3 and 4	5
Assignments	-	5
Seminars	-	5
	Total	60

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

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

MID SEM-II EXAM

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

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

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

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING,TELANGANA

MODEL QUESTION PAPER

EE III SEMESTER MID SEMESTER-I EXAMINATION

Corse Code:EE-305 **Duration:1 Hour**

Course Name: Electrical Circuits **Max.Marks:20**

PART-A

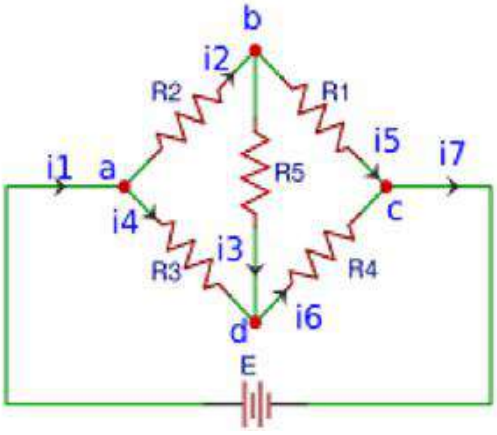
Answer all questions, Each Question carries one mark **4x1 = 4 Marks**

1) State Kirchhoff's current law.
2) Define junction of an electrical network
3) What is an ideal voltage source?
4) StateThevenin's theorem.

PART-B

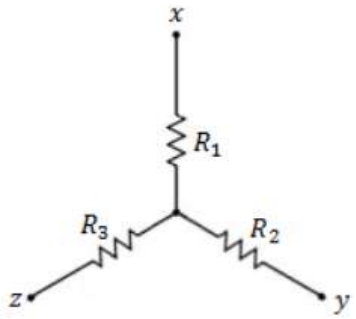
Answer two questions. Each question carries three marks **2x 3 = 6 Marks**

5) a) Find the magnitude and direction of the unknown currents in below circuit. Given i1 = 10A, i2 = 6A and i5 = 4A.



OR

b) Convert the below star network to an equivalent delta network if $R_1=R_2=R_3=2\Omega$.



6) a) State how to convert a voltage source to current source with an example.

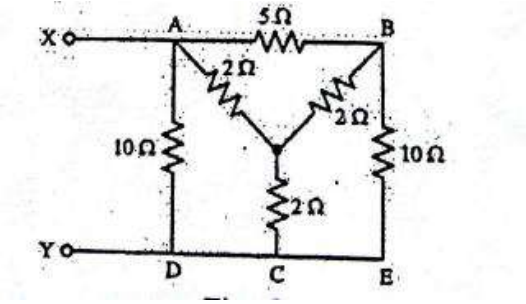
OR

b) State superposition theorem.

PART-C

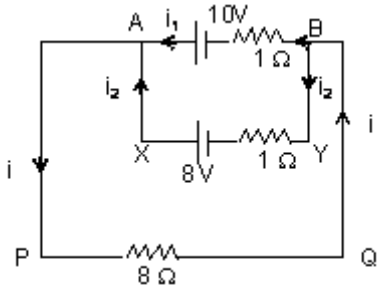
Answer two questions. Each question carries five marks **2x 5 = 10 Marks**

7) a) Find the equivalent resistance between X and Y for the circuit shown below

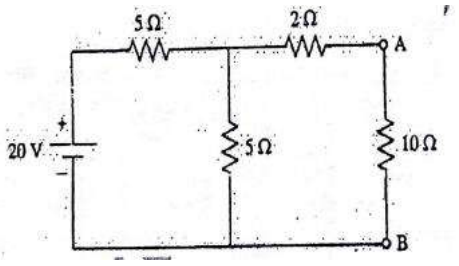


OR

b) Find the current through 8Ω resistor for the network shown below by using Kirchhoff's law.

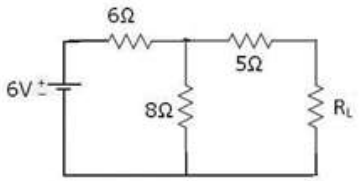


8) a) Determine the current through 10Ω resistor of the network shown below by using Norton theorem.



OR

b) Find the value of R_L for the given network below so that the power drawn by R_L is maximum.



STATE BOARD OF TECHNICAL EDUCATION AND TRAINING,TELANGANA

MODEL QUESTION PAPER

EE III SEMESTER MID SEMESTER-II EXAMINATION

Corse Code:EE-305 **Duration:1 Hour**

Course Name: Electrical Circuits **Max.Marks:20**

PART-A

Answer all questions, Each Question carries one mark4x1 = 4 Marks

1) Define form factor
2) Convert 3+j4 to polar quantity.
3) Draw the power triangle of single phase series RC circuit .
4) Draw the phasor diagram of pure inductor.

PART-B

Answer two questions. Each question carries three marks **2x 3 = 6 Marks**

5) a) Give the expression of rms value and average value of half wave rectified sine wave.

OR

b) Define the phase and phase difference of alternating quantities.

6) a) Give the expressions of impedance and power factor of single phase series RL circuit.

OR

b) Give the expressions of Q-factor and resonant frequency of single phase series circuit.

PART-C

Answer two questions. Each question carries five marks **2x 5 = 10 Marks**

7) a) Derive the expression for RMS value and average value of full wave rectified sine wave.

OR

b) Derive the expression for peak factor and form factor of a square wave.

8) a) Derive the expression for resonant frequency of a series RLC circuit.

OR

b) A coil having resistance of 7Ω and inductance of 30 mH is connected to 230V, 50 Hz single phase supply. Calculate the circuit current and power factor.

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING,TELANGANA

MODEL QUESTION PAPER

DEEE III SEMESTER

SEMESTER END EXAMINATION

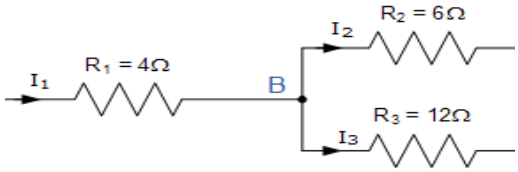
Corse Code:EE-305 **Duration:2 hours**

Course Name: Electrical Circuits **Max.Marks:40Marks**

PART-A

Answer **all** questions 8**x1 =8 Marks**

1) Find the current I_2 in the below circuit given I_1= 10 A and I_3 = 7A.

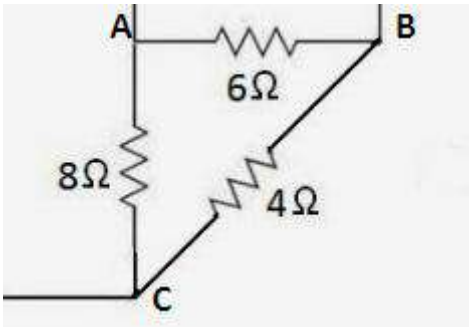


2) Define a) Average value and b) RMS value.
3) Write the voltage and current relationships in a three phase circuits for a star connected balanced load.
4) What is the current through a capacitor C= 10nF connected to a single phase 50V, 50Hz voltage source?
5) Define Q-factor.
6) State the condition for resonance in parallel circuits.
7) Define the term polyphase.
8) State any two advantages of 3 phase system over single phase system.

PART-B

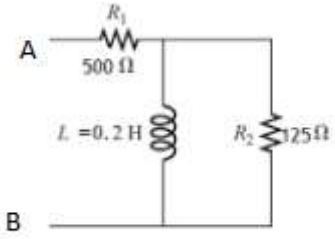
Answer four questions **4 x 3 = 12 Marks**

9) a) Transform the given delta network to star.



OR

b) Find the impedance between A and B in the below circuit when it is energized by v(t) = 100sin314t Volts.



10 a) Determine the average value, RMS value and form factor of single phase AC 230 V, 50Hz full wave rectified sine wave.

OR

b) Write the expressions for Poly phase emfs and represent them by phasor diagram.

11. a) Derive the resonant frequency of single phase parallel RLC circuit.

OR

b) Give the expression for impedance and current of single phase parallel RLC circuit.

12. a) Calculate the power in 3 phase balanced resistive circuit connected to 3 phase 440V, 50Hz carrying line current of 0.5A.

OR

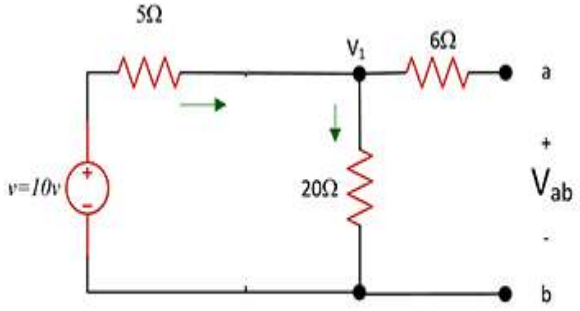
b) Write the expression for power in balanced three phase star circuit and delta circuit.

PART - C

Instructions: (1) Answer the following questions

(2) Each question carries **five** marks. **Marks: 4 X 5 = 20**

13. a) Find the Thevenins equivalent of the circuit shown below:



OR

b) Derive an expression for resonant frequency of a parallel RLC circuit.

14. a) A current of 10A flows through a non-inductive resistance in series with a coil when supplied at 250V, 50Hz. If the voltage across the resistance is 250V and across the coil is 400V, calculate a) impedance of the coil and b) total power consumed by the circuit.

OR

b) Explain how to generate the 3 phase emf's with neat figures.

15. a) A parallel RLC circuit with a 16 Ω resistance, 8 Ω inductive reactance, and 20 Ω capacitive reactance is supplied by a 120-V power supply. What are the values of currents through R, L and C, total line current and active power?

OR

b) A parallel RC circuit has a power supply of 100 V, 60 Hz. A current of 10A flows through the resistor and a current of 10A flows through the capacitor. Calculate the values of line current, true power, reactive power, apparent power and power factor?

16. a) Three identical impedances are connected in delta to a 3-phase 400 V, 50Hz supply. The line current is 34.65 A and the total power taken from the supply is 14.4 kW. Calculate the resistance and reactance values of each impedance.

OR

b) Three coils each having a resistance of 20Ω and inductive reactance of 15Ω are connected in star to a 3-phase, 400V, 50Hz supply. Calculate a) line current, and b) power consumed.

EC-306-ELECTRONIC DEVICES LAB

Course Title	Electronic Devices Lab	Course Code	EC-306
Semester	III	Course Group	Core
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practicals	Total Contact Periods	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

This course requires the basic skills of Handling Basic Electronics tools and Components, knowledge of connecting cables and meters

Course Contents

I. Amplifiers and Oscillators

1. Implement voltage divider bias single stage RC coupled CE amplifier and plot frequency response.
    - **a)** Observe the effect of connecting and disconnecting the emitter bypass capacitor on gain and distortion.
    - **b)** Observe the effect of emitter bypass capacitor Ce on voltage across Emitter Resistance using CRO.
    - **c)** Measure the output power using ac power meter
2. Implement Colpitt's oscillator and verify the effect of Varying the tank circuit component values and observe output waveforms on CRO.
3. Implement Hartley oscillator and verify the effect of Varying the tank circuit component values and observe output waveforms on CRO.
4. Implement transistor Astable multi vibrator circuit and observe the waveforms on CRO.

II. Special Semiconductor Devices

5. Plot the characteristics of a) Photodiode b) photo transistor
6.
    a) Implement a Twilight switch using a Phototransistor and a Relay
    b) Replace Phototransistor with LDR and Test
7.

a) Plot the VI characteristics of different color LEDs & determine the Vf (forward voltage drop)
b) Test the above devices with DMM & Analogue multimeter and identify the Terminals

8.
a) Plot the characteristics of i) LDR ii) Thermistor iii) VDR
b) Test the above devices with DMM & Analogue multimeter

9.
a) Implement a simple Temperature controller using Thermistor and a Relay
b) Use a VDR /Trigistor for protection against high voltage surges and verify

10.
a) Plot the characteristics of opto coupler MCT2E
b) Test the given optocoupler and identify its terminals

11.
a) Use MCT 2E to switch on a 6V lamp connected to RPS by applying a Low voltage 1.5 V signal from a cell at input
b) Implement a simple timer using 1 M Ω Resistor , 1000 mfd capacitor ,Transistor BC148 and a Relay

III. Wave shaping Circuits

Realize Clipper and Clamper circuits and observe the waveforms on CRO

12.
a) Realize Series and Parallel diode clippers
b) Assemble and test Positive and negative clipper circuits with and without bias

13.
a) Implement Amplitude limiter (two diodes connected back to back) and observe the waveform on CRO.
b) Implement a Zener diode Clipper and measure the output voltage with DMM and also observe waveform on CRO

14. Implement Boot-strap sweep circuit and observe the sweep wave form.
15. Implement Miller sweep circuit and observe the waveform.

Suggested Student Activities

i. Collection of catalogues and specification sheets, preparation of a chart displaying symbols of passive components and connectors/cables.
ii. Collection of the contributors (scientists) and contribution details to the field of Electrical and Electronics engineering

iii. Any other such activities that can contribute to the student's knowledge in respect of this course.

iv. Record the best practices used in the disposal of E-waste and precautions in the operation of electrical appliances.

Course Outcome		Linked PO	
CO1	Apply the basics of transistor to construct amplifiers, oscillators and multi-vibrators and analyze the effect of circuit components	1,2,3,8,9,10	12
CO2	Identify different special semiconductor devices and apply the knowledge of special semiconductor devices in special applications	1,2,3,4,5,6,8,9,10	18
CO3	Apply the knowledge of semiconductor components in realizing and analyzing wave shaping circuits	1,2,3,4,8,9,10	15
			45

E Learning Resources

1. http://electrical4u.com/
2. www.electronics-tutorials.ws
3. www.nptel.ac.in
4. studentboxoffice.in

State Board of Technical Education and Training, Telangana

III Semester Mid Examination-I Model Question paper

DECE III semester practical Examination

Corse Code:EC-306 **Duration:2 hours**

Course Name: Electronic Devices Lab
Max.Marks:20

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the circuit diagram for illustration, choose appropriate values when not mentioned in the question

1. Implement voltage divider bias single stage RC coupled CE amplifier and plot frequency response. Record the effect of emitter bypass capacitor on gain of the amplifier.

   b) Implement Colpitt's oscillator and verify the effect of Varying the tank circuit component values and observe output waveforms on CRO.

   c) Implement Hartley oscillator and observe the effect of Varying the tank circuit component values and observe output waveforms on CRO. Record your observations.

4. Implement transistor Astable multi vibrator circuit and observe the waveforms on CRO and record your observations.

5. Implement the Photo diode circuit to show that the resistance of the photo diode varies with light and also measure the current through the Photodiode. Record your observations.

State Board of Technical Education and Training, Telangana

III Semester Mid Examination-II Model Question paper

DECE III semester practical Examination

Corse Code:21EC-306P **Duration:2 hours**

Course Name: Electronic Devices Lab **Max.Marks:20**

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the circuit diagram for illustration, choose appropriate values when not mentioned in the question

1.. Implement the Photo transistor circuit to show that the resistance of the photo transistor varies with light and also measure the current through the Photo transistor. Record your observations.

2.a) Implement a Twilight switch using a Phototransistor and a Relay

b) Replace Phototransistor with LDR and record the observations.

3. a)Plot the VI characteristics of white, red and green color LEDs & determine the Vf (forward voltage drop)

b) Test the above devices with DMM & Analogue multimeter and identify the Terminals

4.a) Plot the V-I characteristics and response characteristics of i) LDR

b) Test the above devices with DMM & Analogue multimeter

5. a) Implement a simple Temperature controller using Thermistor and a Relay

b) Use a VDR for protection against high voltage surges and verify

State Board of Technical Education and Training, Telangana

Semester End Examination Model Question paper

DECE III semester practical Examination

Corse Code:EC-306 **Duration:3 hours**

Course Name: Electronic Devices Lab **Max.Marks:40**

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required, and conclude your observation of the experiment

(iii) Draw the circuit diagram for illustration ,choose appropriate values when not mentioned in the question

1. Implement voltage divider bias single stage RC coupled CE amplifier and plot frequency response. Record the effect of emitter bypass capacitor on gain of the amplifier.

d) Implement Colpitt's oscillator and verify the effect of Varying the tank circuit component values and observe output waveforms on CRO.

e) Implement Hartley oscillator and observe the effect of Varying the tank circuit component values and observe output waveforms on CRO. Record your observations.

4. Implement transistor Astable multivibrator circuit and observe the waveforms on CRO and record your observations.

5.Implement the Photo diode circuit to show that the resistance of the photo diode varies with light and also measure the current through the Photodiode. Record your observations.

6.. Implement the Photo transistor circuit to show that the resistance of the photo transistor varies with light and also measure the current through the Photo transistor. Record your observations.

7.a) Implement a Twilight switch using a Phototransistor and a Relay

b) Replace Phototransistor with LDR and record the observations.

8. a) Plot the VI characteristics of white, red and green color LEDs & determine the Vf (forward voltage drop)

b) Test the above devices with DMM & Analogue multimeter and identify the Terminals

9.a) Plot the V-I characteristics and response characteristics of i) LDR

b) Test the above devices with DMM & Analogue multimeter

10. a) Implement a simple Temperature controller using Thermistor and a Relay

    b) Use a VDR for protection against high voltage surges and verify

11. a) Plot the characteristics of optocoupler MCT2E

    b) Test the given optocoupler and identify its terminals

12. a) Use MCT 2E to switch on a 6V lamp connected to RPS by applying a Low voltage 1.5 V signal from a cell at input b) Implement a simple timer using 1 M Ω Resistor , 1000 mfd capacitor ,Transistor BC148 and a Relay

13. Construct and test Positive and negative clipper circuits with and without bias

14. Implement Amplitude limiter (two diodes connected back-to-back) and observe the waveform on CRO.

b) Implement a Zener diode Clipper and measure the output voltage with DMM and also observe waveform on CRO

15. Implement Boot-strap sweep circuit and observe the sweep wave form.

EE-307-CIRCUITS LAB

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

Pre requisites:

This course requires

- Data handling through graphs:
  - Select proper X & Y parameters
  - Choose proper scale
  - Analyse the trend of the graph
  - Correlate trend of the graph with the relation between the parameters
- Use of Voltmeter, Ammeter, Wattmeter & CRO
- The knowledge of electrical circuits

Course Outcomes:

At the end of the course the students will have the ability to:

Course Outcomes	
CO1	Verify Ohms law
CO2	Apply Kirchhoff's laws to solve electric circuits
CO3	Apply network theorems to solve electric circuits
CO4	Verify the voltage, current phasor relationship in 1-Φ AC circuits with R, RL and RC loads

Suggested Learning Outcomes

1.0 Verify Ohms law

1.1 Verify Ohm's law
1.2 Verify limitations of Ohm's law

2.0 Apply Kirchhoff's laws to solve electric circuits

2.1 Verify Kirchhoff's current law in a DC circuit
2.2 Verify Kirchhoff's voltage law in a DC circuit

3.0 Apply network theorems to solve electric circuits

3.1 Verify Thevenin's theorem in a DC circuit
3.2 Verify Norton's theorem in a DC circuit
3.3 Verify Maximum power transfer theorem in a DC circuit
3.4 Verify Super position theorem in a DC circuit with two sources

4.0 Verify the voltage, current phasor relationship in 1-Φ AC circuits with R, RL and RC loads

4.1 Verify that the voltage and current for 1-Φ AC circuit with pure R- load are in-phase using CRO and draw the phasor diagram.
4.2 Verify that the current in 1-Φ AC circuit with pure RL - load lags the voltage using CRO and draw the phasor diagram.
4.3 Verify that the current in 1-Φ AC circuit with pure RC - load leads the voltage using CRO and draw the phasor diagram.

CO-PO Mapping Matrix

	Basic and Discipline Specific knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation & Testing	Engineering practices for society, sustainability and environment	Project Management	Lifelong learning	Linked PO
CO\PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7	
CO1	3	1	-	-	2	2	3	1,2,5,6,7
CO2	3	-	2	3	2	2	3	1,3,4,6,7
CO3	-	1	3	2	2	2	3	2,3,4,5,6,7
CO4	-	3	3	3	2	2	3	2,3,4,5,6,7

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING, TELANGANA
MODEL QUESTION PAPER
DEEE III SEMESTER
MID SEMESTER-I EXAMINATION

Corse Code: EE-307 **Duration: 1 Hour**
Course Name: Circuits Lab **Max.Marks: 20**

Note: ***Answer allotted Question.***
Instructions to the Candidate:
(i)Record the results on a graph sheet if required, and conclude your observation of the experiment
(ii) Draw the circuit diagram for illustration; choose appropriate values when not mentioned in the question

1.Verify Ohm's law
2.Verify limitations of Ohm's law
3.Verify Kirchhoff's current law in a DC circuit
4.Verify Kirchhoff's voltage law in a DC circuit

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING, TELANGANA
MODEL QUESTION PAPER
DEEE III SEMESTER
MID SEMESTER-II EXAMINATION

Corse Code: EE-307 **Duration: 1 Hour**
Course Name: Circuits Lab **Max.Marks: 20**

Note: ***Answer allotted Question.***
Instructions to the Candidate:
(i)Record the results on a graph sheet if required, and conclude your observation of the experiment
(ii) Draw the circuit diagram for illustration; choose appropriate values when not mentioned in the question

1.Verify Thevenin's theorem in a DC circuit
2.Verify Norton's theorem in a DC circuit
3.Verify Maximum power transfer theorem in a DC circuit
4.Verify Super position theorem in a DC circuit with two sources

State Board of Technical Education and Training, Telangana

Model Question paper

DEEE III Semester

Semester End Examination

Corse Code: EE-307 **Duration: 2 Hour**

Course Name: Circuits Lab **Max.Marks: 40**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

(i)Record the results on a graph sheet if required, and conclude your observation of the experiment

(ii) Draw the circuit diagram for illustration; choose appropriate values when not mentioned in the question

1. Verify Ohm's law
2. Verify limitations of Ohm's law
3. Verify Kirchhoff's current law in a DC circuit
4. Verify Kirchhoff's voltage law in a DC circuit
5. Verify Thevenin's theorem in a DC circuit
6. Verify Norton's theorem in a DC circuit
7. Verify Maximum power transfer theorem in a DC circuit
8. Verify Super position theorem in a DC circuit with two sources
9. Verify that the voltage and current for 1-Φ AC circuit with pure R- load are in-phase using CRO and draw the phasor diagram.
10. Verify that the current in 1-Φ AC circuit with pure RL - load lags the voltage using CRO and draw the phasor diagram.
11. Verify that the current in 1-Φ AC circuit with pure RC - load leads the voltage using CRO and draw the phasor diagram.

EC-308-Digital Electronics Lab

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

Pre requisites

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

Course outcomes:

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

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

Course Contents:

I. Basic Gates and Logic Families

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

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

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

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

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

b) Verify the Truth table of 4073 IC.

3.

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

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

4.

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

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

II. Realizing Boolean Functions.

5.

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

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

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

6.

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

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

7.

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

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

8.

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

b) Implement a full adder using NOR gates only.

III. Realization of Boolean Functions using Multiplexers and Demultiplexers

9. a) Verify the truth table of IC 74153MUX.
   b) Verify the truth table of IC 74154 DE-MUX.
10. a) Verify the function of 74148 Encoder and write the truth table
    b) Verify the function of 74138 Decoder and write the truth table
11. a) Verify the to decimal decoder and write function of BCD its truth table.
    b) Verify the function of decimal BCD to encoder and write its truth table.

IV. Flip Flops &Sequential Circuits

12. a) Construct clocked RS FF using NAND gates and Verify its truth table.
    b) Verify the truth table of CD 4013 Dual D flip Flop
13. a) Verify the functionality and truth table of 74L71 RS flip flop with Preset and Clear
    b) Verify the Truth table of JK FF using 7476 IC.
14. a) Construct and verify the function of decade counter using 7490 ICs.
    b) Verify the function of up/down counter using 74190, 74193
15. a) Verify the function of CD 4029 up/down counter.
    b) Verify the function of shift register (ICs like 7495or 74194 etc.)
    c) Verify the function of Johnson counter using CD 4017 IC

EE-309-ELECTRICAL MEASUREMENTS LAB

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

Pre requisites

This course requires the knowledge of basic electricity and fundamentals of various measuring instruments

Course Outcomes

At the end of the course the students will have the ability to:

Course Outcome	
CO1	Compare calibrated meter readings with standard meters
CO2	Illustrate the methods of range extension in A.C. & D.C. meters
CO3	Interpret the various methods to measure unknown resistance
CO4	Demonstrate various methods of measuring power in three phase circuit

Suggested Learning Outcomes

1.0 Compare calibrated meter readings with standard meters

1.1 Calibration and testing of single phase energy meter

1.2 Calibration of dynamometer wattmeter

1.3 Calibration of PMMC Ammeter and PMMC voltmeter

1.4 Calibration of LPF wattmeter

2.0 Illustrate the methods of range extension in A.C. & D.C. meters

2.1 Extend the range of D.C. ammeter by using shunt resistances (low range to high range)

2.2 Extend the range of D.C. voltmeter by using series multiplier(low range to high range)

2.3 Extend the range of A.C. ammeter by using C.T.(high range to low range)

2.4 Extend the range of A.C. voltmeter by using P.T.(high range to low range)

3.0 Interpret the various methods to measure unknown resistance

3.1 Measurement of low and medium resistance by volt-ampere method

3.2 Measurement of resistance by Kelvin's double Bridge.

3.3 Measurement of earth resistance using digital earth tester

3.4 Measurement of insulation resistance using digital insulation tester

4.0 Demonstrate various methods of measuring power in AC circuits

4.1 Measurement of power in a three-phase balanced circuit with two watt meter method

4.2 Measurement of single phase power by 3-voltmeter and 3-Ammeter methods

Note:

1. Every student has to bring insulated tool kit and follow the general safety precautions throughout the lab sessions
2. Whenever handling/using a meter check for 'zero' position of the pointer and adjust for 'zero' position if there is any deviation.

CO-PO Mapping Matrix

	Basic and Discipline Specific knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation & Testing	Engineering practices for society, sustainability and environment	Project Management	Lifelong learning	Linked PO
CO\PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7	
CO1	3	1	-	-	2	2	3	1,2,5,6,7
CO2	3	-	2	3	2	2	3	1,3,4,6,7
CO3	-	1	3	2	2	2	3	2,3,4,5,6,7
CO4	-	3	3	3	2	2	3	2,3,4,5,6,7

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING, TELANGANA

MODEL QUESTION PAPER

DEEE III SEMESTER

MID SEMESTER-I EXAMINATION

Course Code: EE-309 **Duration: 1 Hour**

Course Name: Electrical Measurements Lab **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

(i)Record the results on a graph sheet if required, and conclude your observation of the experiment

(ii) Draw the circuit diagram for illustration; choose appropriate values when not mentioned in the question

1. Calibration and testing of single phase energy meter
2. Calibration of dynamometer wattmeter
3. Calibration of PMMC Ammeter and PMMC voltmeter
4. Calibration of LPF wattmeter
5. Extend the range of D.C. ammeter by using shunt resistances (low range to high range)
6. Extend the range of D.C. voltmeter by using series multiplier(low range to high range)

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING, TELANGANA

MODEL QUESTION PAPER

DEEE III SEMESTER

MID SEMESTER-II EXAMINATION

Course Code: EE-309 **Duration: 1 Hour**

Course Name: Electrical Measurements Lab **Max.Marks: 20**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

(i)Record the results on a graph sheet if required, and conclude your observation of the experiment

(ii) Draw the circuit diagram for illustration; choose appropriate values when not mentioned in the question

1. Extend the range of A.C. ammeter by using C.T.(high range to low range)
2. Extend the range of A.C. voltmeter by using P.T.(high range to low range)
3. Measurement of low and medium resistance by volt-ampere method
4. Measurement of resistance by Kelvin's double Bridge.
5. Measurement of earth resistance using digital earth tester
6. Measurement of insulation resistance using digital insulation tester

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING, TELANGANA

MODEL QUESTION PAPER

DEEE III SEMESTER

SEMESTER END EXAMINATION

Course Code: EE-309 **Duration: 2 Hour**

Course Name: Electrical Measurements Lab **Max.Marks: 40**

Note: ***Answer allotted Question.***

Instructions to the Candidate:

(i)Record the results on a graph sheet if required, and conclude your observation of the experiment

(ii) Draw the circuit diagram for illustration; choose appropriate values when not mentioned in the question

1. Calibration and testing of single phase energy meter
2. Calibration of dynamometer wattmeter
3. Calibration of PMMC Ammeter and PMMC voltmeter
4. Calibration of LPF wattmeter
5. Extend the range of D.C. ammeter by using shunt resistances (low range to high range)
6. Extend the range of D.C. voltmeter by using series multiplier(low range to high range)
7. Extend the range of A.C. ammeter by using C.T.(high range to low range)
8. Extend the range of A.C. voltmeter by using P.T.(high range to low range)
9. Measurement of low and medium resistance by volt-ampere method
10. Measurement of resistance by Kelvin's double Bridge.
11. Measurement of earth resistance using digital earth tester
12. Measurement of insulation resistance using digital insulation tester
13. Measurement of power in a three-phase balanced circuit with two watt meter method
14. Measurement of single phase power by 3-voltmeter and 3-Ammeter methods

HU-310 - Communication and Life Skills Lab

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

Rationale:

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

Prerequisites:

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

Course Contents

I. Listening Skills-I

Duration: 6 (L 2 P 4)

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

II. Life Skills – I

Duration: 6 (L2 P 4)

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

- Need for adaptability
- Willingness to experiment
- Fear of failure
- Think ahead
- Stay positive
- Open mind
- Curiosity
- Being in present

III. Listening Skills – II

Duration: 9 (L 3 P 6)

- Biography
- Interview
- A Report
- Telephone Conversation

IV. Life Skills – II

Duration: 9 (L 3 P 6)

4. Goal setting

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

5. Motivation

- Why motivation
- Characteristics of motivation
- Extrinsic motivation
- Intrinsic motivation

6. Time Management

- Features of time
- Secrets of time management
- Time wasters
- Prioritisation
- Productive time
- Time Quadrant

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

7. Creativity

- Flexibility
- Curiosity
- Determination
- Innovative ideas

8. Critical Thinking

- Observation
- Curiosity
- Introspection
- Identify biases
- Critical Analysis

9. Problem Solving and Decision Making

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

VI. Life Skills – IV

Duration: 9 (L 3 P 6)

10. Leadership Qualities and Teamwork

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

11. Stress Management/Managing Emotions

- Components of Emotions
- Stress busters
- Managing Emotions
- Emotions at workplace

12. Core Human Values / Forming Values

- Honesty and integrity
- Work Ethics
- Ego and Respect
- Trust and Truthfulness
- Social Responsibility
- Character formation
- Designing Destiny

Course Outcomes:

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

CO-PO Matrix

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

Suggested Student Activities:

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

Evaluation Pattern:

I. Continuous Internal Examination: 60 Marks

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

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

c. **Internal assessment**: 20 marks

i. Seminars: 10 marks

ii. Assignments: 5 marks

iii. Lab record submission: 5 marks

II. Semester End Examination : 40 Marks

a. Listening: 10 Marks

b. Life Skills topics: 15 Marks

c. *Viva Voce* : 15 Marks

References:

a. Flint, Chrisand Jamie Flockhart*Listening: A2 (Collins English for Life: Skills)* Collins. 2013
b. Brown, Stephen E. English in Everyday Life. McGraw-Hill Education.2008
c. Mohanraj, Jayashree. *Let Us Hear Them Speak: Developing Speaking-Listening Skills in English*.Sage. 2015
d. Susan Earle – Carlin. *Q Skills for Success: Listening and Speaking 5: Student Book with Online Practice*. Oxford University Press. 2013
e. Kumar, Sanjay and Pushpa Latha. *Communication Skills: A Work Book*.Oxford University Press. 2018
f. Carnegie, Dale.*The Leader in You*. Simon & Schuster: 1995
g. Carnegie, Dale.*The Art of Public Speaking*. Prabhat Prakashan. NewDelhi.2013
h. Kaye, Martin. *Goal Setting (Workbook Included): Goals & Motivation: Introduction To A Complete & Proven Step-By-Step Blueprint For Reaching Your Goals (Goal Setting Master Plan 1)*. Kindle Edition. MK Coaching.2016.
i. West, Steven. *Critical Thinking Skills: Practical Strategies for Better Decision making, Problem-Solving and Goal Setting.* Kindle Edition.2018
j. Tracy, Brain. *Goals*. Berret-Koehler PublishersInc. San Francisco. 2017
k. Tracy, Brain. *Master your Time Master your Life.* Penguin Random House Inc. New York. 2017
l. Sean Covey. *The 7 Habits of Highly Effective Teens.* Simon and Schuster,2011

E-Learning Resources:

a. http://www.bbc.co.uk/worldservice/learningenglish/youmeus/learnit/learnitv39.shtml
b. https://www.examenglish.com/leveltest/listening_level_test.htm
c. https://www.oxfordonlineenglish.com/listening?utm_referrer=https%3A%2F%2Fwww.google.co.in%2F
d. https://takeielts.britishcouncil.org/prepare-test/free-ielts-practice-tests/listening-practice-test-1
e. https://learnenglish.britishcouncil.org/en/listening

f. https://www.cambridgeenglish.org/learning-english/activities-for-learners/?skill=listening
g. https://www.businessenglishsite.com/business-english-listening.html

BOARD DIPLOMA EXAMINATION (C-21)
MID SEMESTER EXAMINATION - I
HU-310- COMMUNICATION AND LIFE SKILLS LAB

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)

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

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

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

It is not right for us in India to be dissuaded from this by considerations as to overtaking the young mind. What is necessary must be done and it is not in the fact too great a burden.

On the basis of reading the above passage, answer the following questions:

1. Which two problems have our educations to face?
2. What is the primary aim of the education of children?
3.How should the problem of religious and moral instruction be dealt with?
4. Which basic training is the writer talking about?
5. How can we serve the spiritual needs of school children?

PART- B **10 Marks**

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

2. What are the benefits of developing an optimistic sense towards your life?
3. Give an instance from your life when you adapted yourself to a new situation.

BOARD DIPLOMA EXAMINATION (C-21)
MID SEMESTER EXAMINATION - II
HU-310- COMMUNICATION AND LIFE SKILLS LAB

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)

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

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

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

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

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

PART- B **10 Marks**

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

2. What were the short term goals which you set to yourself and how you managed to achieve them in the recent past?
3. Explain - i) how you prioritise your tasks.
   ii) how you manage your time in the best possible way.

BOARD DIPLOMA EXAMINATION (C-21)
SEMESTER END EXAMINATION
HU-310- COMMUNICATION AND LIFE SKILLS LAB

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)

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

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

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

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

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

Answer the following questions:

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

Part – B **15 marks**

2. Seminar Presentations on Life Skills topics:

Part – C **15 marks**

3. Viva Voce.

EE-311: SKILL UPGRADATION

Course Title	Skill Upgradation	Course Code	EE-311
Semester	III	Course Group	Core
Teaching Scheme in periods (L : T :P)	0:0:8	Credits	2.5
Methodology	Activities	Total Contact Periods	120
CIE	Rubrics	SEE	Nil

Suggested Course Outcomes

CO.1 Address the identified needs of the community collaboratively to facilitate positive social change.

a. Prepare a chart related to the topics covered in the present semester.
b. Listen to expert talk, guest lecture, youtube video and write a summary.
c. Participate in Haritha Haram and submit a small report about the activities.
d. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
e. Seminar on problems with possible solutions in the campus or nearby places
f. Group discussions or enacting a play on topics creating awareness about socio-economic problems
g. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
h. Participate in NCC

PO5, 6,7)

CO.2 Listen attentively to others and respond appropriately

a. Listen to expert talk, guest lecture, youtube video and write a summary.
b. Participating in Group discussions or enacting a play on topics creating awareness about socio-economic problems that can be mitigated by technologies.
c. Participate in quiz on technical aspects or current affairs
d. Participate in Mock Interview

(PO5, 6,7)

CO.3 Adapt your style to the occasion, task, and audience

a. Group discussions or enacting a play on topics creating awareness about socio-economic problems that can be mitigated by technologies.
b. Seminar on problems with possible solutions in the campus or nearby places
c. Participate in Mock Interview

(PO5, 6,7)

CO.4 Articulate ideas in various formats including oral, written, nonverbal, visual, and electronic devices.

a. Prepare a chart related to the topics covered in the present semester.
b. Refer to an e-journal and submit a summary report on upcoming technologies.
c. Visit factory / industry and submit a report/PPT on the observations made.
d. Prepare a mini project and submit report.
e. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
f. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
g. Seminar on problems with possible solutions in the campus or nearby places
h. Participate in Mock Interview

(PO5, 6,7)

CO.5 Demonstrate ability to recognize and effectively manage ambiguous ideas, experiences and situations

a. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
b. Seminar on problems with possible solutions in the campus or nearby places

(PO5, 6,7)

CO.6 Analyze the interconnections between individuals and society as well as how individual actions have an impact on others.

a. Participate in Haritha Haram and submit a small report about the activities.
b. Participate in Swatch Bharath and write an essay on the importance of the program
c. Participate in NCC

(PO5, 6,7)

CO.7 Utilize others' ideas, strengths, knowledge, and abilities to foster an inclusive environment & Develop and sustain healthy and meaningful relationships with others

a. Prepare a mini project and submit report.
b. Participate in Haritha Haram and submit a small report about the activities.
c. Participate in Swatch Bharath and write an essay on the importance of the program
d. Participate in NCC

(PO5, 6,7)

CO.8 Ability to recognize their strengths and those of others to work towards a shared vision.

a. Prepare a mini project and submit report.
b. Participate in Haritha Haram and submit a small report about the activities.
c. Participate in Swatch Bharath and write an essay on the importance of the program
d. Participate in NCC

(PO5, 6,7)

CO.9 Act in alignment with one's own values to contribute to one's life-long growth and learning.

a. Physical activities such as sports, yoga, meditation and other relaxation techniques

(PO5, 6,7)

CO.10 Gain, process, and act upon knowledge regarding the effects of individual, community, national, and international level choices on ecosystems and people.

a. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
b. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
c. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
d. Seminar on problems with possible solutions in the campus or nearby places

(PO5, 6,7)

CO	Outcome	CO/PO Mapping
CO1	Address the identified needs of the community collaboratively to facilitate positive social change.	5,6,7
CO2	Listen attentively to others and respond appropriately	5,6,7
CO3	Adapt your style to the occasion, task, and audience	5,6,7
CO4	Articulate ideas in various formats including oral, written, nonverbal, visual, and electronic devices.	5,6,7
CO5	Demonstrate ability to recognize and effectively manage ambiguous ideas, experiences and situations	5,6,7
CO6	Analyze the interconnections between individuals and society as well as how individual actions have an impact on others.	5, 6, 7,

CO7	Utilize others' ideas, strengths, knowledge, and abilities to foster an inclusive environment & Develop and sustain healthy and meaningful relationships with others	5, 6, 7,
CO8	Ability to recognize their strengths and those of others to work towards a shared vision	5, 6, 7,
CO9	Act in alignment with one's own values to contribute to one's life-long growth and learning.	5, 6, 7
CO10	Gain, process, and act upon knowledge regarding the effects of individual, community, national, and international level choices on ecosystems and people.	5, 6, 7

Note: The above COs may be mapped to other POs from 1 to 4 apart from PO's 5 to 07 depending on the topic

Suggested Student Activities

1. Prepare a chart related to the topics covered in the present semester.
2. Refer to an e-journal and submit a summary report on upcoming technologies.
3. Visit factory / industry and submit a report/PPT on the observations made.
4. Prepare a mini project and submit report.
5. Listen to expert talk, guest lecture, youtube video and write a summary.
6. Participate in Haritha Haram and submit a small report about the activities.
7. Prepare a report / PPT / poster on waste water recycling or any eco-friendly practices.
8. Take up a case study on identification of latest technologies to tackle day to day problems such as pollution control or traffic management and submit a report / PPT/ poster
9. Participate in Swatch Bharath and write an essay on the importance of the program
10. Group discussions or enacting a play on topics creating awareness about socio-economic problems
11. Physical activities such as sports, games, yoga, meditation and other relaxation techniques
12. Participate in quiz on technical aspects or current affairs
13. Seminar on problems with possible solutions in the campus or nearby places
14. Participate in NCC
15. Participate in Mock interviews

Note: The above student activities will be assessed using rubrics. A sample rubrics template is given below. The subject teacher can assess students using rubrics with atleast four relevant aspects.

RUBRICS MODEL (For assessing Presentation skills)

Aspects	Needs improvement	Satisfactory	Good	Exemplary
Collection of data	Collects very limited information	Collect much Information with very limited relevance to the topic	Collects some basic information with little bit of irrelevance	Collects a great deal of information with relevance
Presentation of data	Clumsy presentation of data	Presents data well; but presentation needs to be more meaningful	Presents data well but need to improve clarity	Presents data in an understandable yet concise manner
Fulfill team's roles & duties	Performs very little duties but Unreliable.	Performs very little duties and is inactive	Performs nearly all duties	Performs all duties of assigned team roles
Shares work equally	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded
Interaction with other team mates	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening to others	Listens, but sometimes talks too much	Listens and speaks a fair amount
Audibility and clarity in speech	Hardly audible and unclear	Very little audibility and clarity	Audible most of the time with clarity	Audible and clear
Understanding content	Lacks content understanding and is clearly a work in progress	Little depth of content understanding	Some depth of content understanding is evident but needs improvement	Insight and depth of content understanding are evident
Content Presentation	Content is inaccurate and information is not presented in a logical order making it difficult to follow	Content is accurate and information is not presented in a logical order making it difficult to follow	Content is accurate but some information is not presented in a logical order but is still generally easy to follow	Content is accurate and information is presented in a logical order

Suggested additional aspects for assessing Leadership Qualities:

1. Carrying self
2. Punctuality
3. Team work abilities
4. Moral values
5. Communication skills
6. Ensures the work is done in time

Suggested additional aspects for assessing "Participation in social task"

1 Interested to know the current situation of society.
2 Shows interest to participate in given social task.
3 Reliable
4 Helping nature
5 Inter personal skills
6 Ensures task is completed

Suggested additional aspects for assessing "Participation in Technical task"

1. Updated to new technologies
2. Identifies problems in society that can be solved using technology
3. Interested to participate in finding possible technical solutions to identified project
4. Reliable
5. Interpersonal skills

Suggested additional aspects for Carrying Self:

1 Stand or sit straight.
2 Keep your head level.
3 Relax your shoulders.
4 Spread your weight evenly on both legs.
5 If sitting, keep your elbows on the arms of your chair, rather than tightly against your sides.
6 Make appropriate eye contact while communicating.
7 Lower the pitch of your voice.
8 Speak more clearly.