CURRICULUM – 2018

(C-18)

DIPLOMA IN AUTOMOBILE ENGINEERING



STATE BOARD OF TECHNICAL EDUCATION & TRAINING

TELANGANA, HYDERABAD

III SEMESTER

TEACHING AND EXAMINATION SCHEME

Note: Pass criteria: The minimum marks required for passing in any of courses are given below

	Course Code	Course Name	Teaching Scheme					Examination Scheme						
			Instruction periods per week			Total Periods per semester	Credits	Continuous internal Evaluation(CIE)			Semester end examination (SEE)			
			L	T	P			Sem Mid 1	Sem Mid 2	Internal Evaluation	Max marks Min marks		Total Marks	Min marks for passing including CIE
1	18A-301F	Engineering Mathematics - III	3	1	0	60	3	20	20	20	40	14	100	35
2	18A-302C	Engineering materials and Manufacturing process	3	1	0	60	3	20	20	20	40	14	100	35
3	18A-303C	Engineering Mechanics	3	1	0	60	3	20	20	20	40	14	100	35
4	18A-304C	Automobile Power Train	3	1	0	60	3	20	20	20	40	14	100	35
5	18A-305C	Thermal Engineering-I	3	1	0	60	3	20	20	20	40	14	100	35
6	18A-306P	Machine Drawing	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18A-307P	Mechanical Machine Shop- I	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18A-308P	CAD Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18A-309P	Automobile Power Train Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
10	18A-310F	Communication and Life skills lab	1	0	2	45	1.5	20	20	20	40	20	100	50
11		**Skill Upgradation**	0	0	7	105	2.5	0	0	**Rubrics**			--	-
		TOTAL	20	5	17	630	**25**	200	200	200	400	170	1000	425
	Activities: student performance is to be assessed through Rubrics													

1. Cumulative 35% (Sem Mid-1 + Sem Mid-2+ Tutorials+ End examination) and minimum marks in end examination is 35% (i.e.14marks).
2. If the cumulative of CIE is less than 35% (i.e.21 marks out of 60) therefore more than 35% of SEE is required to get overall 35%.

APPLIED ENGINEERING MATHEMATICS

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

Pre requisites

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

Course Outcomes: COs

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

CO 1	Integrate different kinds of functions
CO 2	Integrate functions using different methods
CO 3	Find the values of definite integrals.
CO 4	Solve simple problems of Areas, Volumes.
CO 5	Find the Mean and RMS values of various functions and Approximate values of Definite integrals using Trapezoidal and Simpson's 1/3rd rule
CO 6	Form the Differential Equation and Solve Simple DEs of 1st order and 1stdegree.

Course Content:

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

Indefinite Integration-I

Integration regarded as anti-derivative – Indefinite integral of standard functions. Properties of indefinite integral. Integration by substitution or change of variable. Integrals of the form $\sin^m\theta . \cos^n\theta$. where m and n are positive integers. Integrals of tan x, cot x, sec x, cosec x and powers of tan x, sec x by substitution.

Evaluation of integrals which are reducible to the following forms:

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

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

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

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

Indefinite Integration-II

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

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

Definite Integral and its Properties:

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

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

Applications of Definite Integrals:

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

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

Mean, RMS values and Numerical Integration:

Mean values and Root Mean Square values of a function on a given interval.

Trapezoidal rule, Simpson's 1/3 rule to evaluate an approximate value of a definite integral.

Unit – VI **Duration: 18 Periods (L: 10.8 – T:7.2)**

Differential Equations of First Order:

Definition of a differential equation – order and degree of a differential equation – formation of differential equations – solution of differential equation of first order, first degree : variables -separable, homogeneous, exact, linear differential equation, Bernoulli's equation.

Reference Books:

1. Integral Calculus Vol.I, by M.Pillai and Shanti Narayan
2. Thomas' Calculus, Pearson Addison –Wesley Publishers

Suggested E-Learning references

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

2.E-books:www.mathebook.net

Suggested Learning Outcomes

Unit-I

1.0 Use Indefinite Integration to solve engineering problems

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

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

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

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

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

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

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

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

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

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

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

1.8 Evaluate the Standard Integrals of the functions of the type

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

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

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

1.9 Evaluate the integrals of the type

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

Unit-II

2.0 Use Indefinite Integration to solve engineering problems

2.1 Evaluate integrals using decomposition method.

2.2 Evaluate integrals using integration by parts with examples.

2.3 State the Bernoulli's rule for evaluating the integrals of the form $\int u.vdx$.

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

Unit-III

3.0 Understand definite integral and use it in engineering applications

3.1 State the fundamental theorem of integral calculus

3.2 Explain the concept of definite integral.

3.3 Calculate the definite integral over an interval.

3.4 State various properties of definite integrals.

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

3.6 Explain definite integral as a limit of sum by considering an area.

Unit –IV

4.0 Understand definite integral and use it in engineering applications

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

4.2 Obtain the Volumes of solids of revolution.

Unit –V

5.0 Understand Mean, RMS values and Numerical Methods

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

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

Unit –VI

6.0 Solve Differential Equations in engineering problems.

6.1 Define a Differential equation, its order and degree

6.2 Form a differential equation by eliminating arbitrary constants.

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

i. Variables Separable.

ii. Homogeneous Equations.

iii. Exact Differential Equations

iv. Linear differential equation of the form $dy/dx + Py = Q$,
where P and Q are functions of x or constants.

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

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

Suggested Student Activities

1. Student visits Library to refer Standard Books on Mathematics and collect related material

2.Quiz

3.Group discussion

4.Surprise tests

5. Seminars

6. Home Assignments

CO / PO - MAPPING

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

MID SEM-I EXAM

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

MID SEM –II EXAM

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

Semester End Examination

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

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

Code: C18-Common-301F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

BOARD DIPLOMA EXAMINATIONS

MID SEM –I, MODEL PAPER, III SEMESTER

APPLIED ENGINEERING MATHEMATICS

TIME: 1: 00 Hour Max. Marks: 20

PART-A

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

2 Each question carries **ONE** mark

1. Integrate: $e^x - \sin x + x^4$
2. Find : $\int \frac{dx}{5x+7}$ dx
3. Write Bernoulli's rule of integration
4. Find : $\int x \log x \, dx$

PART-B

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

2. Each question carries **THREE** marks

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

Or

5 b) Evaluate : $\int \frac{dx}{(x^{2+}25)}$

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

Or

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

PART C

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

2. Each question carries **FIVE** marks

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

Or

7 b) Evaluate : $\int cosx\ cos2xdx$.

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

Or

8 b) Find $\int x^4Cos2xdx$.

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Code: C18-Common-301F

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA

BOARD DIPLOMA EXAMINATIONS

MID SEM –II, MODEL PAPER, III SEMESTER

APPLIED ENGINEERING MATHEMATICS

TIME: 1: 00 Hour Max. Marks: 20

PART-A

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

2 Each question carries **ONE** mark

1. Integrate : $\int_0^1 (x^4 + 1)\, dx$
2. Evaluate : $\int_0^{\pi} Sin3x dx$
3. Evaluate : $\int_0^1 \frac{1}{1+x^2} dx$
4. Write the formula to find area bounded by the curve y= f(x) , x-axis,between the limits x=a and x =b

PART-B

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

2. Each question carries **THREE** marks

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

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

Or

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

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

Or

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

PART C

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

2. Each question carries **FIVE** marks

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

Or

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

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

Or

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

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C18-common
SUB.CODE:301F

BOARD DIPLOMA EXAMINATION,(C-18)

MODEL PAPER

III SEMESTER EXAMINATION

APPLIED ENGINEERING MATHEMATICS

Time: 2 hours [Total Marks: 40]

PART-A

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

2 Each question carries **ONE** mark

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

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

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

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

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

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

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

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

PART-B

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

2. Each question carries **THREE** marks

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

Or

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

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

Or

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

Constants.

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

Or

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

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

Or

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

PART C

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

2. Each question carries **FIVE** marks

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

Or

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

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

Or

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

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

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

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

Or

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

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

Or

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

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III SEMESTER

SKILL UPGRADATION IN - APPLIED ENGINEERING MATHEMATICS

ACTIVITY ASSESSMENT Steps

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

ACTIVITIES

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

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

3. List out Properties of definite integrals.

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

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

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

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

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

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

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

CO / PO - MAPPING OF ACTIVITIES

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	1			1	2	2	3
CO2	3	2	2	1			1	2	2	3
CO3	3	2	2	1			1	2	2	3
CO4	3	2	2	1			1	2	2	3
CO5	3	2	2	1			1	2	2	3
CO6	3	2	2	1			1	2	2	3
CO7	3	2	2	1			1	2	2	3
CO8	3	2	2	1			1	2	2	3
CO9	3	2	2	1			1	2	2	3
CO10	3	2	2	1			1	2	2	3

Rubrics for Activity assessment

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

PASS SCORE: 2.5

STUDENT ASSESSMENT by RUBRICS

S.NO	PIN	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	CO 7	CO 8	CO 9	CO 10	AVERAGE

Engineering materials & Manufacturing processes

Course Title :	**Engineering materials & Manufacturing processes**	Course Code	**18A-302C**
Semester	**III**	Course Group	**: Core**
Teaching Scheme in Periods (L:T:P)	**40:20:0**	Credits	: **3**
Methodology	**Lecture + practicals**	Total Contact Periods :	**: 60 Periods**
CIE	**60 Marks**	SEE	**: 40 Marks**

Course Content and Blue Print of Marks for SEE

Sl. No.	**Unit No.**	**Questions to be set for SEE**					**Periods**
		R			U	A	
1	Engineering Materials & Iron– Carbon System	4	1		9(a)	13(a)	10
2	Manufacture ofsteel &HeatTreatment						10
3	Ferrous &Non-Ferrous Metals and alloys		2		10(a)	14(a)	08
4	Lathe and Lathe Work						08
5	Welding		3	5, 6	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	12
6	Drilling, Shaping, Slotting & Planing Machines			7,8	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	12
Total Questions		8			8	8	60
Legend:	Remembering (R)	1 Mark					
	Understanding (U)	3 Marks					
	Application (A)	5 Marks					

Pre requisites

This course requires the basic knowledge of Engineering Physics, Engineering Mechanics, Strength of Materials, Machine drawing and Workshop Technology.

Course Outcomes

On successful completion of the course student should be able to:

CO1 :	Explain the properties, importance of engineering materials and their engineering applications.
CO2 :	Demonstrate the various methods of manufacturing of Iron, Steel and their alloys and modify the properties of steel by appropriate heat treatment methods for a given engineering application.
CO3 :	Select a suitable ferrous and non-ferrous materials based on composition and properties for industrial applications.
CO4 :	Understand the impact of various materials on the environment and methods adapted for minimizing the degradation of environment.
CO5 :	Demonstrate the various types of welding processes and recent developments in welding techniques for industrial applications.
CO6 :	Perform various machining operations using different machine tools as per industrial requirements.

Course Content:

UNIT- 1: Engineering Materials & Iron– Carbon System:

Duration: 10 periods (L: 6.8 – T:3.2)

Introduction– Classification of engineering materials-Importance of materials in modern Technology-Mechanical properties – Tensile strength, Compressive strength, Stiffness, Elasticity, Brittleness,Ductility,Malleability,Hardness,Toughness,Fatigueresistance, Creep, Impact strength – brief explanation of the above terms with examples.

Types of testing – Destructive and non-destructive- testing methods to determine tensile strength, compressive strength(by using UTM)-impact strength(Charpy and Izod tests)-Hardness(Brinell, Rockwell and Vicker's hardness tests)-Fatigue strength – equipment and procedure for testing-Formulae-Calculations–Importance of non–destructivetests–Visual inspection-Penetrant test-Magnetic particles test–Radiography(X-ray and Gamma ray)test–Ultrasonic test–Sparkstream test-identification of metals-use of these tests inindustry.

Spacelattice-Unitcell-three maintypesof metallicspacelatticeslikeBCC, FCCandHCP–CoolingcurveforpureIron–Allotropicformsofpureiron – Iron–Carbon equilibrium diagram.

UNIT-2: Manufacture of Steel &Heat Treatment Duration: 10 periods (L: 7.6 – T:2.4)

Introduction-Manufacture of Cast iron – Cupola Furnace -manufacture of steel – Open hearth furnace – Bessemer converter – L.D. process –Electric arc furnace and Electric Induction furnace.

Need of Heat Treatment–stages of heat treatment-purpose of Heat Treatment –Description of different heat treatment processes–Annealing ,types –Normalising –Hardening, types-Tempering, types –Case hardening and Nitriding - Carburizing–Application of these heat treatment processes.

UNIT-3: Ferrous &Non- Ferrous Metals and alloys Duration: 08 periods (L: 4.8 – T: 3.2)

Classification of Ferrous metals–types of Cast Iron-White, Grey, Modular, Malleable and alloy Cast Iron- Types of plain Carbon steels– Low, Medium, High carbon steels and their alloys–Special alloy steelssuchasStainlessSteelandHighspeedsteel,theircomposition,properties and uses.

Need for the use of Non – Ferrous metals and their alloys in engineering applications –composition-properties and uses of Copper, Aluminium- Tin-Zinc-Lead-Nickel- Magnesium and their alloys–their Industrial applications.

UNIT-4: Lathe and Lathe Work Duration: 08 periods (L: 4.8 – T: 3.2)

Functions –Types of Lathes – Engine Lathe -Lathe construction – Functions of each part – Lathe specifications – Work holding Devices – Tool holding Devices- Lathe operations: Cylindrical Turning – Taper turning –Methods of Taper turning- Taper turning by Tailstockset over Method- Thread cutting – Knurling – Facing – Parting off – Drilling- Boring- Reaming on Lathe.

Capstan and Turret lathe -Constructional details and working principles - comparison between Capstan and Turret lathe -Turret mechanism - Work and Tool holding devices.

UNIT-5: Welding Duration: 12 periods (L: 8.4 – T: 3.6)

Introduction – Types of welding – Pressure welding and Non-pressure welding- Principle of Electric Arc welding – Metal Arc- Atomic Hydrogen welding – TIG and MIG welding – Submerged Arc welding-Welding rods-types-specifications- principle of Resistance welding – Spot, Seam and Butt welding.

Oxy-acetylene gas welding –Gas welding Equipment-Types of Oxy-acetylene gas flames and their uses – Techniques of gas welding - Gas cutting (oxygen and oxygen Lance cutting) – Thermit welding-Robotic welding-recent developments in welding techniques.

UNIT-6: Drilling, Shaping, Slotting &Planing Machines :

Duration: 12 periods (L: 7.2 – T: 4.8)

Function-Types of Drilling machines- Sensitive drilling machine- Radial drilling machine-Description of these machines parts and their functions- specifications - Tool holding devices and Work holding devices-Machining operations: Reaming-Boring-Counter boring- Counter sinking-Tapping-Spot facing.
Shaper-Work holding Devices – Quick return motion arrangement– Crank and slotted lever method- Whit worth method– Automatic feed mechanism-Shaper specifications.

Slotting machine – general use of a Slotter – Slotter parts and their functions –Tool and Work holding devices – Quick return motion arrangement – Slotter specifications.

Planing machine – general use of Planer – Planer parts and their functions – Tool and working holding devices – table drive and feeds – Planer specifications - comparison of Shaper, Planer and Slotter.

Recommended Books :

1.	Engineering Material and Manufacturing Processes Volume I & II	by HazraChowdhary
2.	A course in workshop Technology vol.I & II	by Raghuvamsi
3.	Engineering Materials	by R.S. Deshpande
4.	Production Technology	by R.B. Gupta
5.	Engineering Material and Manufacturing Processes	by V.N. Kumar
6.	Engineering Materials	byRay&Chowdhary
7.	Elements of Workshop Technology Volume I& II	by HazraChowdhary

Suggested Learning Outcomes:

Upon completion of the course, the student shall able to

1.0 Engineering Materials & Iron– Carbon System

1.1 Explain the importance of Engineering materials and their applications.

1.2 Identify the Tensile strength, Compressive strength, Stiffness, Elasticity and Plasticity.

1.3 Define the terms Ductility, Malleability, Hardness, Brittleness, Toughness, Impact strength, Fatigue resistance and Creep.

1.4 Identify the various properties of materials in engineering applications.

1.5 Describe the tests to measure impact strength, Hardness, Fatigue and creep resistance.

1.6 Know the different Destructive and Non-destructive tests.

1.7 Write the difference between Destructive and Non-destructive tests.

1.8 Demonstrate the different destructive tests like Tensile test and Compression tests by using Universal Testing Machine (UTM).

1.9 Demonstrate the impact strength of a given specimen by using Charpy and Izod testing apparatus.

1.10 Demonstrate and calculate the Hardness number of a given specimen by using Brinell, Rockwell and Vickers hardness testing apparatus.

1.11 Describe the different non-destructive tests like Visual inspection, Penentrant test, Magnetic particles test, Radiography (X-ray and Gamma ray) test, Ultrasonictest and Spark stream test.

Iron– Carbon System:

1.12 Illustrate the Space lattice and Unit cell.

1.13 Describe the Cooling curves of pure Iron.

1.14 Explainthe Allotropic forms of pure iron with temperature and their Crystal Structures.

1.15 Analyse and draw Iron–Carbon equilibrium diagram.

2.0Manufacture of steel &Heat Treatment

2.1 Identify the Iron ore materials.

2.2 Understand the various manufacturing methods of Iron and steel.

2.3 Describe the sequence of operations involved in the manufacturing cast iron in cupola furnace.

2.4 Identify the sequence of steps to be followed in the manufacture of steel by Bessemer converter, Open-hearth process, L.D. process, Electric arc furnace and Electric induction furnace.

Heat Treatment:

2.5 Identify the sequence of operations involved in Heat Treatment process.

2.6 Describe various heat treatment methods such as Annealing, Normalizing, Hardening, Tempering, Casehardening, Nitriding and Carburizing.

2.7 Identify the changes in Mechanical properties of materials by using heat treatment

2.8 Understand the appropriate heat treatment methods for a given application.

3.0 Ferrous &Non- Ferrous Metals and alloys

3.1 Understand the properties of ferrous metals and their alloys.

3.2 Know the importance of alloying steels with other elements.

3.3 Identify the composition, properties and Industrial applications of alloy steels.

3.4 Choose the proper alloy steel for a particular engineering application.

3.5 List the advantages and disadvantages of Ferrous metals and their alloys.

Non-ferrous metals and their alloys

3.6 Identify thecomposition,propertiesandindustrialapplicationsofnon-ferrousmetals.

3.7 Identify the proper non-ferrous alloys for given engineering applications.

3.8 List the advantages and disadvantages of Non-ferrous metals and their alloys.

4.0 Lathe and Lathe Work

4.1 Explain the constructional details and working principle of Lathe.
4.2 Describe the classification of lathe, different parts of lathe and their functions.
4.3 Explain the steps to be followed for various Lathe operations.
4.4 Understand the various methods of Taper turning.
4.5 Describe the working principle of Turret and Capstan lathes.
4.6 State the specifications of Turret and Capstan lathes.
4.7 Compare the Turret and Capstan lathes.
4.8 Identify the Tool holding and Work holding devices of Lathe machine.

5.0 Welding

5.1 State the principle of joining metals by Fusion welding.
5.2 Describe the working principle of Arc welding process.
5.3 Recognize the equipment used in Arc welding and their functions.
5.4 Explain the principle of Gas welding and know the procedure of gas welding.
5.5 Recognize the equipment used in Gas welding and their functions.
5.6 Identify the types of flames used in Gas welding and their applications.
5.7 Know the limitations of Gas and Arc welding processes.
5.8 Know the Oxy-acetylene cutting equipment and selecting the type of nozzle for gas cutting.
5.9 Describe Shielded arc welding, Inert gas welding-TIG welding, MIG welding and Atomic Hydrogen welding processes.
5.10 Understand the principle of Electric resistance welding and its types, Spot welding, Seam welding, Butt welding.
5.11 Recognize the Robotic welding and recent developments in welding techniques.

6.0 Drilling, Shaping, Slotting & Planning Machines

6.1 State the working principle of a Drilling machine
6.2 Identify the parts and their functions of Sensitive drilling machine and Radial drilling machines.
6.3 Describe the different operations such as Drilling, Reaming, Boring that can be done on a drilling machine.
6.4 Know the specifications of Drilling machine.
6.5 Identify the various Tool holding and Work holding tools of Drilling machine.
6.6 Differentiate the Drilling, Reaming and Boring.
6.7 Describe the working principle of Shaping, Slotting and Planing machine.
6.8 Identify the parts of Shaping, Slotting and Planing machines and their functions.
6.9 Know the sequence of operations involved for machining a given job on Shaping, Slotting and Planing machines.
6.10 Identify the various Tool holding and Work holding tools Shaping, Slotting and Planning machines.

6.11 Know the specifications of Shaping, Slotting and Planing machines for procurement..
6.12 Understand the Crank and slotted lever and Whit worth quick return mechanisms of Shaper.
6.13 Understand the Quick return motion arrangement of Slotter.
6.14 Compare the Shaping, Slotting and Planning machines.

Suggested Student Activities:

1. Student visits Library to refer to manual of Engineering Materials to find their properties.
2. Student inspects the available equipment in the Laboratory to identify the components.
3. The students can visit nearby workshops/Industries and collect information like which type of materials are used for particular purpose and their mechanical properties, design features of various machine components.
4. The students can visit nearby workshops/Industries and collect information about different types of welding processes and welding techniques used for different materials according to their properties and observe the recent developments.
5. The students can visit nearby workshops/Industries and collect information about various manufacturing processes by using different machine tools and observe their spefications.
6. The student should Download and present various presentations related to design of Machine elements.
7. The student should prepare the different products as mini-project.

Suggested E-Learning references

1. www.learnengineering.org
2. www.sae.org
3. www.nptel.ac.in

CO PO Mapping Matrix

Upon completion of the course the student shall able to

Course Outcome		**CL**	**Linked POs**
CO1	Explain the properties, importance of engineering materials and their engineering applications.	R/U/A	2,5,6,7
CO2	Demonstrate the various method of manufacturing of Iron, Steel and their alloys and modify the properties of steel by appropriate heat treatment methods for a given engineering application.	R/U/A	2,3,4,6,10

CO3	Select a suitable ferrous and non-ferrous materials based on composition and properties for industrial applications.	R/U/A	2,3,5,6,7
CO4	Understand the impact of various materials on the environment and methods adapted for minimizing the degradation of environment.	U/A	2,3,5,6,8
CO5	Demonstrate the various types of welding processes and recent developments in welding techniques for industrial applications.	R/U/A	2,3,4,8,10
CO6	Perform various machining operations using different machine tools as per industrial requirements.	R/U/A	2,3,4,8,10

Skill up gradation:

1. Student should observe the materials used for automobile components and prepare a chart with their properties.
2. Students has to present a seminar on ferrous and non ferrous materials and their alloys available in daily usage.
3. Observe and prepare the chart or seminar of different microstructures of given engineering materials by using microscope.
4. Students should visit the nearby workshops and observe the different types of lathes used for different applications and submit the article.
5. Students should identify the different welding procedures for different materials and prepare a chart.

Mid Semester Examination Blueprint of Questions and Marks:

	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	

(Model Question Paper)

Mid Sem -I

Subject Name: **Engineering materials & Manufacturing processes**

Subject Code: 18A-**302C**

Time : 1:00 hour **Max Marks : 20**

PART – A

Remembering type questions

Answer all Questions. Each question carries 1marks **4 X 1M = 04 marks**

1) Define the term 'Elasticity'.
2) Draw a neat sketch of 'Unit cell'.
3) List any four Iron ore materials.
4) Write any four uses of heat treatment processes.

PART – B

Understanding type questions

Answer any two Questions. Each question carries 3 marks **2 X 3M = 06 Marks**

5. a) Interpret the difference between Tensile strength and Compressive strength.

(OR)

b) Illustratethe Allotropic forms of pure iron with diagram.

6. a) Write the difference between Cast iron and Steel?

(OR)

b) State the significance of Case hardening in engineering practice.

PART – C

Application type questions

Answer any two Questions. Each question carries 5 marks **5 X 2M = 10 Marks**

7. a) Write the procedure of tensile test by using Universal Testing Machine (UTM) for a given Mild Steel specimen.

(OR)

b) Illustrate the Iron-Carbon equilibrium diagram with neat sketch and mark the salient points.

8. a) Explainthe manufacturing procedure of Cast Iron in Cupola furnace with neat sketch.

(OR)

b) What is Annealing Process? Write any four advantages of Annealing Process.

(Model Question Paper)

Mid Sem-II

Subject Name: **Engineering materials & Manufacturing processes**

Subject Code: **18A-302C**

Time : 1:00 hour **Max Marks : 20**

PART – A

Remembering type questions

Answer all Questions. Each question carries 1 marks **4 X 1M = 04 marks**

1. Define the term 'Ferrous metal'?
2. List any four properties of Aluminum.
3. What is the function 'Chuck' in Lathe?
4. List any four work holding and tool holding tools in Lathe.

PART – B

Understanding type questions

Answer any two Questions. Each question carries 3 marks **2 X 3M = 06 Marks**

5. a) State the composition of High Speed Steel.

   (OR)

   b) Write any four engineering applications of Non-Ferrous metals with examples.

6. a) List any three specifications of Lathe.

   (OR)

   b) Draw a neat sketch of Tail stock in Lathe and label the parts.

PART – C

Application type questions

Answer any two Questions. Each question carries 5 marks **5 X 2M = 10 Marks**

7. a) Explain about different plain carbons steels according to their carbon content.

   (OR)

   b) Explain the different Industrial applications of Copper and write its properties, advantages and disadvantages.

8. a) Draw a line diagram of Engine lathe, show its main parts and explain the functions of each part.

   (OR)

   b) Explain about Capstan Lathe with neat sketch.

(Model Question Paper)
Semester End examination (SEE)

Subject Name: **Engineering materials & Manufacturing processes**
Subject Code: **18A-302C**

Time : 2 hours **Max Marks : 40**

PART-A

Remembering type questions

Answer all Questions. Each question carries 2 marks 8 x 1M = 08 Marks

1. Define the term 'Ductility'.
2. What is 'Non-ferrous metal'?
3. State the function of Drill bit.
4. Define the term 'Space lattice'.
5. What is Pressure welding?
6. List any four safety precautions should be followed while welding.
7. Write any two specifications Shaper.
8. State the function of Planer.

PART-B

Understanding type questions

Answer any four Questions. Each question carries 3 marks 4 x 3M = 12 Marks

9. a) What is the difference between Hardness and Toughness?

(OR)

b) State the working principle Butt welding.

10. a) What is the function of 'Head stock' in lathe machine.

(OR)

b) Write any three specifications Shaper.

11. a) Explain about the different types of flames in Oxy-acetylene gas welding with diagrams.

(OR)

b) What are the different types of gas welding techniques?

12. a) Write any three specifications of Planer.

(OR)

b) List any six Drilling operations.

PART-C

Application type questions

Answer any four Questions. Each question carries 10 marks 4 x 5M = 20 Marks

13. a) Describe the process of Steel making by Bessemer converter with neat sketch.

(OR)

b) Explain about the Spot welding process with neat sketch.

14. a) Draw a line diagram of Engine lathe, show its main parts and explain the function of each part.

(OR)

b) Describe the quick return mechanism of Shaper.

15. a) Explain the working of TIG welding with neat sketch and write its applications.

(OR)

b) Explain the working of Electric Arc welding. List out the equipment used in Arc welding and explain their functions.

16. a) Describe the construction and working of Shaper with line diagram.

(OR)

b) Draw a line diagram of Slotter, name the parts and explain its working.

Engineering Mechanics.

Course Title :	**Engineering Mechanics**	Course Code	**18A-303C**
Semester	**III**	Course Group	**: Core**
Teaching Scheme in Periods (L:T:P)	**40:20:0**	Credits	: **3**
Methodology	**Lecture + Tutorials**	Total Contact Periods	**:60 periods**
CIE	**20+20+20=60 Marks**	SEE	**: 40 Marks**

Course Content and Blue Print of Questions for SEE
Semester End Examination

Unit No	Unit Name	Questions to be set for SEE				Periods
		R		U	A	
1	Statics	4	1	9(a)	13(a)	09
2	Friction					09
3	Dynamics		2	10(a)	14(a)	10
4	Basic Link Mechanisms					08
5	Simple machines		3 (5, 6)	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	10
6	Transmission of power		3 (7,8)	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	14
	Total Questions	8		8	8	60

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

Pre requisites

This course requires the basic knowledge of Basic Physics and Mathematics at Secondary school level

Course Outcomes

On successful completion of the course student should be able to

CO1 :	Determine magnitude and direction of the resultant for a given system forces.
CO2 :	Calculate the effect of friction on horizontal and inclined planes.
CO3 :	Summarize different types of motions.
CO4 :	Form various mechanisms required for different machines and Construct various simple machines
CO5 :	Acquire the knowledge on contemporary issues in the field of Special purpose vehicles
CO6 :	Comprehend the transmission power through different media.

COURSE CONTENT:

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UNIT 1: Statics **Duration: 09 periods (L: 7 – T:2)**

Meaning of word Mechanics-Application of mechanics to engineering-System of Units-Definition and specifications of force-Classification of forces-System of forces and classification of system of forces-Composition and resolution of a forces-Statement of Parallelogram law of forces and its formulae (No derivation)-Method of Resolution of forces-Lami's theorem and its formulae (No derivation)-Numerical problems related to coplanar concurrent forces on above cases-Equilibrium and Equilibrant-Condition for equilibrium of a rigid body subjected to number of coplanar concurrent forces-Related Numerical problems.

UNIT 2: Friction **Duration: 09 periods (L: 7– T:2)**

Define static, dynamic and impending friction-Define coefficient of friction-Laws of dry and fluid friction-Derivation of limiting angle of friction and angle of repose-Resolution of Forces considering Friction when a body moves on horizontal plane-Resolution of Forces considering Friction when a body moves on inclined plane-Numerical examples on the above cases.

UNIT 3: Dynamics **Duration: 10 periods (L: 7 – T:3)**

Definition of Kinematics and Kinetics-Classification of motion-Definition of displacement, velocity and acceleration-Equations of motion (without derivation)-Solving the problems related to the rectilinear motion of a Particle-Newton's laws of motion-Law of conservation of momentum; Impulse–momentum equation; Solving the kinetic problems using the above principles-Rotary motion of particle-Simple harmonic motion.

UNIT 4: Basic Link Mechanisms **Duration: 8 periods (L: 6 – T:2)**

Definition of the terms: link, kinematic pair, kinematic chain, Mechanism, structure-Classification of Kinematic pairs-Condition to form a kinematic chain-Quadric cycle chain and its inversions-Slider Crank chain and its inversions.

UNIT 5: Simple machines **Duration: 10 periods (L: 7 – T:3)**

Definition of Simple machine-Uses of simple machines like levers and inclined plane-Define fundamental terms like mechanical advantage, velocity ratio and efficiency-Expressions for VR in case of Simple pulley, Differential pulley, System of pulleys, Wheel and axle, Differential wheel and axle, Worm and Worm wheel, Rack and pinion, Winch crabs, & Screw jack-Conditions for reversibility and self locking-Law of Machine-Effort lost in friction, Load equivalent of Friction- Max. M.A. and Max. Efficiency.

UNIT 6 : Transmission of power **Duration: 14 periods (L: 10 – T:4)**

Belt drive-Materials for the belt drive and belt fasteners- Explanation of the terms-Velocity ratio in terms of diameters of pulleys- Slip, percentage of slip and its effect on velocity ratio-Thickness of belt and its effect on velocity ratio-Tight side and slack side of the belt-Open belt and cross belt drive-Effective tension ($T_1 – T_2$)-Velocity of the belt and Power transmitted by belt - Problems on –Velocity ratio, slip, length of the belt and power transmitted in a belt drive.

Rope drive – Advantages and limitations over a belt drive.

Chain drive – Advantages and limitations over a belt drive; Types of chains.

Gears and Gear trains-Nomenclature of gear-Types of gears – spur, helical, bevel, and spiral. Simple and compound gear trains- Velocity ratio in gear drives and problems-Advantages and limitations of gear drive over a belt drive.

Recommended Books

1	Basic Mechanical Engineering	by	V.N Kumar
2	Elements of Mechanical engineering	by	Roy & Choudary
3	Engineering Mechanics	by	Singer B.S.Publications
4	Engineering Mechanics	by	Basudeb Bhattacharya – Oxford Publishers
5	Engineering Mechanics	by	A Nelson Mc Graw Hill Publishers

6	Engineering Mechanics	by	I.B.Prasad	
7	Engineering Mechanics	by	R.S.Khurmi	S.Chand & Comp
8	Theory of Machines	by	S.S.Rathan	TMH P
9	Theory of Machines	by	R.S. Khurmi	
10	Theory of Mechanisms and Machines	by	Malik & Ghoshe	

Suggested Learning Outcomes:

1.0 Understand the concept of Statics

1.1 Explain the meaning of mechanics in engineering.
1.2 State the importance of mechanics in engineering.
1.3 Review the system of units used.
1.4 Explain the concept of force.
1.5 List the types of forces.
1.6 Explain the system forces
a) Co-planar and Non-Coplanar,
b) Parallel and Non-Parallel,
c) Like and Un like,
d) Concurrent and Non-concurrent
1.7 Explain the concept of equilibrium.
1.8 State the parallelogram law of forces.
1.9 State the Lami's theorem.
1.10 Solve the problems involving concurrent coplanar forces.
1.11 Solve simple problems using Lami's theorem.
1.12 State the condition of equilibrium of a body acted upon by co-planar forces.

2.0 Understand the concept of Friction

2.1 Explain the concept of friction
2.2 State the laws of friction
2.3 Identify the machine members in which friction exists and desirable
2.4 Resolve the forces acting on bodies moving on horizontal plane.
2.5 Resolve the forces acting on bodies moving along the inclined planes.
2.6 Solve the related numerical problems

3.0 Understand the concept of Dynamics

3.1 Define the terms Kinematics and Kinetics
3.2 Classify the motion types
3.3 Define the terms displacement, velocity and acceleration
3.4 State the Newton's Laws of motion (without derivation)
3.5 Solve the problems related to the rectilinear motion of a particle
3.6 Define the Law of conservation of momentum
3.7 Explain the Impulse –momentum equation
3.8 Solve the problems using the above principles
3.9 Explain the Rotary motion of particle
3.10 Describe simple harmonic motion.
3.11 Explain the application of simple harmonic motion in engineering.

4.0 Understand the concept of Basic Link mechanism

4.1 Define important terms of Basic link mechanism
a) Link, b) kinematics pair, c) Kinematic chain, d) Mechanism & machine
4.2 Explain kinematic pair and kinematic chain with the help of legible sketch
4.3 List examples for Lower and Higher pairs.
4.4 List examples for inversion of quadric cycle chain and slider crank chain.

5.0 Comprehend the Principles involved in Simple Machines

5.1 Define the important terms of simple machines
a) Machine, b) Mechanical Advantage, c) Velocity Ratio, d) Efficiency.
5.2 Illustrate the use of three classes of simple lever.
5.3 Show that an inclined plane is a simple machine to reduce the effort in lifting loads.
5.4 Derive expression for VR in cases of wheel & axle, Weston Differential pulley blocks, pulleys, Worm & Worm wheel ,single and double purchase winch crabs, screw jack, rack & pinion.
5.5 Compute the efficiency of a given machine.
5.6 Compute effort required to raise or lower the load under given conditions.
5.7 Interpret the law of machine.
5.8 State the conditions for self-locking and reversibility.
5.9 Calculate effort lost in friction and load equivalent of friction.
5.10 Evaluate the conditions for maximum M.A.& Maximum efficiency.

6.0 Understand the concept of transmission of power in Engineering.

6.1 Identify various power transmitting drives like belt, Chain, rope, gears.
6.2 Select suitable material for belt.
6.3 Explain the belt fasteners
6.4 Derive the expression for velocity ratio for a belt drive.
6.5 Explain the term slip in belt and its effect on velocity ratio.
6.6 Explain the combined effect of belt thickness and slip on velocity ratio.
6.7 Explain the use of jockey pulley.
6.8 Distinguish between open belt drive and cross belt drive.
6.9 Explain the tensions in tight and slack sides of a belt.
6.10 Calculate velocity ratio and power in belt drive.
6.11 Explain the rope drive state the advantages and limitations.
6.12 Explain the chain drive state the advantages and limitations.
6.13 Explain the types of chain.
6.14 Explain the principle of gear drive state the advantages and limitations.
6.15 Classify the gears.
6.16 Explain Nomenclature of gear
6.17 Discuss the simple and compound gear train.
6.18 Explain the applications of the above drives in engineering.

Suggested students activity:

1. Students visits library to refer various reference books
2. Students visits nearby industries to familiarize with machines and devices.
3. Quiz
4. Group discussion
5. Surprise test
6. Write the mechanisms which you are using in your day to day life. Sketch any three forms of mechanisms. Study and submit handwritten report of 500 words.
7. Take a photo of a actual kinematic mechanism used in an automobile, study and submit handwritten report of 500 words.
8. Analyse the effect of friction in real situation and submit handwritten report of 500 words.
9. List the mechanism used in a typical car. study and submit handwritten report of 500words.
10. Identify and name different simple machines used in day to day life. study and submit hand written report of 500 words.
11. Identify the types of belts, gears and gear trains used in different automobiles and also the type of chains in automobile and bicycle. Study and submit handwritten report of 500 words.
12. Visit the market/industry and collect the data of items which are used in any mechanisms. Data includes specifications, cost, applications, etc. Also name the mechanism/s in which such item/s is/are use. Study and submit handwritten report of 500 words.

Suggested E-Learning references

1. www.learnengineering.org
2. www.sae.org
3. www.nptel.ac.in
4. http://nptel.iitm.ac.in/video.php?subjectId=112104121
5. http://www.technologystudent.com/gears1/gears7.htm
6. http://kmoddl.library.cornell.edu/model.php?m=20http://www3.ul.ie/~kirwanp/whatisacamandfollowersyste.htm

7. http://nptel.iitm.ac.in/courses/Webcourse-contents/IITDelhi/Kinematics%20of%20Machine/index.htm
8. http://elearning.vtu.ac.in/12/enotes/Des_Mac-Ele2/Unit6-RK.pdf
9. www.tecquipment.com/Theory_of_Machines.aspx
10. www.researchgate.net/.../0094-114X_Mechanism_and_Machine_Theory
11. www.journals.elsevier.com/mechanism-and-machine-theory/
12. www.iftomm.org/
13. www.wiziq.com/online-tests/44047-mechanical-theory-of-machine
14. www.cs.ubc.ca/~murphyk/Teaching/CS340-Fall07/infoTheory.pdf

CO- PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	Determine magnitude and direction of the resultant for a given system forces.	R/U/A	1,2,3	9
CO2	Calculate the effect of friction on horizontal and inclined planes.	R/U	1,2,3	9
CO3	Summarize different types of motions.	U/A	1,2,3	10
CO4	Form various mechanisms required for different machines and Construct various simple machines	U/A	1,2,3	8
CO5	Acquire the knowledge on contemporary issues in the field of Special purpose vehicles	R/U	1,2,3,10	10
CO6	Comprehend the transmission power through different media.	R/U	1,2,3	14

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

Mid Semester Examination Blueprint of Questions and Marks:

MID SEM-I EXAM Max.Marks: 20

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 Max.Marks: 20

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	

R-Remembering, U-Understanding, A- Application type questions each carrying 1, 3 and 5 Marks respectively.

State Board of Technical Education and Training, Telangana, Hyderabad
C-18, THIRD SEMESTER
18A-303C - Engineering Mechanics
Mid Sem-I

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

PART – A

Answer **ALL** questions and each question carries **ONE** mark. Marks: 4 X 1M = 4M
and answer should not exceed ¼ page.

1. Define system forces?
2. State the term equilibrium?
3. Define coefficient of friction?
4. State any two laws of dry friction?

PART – B

Answer the following. **E**ach question carries **Three** marks Marks:2 X 3M= 6 M
and answer should not exceed 1 page.

5. a). State the condition of equilibrium of a body acted upon by co-planar forces?

OR

b). State the Lami's theorem ?

6. a) List two names of the machine members in which friction desirable and why it is required?

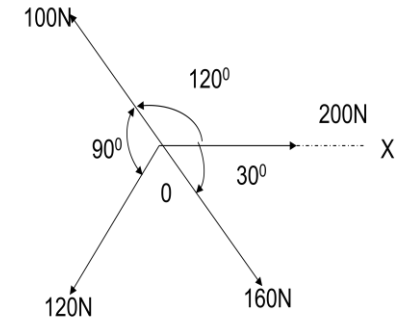
OR

b) Derive formula for limiting angle of friction?

PART – C

Answer the following. **E**ach question carries **five** marks Marks: 2 X 5M = 10 M
and answer should not exceed 2 pages.

7. a). Determine the magnitude of the equilibrant of the forces show in fig. below. State the angle made by it OX axis.



OR

b). Two forces 30 N and 40 N act at a point with angle of 30° between them find the magnitude and direction of the resultant.

8. a) A body weighing 250 N is laying on a rough horizontal plane. A horizontal effort of 50 N is required to cause the body to slide. Determine.

(i) Limiting force of friction. (ii) Co-efficient of friction.

OR

b). A body of weight 735 N rests on rough inclined plane. The plane is inclined at an angle 30^0 with the horizontal and the angle of friction between the body and the plane is 15. Find the horizontal force required to hold the body from sliding down the plane.

State Board of Technical Education and Training, Telangana, Hyderabad
C-18, THIRD SEMESTER
18A-303C - Engineering Mechanics
Mid Sem-II

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

PART – A

Answer **ALL** questions and each question carries **ONE** mark. Marks: 4 X 1M = 4M
and answer should not exceed ¼ page.

1. Define the term velocity?
2. State the Newton's III rd Laws of motion?
3. Define the term link?
4. List the names of any two links?

PART – B

Answer the following. **E**ach question carries **Three** marks Marks: 2 X 3M= 6 M
and answer should not exceed 1 page.

5. a). Describe simple harmonic motion?

OR

b). Define the Law of conservation of momentum?

6. a) Define lower pair and any write two examples of it?

OR

b) Differentiate between machine mechanism?

PART – C

Answer the following. **E**ach question carries **five** marks Marks: 2 X 5M = 10 M
and answer should not exceed 2 pages.

7. a) State the Newton's I st and II nd Law of motion?

OR

b) State Law of conservation of momentum?

8. a) Explain the inversions of Quadric cycle chain with a neat sketch?

OR

b) Explain kinematic pair and kinematic chain?

SEMESTER END EXAMINATION
MODEL QUESTION PAPER
C-18, DIPLOMA IN AUTOMOBILE ENGINEERING
Subject Name: Engineering Mechanics
Subject Code: 18A-303C

Time: 2hrs **Max Marks: 40**

PART-A

Answer all Questions. Each question carries 2 marks **8 x 1 = 8 marks**

1. List any two types of forces and state units of force in SI system?
2. Define the term Kinematics?
3. What are advantages of Rope drives?
4. List any one type of lever with giving practical example?
5. Define terms mechanical advantage?
6. State the condition for reversibility of a simple machine?
7. Name the materials used for belts?
8. Write the use of jockey pulley?

PART-B

Answer any FOUR questions choosing either (a) or (b) from each question. **4 x 3 = 12 Marks**

9. (a) Write any three Laws of dry friction.

Or

9. (b) Dra**w** the sketch of a differential wheel and axle and label the parts?
10. (a) State the Newton's Ist Law of motion?

Or

10. (b) Distinguish between open belt drive and cross belt drive?

11. (a) Write the expression for Velocity ratio of Single purchase crab winch with notations?

Or

11. (b) In a simple lifting machine an effort of 250 N is required to lift a load of 3150 N. The velocity ratio of the machine is 14. Determine frictional effort?
12. (a) State the advantages gear drive over a belt drive?

Or

12. (b) Define the terms addendum and dedendum of a gear wheel?

PART-C

Answer any FOUR questions by choosing either (a) or (b) from each question. 4 x 5 = 20 Marks

13. (a) Find effort required to move a load of 686 N on rough horizontal plane. The co-efficient of friction between the contact surfaces is 0.25 .The effort is applied at an angle 20^0 with the horizontal?

(Or)

13. (b) In a Double purchase winch crab, the number of teeth on spur wheels is 80 and 100 and that on pinions are 30 and 40. The length of handle is 1.5 m and the radius of drum is 0.4 m. Determine the effort to be applied to lift a load of 5800N if the efficiency of the machine is 65%?

14. (a) Explain the Law of conservation of momentum?

Or

14. (b) A shaft is running at 150 rpm carries a pulley of 1250mm diameter, which drives another shaft at 1200 rpm by means of a belt 5mm thick. Determine the diameter of the pulley on driven shaft?

15. (a) In a simple wheel and axle, the diameter of effort wheel is 275 mm and that of axle is 80mm. Determine the effort required to lift a load of 8000 N if the efficiency of the machine is 65%?

Or

15. (b) An effort of 200 N lifts a load of 1500 N and an effort of 300 N lifts a load of 2800N on a simple machine. Establish the law of the machine. Determine

a) Load to be lifted by an effort of 500N
b) Effort required to lift a load of 5 KN.
c) Max. Efficiency if V.R is 20.
d) Frictional effort.

16. (a) A driving pulley of 1.5 m diameter runs at 200r.p.m. The tensions in the tight and slack sides of the belt are 750 N and 400 N respectively. Find the power transmitted by belt.

Or

16. (b) The number of teeth on driver ‘A’ and driven ‘D’ gears are14 and 45 respectively. The number teeth on the intermediate compound gears ‘B’ and ‘C’ are 70 and 15 respectively. If the speed of the driver shaft is 750 RPM. Find (i) V.R of gear train and (ii) Speed of driven shaft?

Automobile Power Train

Course Title :	**Automobile Power Train**	Course Code	**18A-304C**
Semester	**III**	Course Group	**:Core**
Teaching Scheme in Periods (L:T:P)	**40:20:0**	Credits	: **3**
Methodology	**Lecture + Practicals**	Total Contact Periods :	**:60 Periods**
CIE	**60 Marks**	SEE	**: 40 Marks**

	Semester End Examination					
S.No	**Unit Name**	**Questions to be set for SEE**				**Periods**
		R		U	A	
1	Combustion and Combustion Chambers	4	1	9(a)	13(a)	12
2	Fuel Supply System					12
3	Transmission		2	10(a)	14(a)	12
4	Propeller shaft and Differential					08
5	Wheels and Tyres		3 5, 6	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	08
6	Front axle &Rear axle		7,8	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	08
Total Questions		8		8	8	60 Periods

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

Pre requisites

This course requires the basic knowledge of Basic Automobile Engineering at II semester level

Course Outcomes

At the end of the course the student should be **:**

CO1 :	Describe the construction of S.I and C.I engine combustion chambers.
CO2 :	Identify the fuel system components.
CO3 :	Describe various types of gear box for power transmission.
CO4 :	Determine the air-fuel ratios and combustion limits.
CO5 :	Procure knowledge on contemporary issues.
CO6 :	Make presentation on assigned topics related to Automobile Power Train.

Course Content:

1.Combustion and Combustion chambers: Duration: Periods 12 (L:7.2 T:4.8)

Combustion in I.C Engines – Stages of Combustion in S.I Engines – Phenomenon of Detonation and Pre Ignition - Stages of Combustion in C.I Engines - Diesel Knock – Factors influencing abnormal combustion in S.I Engines - Factors influencing abnormal combustion in C.I Engines – Requirements of S.I. and C.I. Engine combustion chambers - Types of S.I and C.I. engine combustion chambers – S.I. Engine Combustion chambers – Ricardo turbulent, Bath tub, Wedge head, Spheroidal and Hemispherical. C.I Engine Combustion chambers - Direct injection type, pre-combustion chambers and Turbulence chambers and types – Air cell combustion chamber - Relative advantages and disadvantages.

2.Fuel Supply System : Duration : Periods 12(L:7.8 T:4.2)

Various types of Carburetor circuits –Types of carburetors: Construction and working of S.U Carburetor, Solex Carburetor. Petrol injection – Types of Petrol injection systems – Classification of Petrol injection - Working principle of supercharger, inter cooler and turbocharger.
Line diagram of Diesel engine fuel system–Types of diesel fuel feed pumps- Types of Diesel filter – primary and secondary filters - Requirements of fuel injection system – types of fuel injection systems – air injection and solid injection systems – common rail system, unit injection system, individual pump systems- distributor type pump system – CRDI system - Injectors- Types of injectors – Constructional details and working of fuel injection pump–Types of Nozzles– Single hole, Multi hole, Pintle and Pintaux– Governing system for diesel engines – Mechanical and Pneumatic types of governors.

3. Transmission: Duration: Periods 12 (L: 7.2 T:4.8)

Dynamics of moving vehicles-Types of resistances encountered by a vehicle-Road resistance, Gradient resistance, Air resistance-Traction-Tractive effort–Simple related problems.
Need of a gear box in the transmission system– Types of gear boxes– Principles and operation of sliding mesh-constant mesh-synchromesh gearbox- Types of gear shifting mechanism– Floor shifting mechanism – Column shifting mechanism-working principle of simple epi-cyclic gear train- Principle and working of freewheel unit– Overdrive mechanism– Transfer case - Fluid coupling - Construction and working - Advantages and disadvantages -percentage slip in fluid coupling -Torque converter its principle and working - Principle of automatic transmission system and advantages-CVT-Principle of operation in two wheeler-advantages and disadvantages. Working principle of AMT (Automated Manual Transmission) with block diagram.

4. Propeller shaft and Differential **Duration :Periods 8 (L:4.8 T:3.2)**

Propeller shaft – Function of propeller shaft - slip joint or sliding joint – universal joint -. Types of universal joints– cross type or spider and two yoke type–ball and trunnion type– constant velocity type– Different types of Constant velocity joints.

Differential gear–Final drive–purpose of final drive, types of final drive– Bevel, worm and worm wheel, Hypoid gear and Palloid gear-single and double reduction final drives – Four wheel drive – differential gear - differential lock – self locking differential – Transaxle.

5.Wheels and Tyres: **Duration : Periods 8(L:4.8 T:3.2)**

Wheel assembly–functions of the wheels–Types of wheels, types of rims–Types of tyres–Construction of tyres-cross ply tyre–radial tyre –belted bias ply–merits of radial tyre over cross ply tyre- tube tyre-tubeless tyre –tyre tread patterns – tyre inflation pressure & wear – Desirable tyre properties – causes of tyre wear – Tyre rotation–procedure for Puncture repair of tubeless tyre–Retreading- Advantages of nitrogen for tyre inflation.

6.FrontAxleandRearAxle: **Duration : Periods 8 (L:4.8 T:3.2)**

Live and dead axles – Components of Front axle –stub axle–types of stub axles–Elliot–Reversed Elliot–Lamoine–Reversed Lamoine. Loads on the rear axle–Types of rear axles-semi floating–Three quarter floating–fully floating axles–Axle Housings and types–Split, Banjo and Salisbury types-Types of drives–Hotchkiss drive, Torque tube drive.

Recommended Books

1.Automobile Engineering Vol. I & II	by	Dr. Kirpal Singh
2. Automotive Mechanics	by	Heitner
3. Automobile Engineering	by	G.B.S. Narang
4. Automobile Engineering	by	R.B.Gupta
5. Automobile Engineering	by	Banga and Nathun Singh
6. Automobile mechanics	by	William Crouse
7. Internal Combustion Engines	by	Mathur&Sharma
8. Automobile Engineering Vol. I	by	Anil Chikara

Suggested Learning outcomes

After completion of the course Student will be able to

1.0 Understand Combustion

1.1 State the function of combustion chamber

1.2 Explain the different types of S.I. Engine combustion chambers with sketches

1.3 Explain the different types of C.I engine combustion chambers with sketches

2.0 Explain the working of various types of carburetors.
2.1 Explain petrol injection system
2.2 Draw line diagram of Diesel engine fuel system
2.3 Identify the parts of Diesel engine fuel system
2.4 Explain the need of fuel Injection system
2.5 Explain the working principle of Fuel Injection pump
2.6 List the types of Nozzles.
2.7 Explain the working principle of mechanical and pneumatic type governors.

3.0 List various resistance encountered by vehicle.
3.2 Define the terms Traction and tractive effort.
3.3 Explain the working of various types of gear Box.
3.4 Explain the working principle of the torque converter
3.5 List the advantages of automatic transmission system
3.6 Explain the Principle of operation of CVT in two wheeler
3.7 Explain the working principle of AMT

4.0` State the function of the propeller shaft.
4.1 Explain the types of universal joints.
4.2 Explain the working of final drive and Differential
4.3 State the purpose of the four wheel drive.
4.4 Explain the working principle of the four wheel drive.
4.5 Explain the working principle of differential gear, differential lock, Selflocking differential.
4.6 Explain the working of Transaxle.

5.0 Explain the construction of wheel assembly
5.2 Describe the construction of tyres
5.3 Explain the need of tyre rotation.
5.4 Mention the Advantages of nitrogen for tyre inflation.

6.0 Differentiate between live and dead axles.
6.1 List the components of front axle assembly.
6.2 Explain Stub axle and list various types of stub-axles
6.3 Explain the types of rear axles

Suggested Student Activities

1.Student visits Library to refer to Manual of Automobile components to find the various combustion chambers used in Engines.

2.Student inspects the available equipment in the Laboratory to identify the components of transmission system.

3.Visit nearby workshop / service station to familiarize with type of gear box used in four wheeler and two wheeler.

4.Quiz

5.Group discussion

6.Surprise test

Suggested E-Learning references

1. www.learnengineering.org
2.www.sae.org
3. www.nptel.ac.in

CO PO Mapping Matrix

Course Outcome		**CL**	**Linked PO**	**Teaching Hrs**
CO1	Describe the construction of combustion chambers.	R/A	1,2,10	**6**
CO2	Identify the fuel system components.	R/U/A	2,10	**4**
CO3	Describe various types of gear box for power transmission.	R	2,10	**7.2**
CO4	Determine the air-fuel ratios and combustion limits.	R/U/A	2,6	**2**
CO5	Procure knowledge on contemporary issues	U/A	2,6,8,9	**4.8**
CO6	Make presentation on assigned topics related to Automobile Power Train.	R/U	1,2,10,6	**4.8**
			Total	**28.8**

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	

(Model Question Paper)

Mid Sem -I

Subject Name : **Automobile Power Train**

Subject Code : **18A-304C**

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

PART – A

Answer **ALL** questions and each question carries **ONE** mark. Marks: 4 X 1M = 4M
and answer should not exceed ¼ page.

1. State the function of combustion chamber?
2. List any two types of SI engine combustion chambers?
3. List two types of carburetor circuits ?
4. List the types of diesel filters?

PART – B

Answer the following. **E**ach question carries **Three** marks Marks: 2 X 3M= 6 M
and answer should not exceed 1 page.

5. a). Define the term diesel knock?

OR

b). Write three requirements of SI engine combustion chamber?

6. a) Draw line diagram of diesel engine fuel system and also label the parts ?

OR

b) Write the functions of fuel injector in diesel engine

PART – C

Answer the following. **E**ach question carries **five** marks Marks: 2 X 5M = 10 M
and answer should not exceed 2 pages.

7. a). Explain any one type of SI engine combustion chamber with a sketch?

OR

b). List the factor that influence abnormal combustion in CI?

8. a). Explain the working principle of turbo charger with aid of a sketch?

OR

b). Explain the CRDI system with help of a sketch ?

(Model Question Paper)

Mid Sem -II

Subject Name : **Automobile Power Train**

Subject Code: **18A-304C**

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

PART – A

Answer **ALL** questions and each question carries **ONE** mark. Marks: 4 X 1M = 4M
and answer should not exceed ¼ page.

1. Define the term traction?
2. List any two types of gear boxes?
3. Write the function of slip joint?
4. Write the function of universal joint?

PART – B

Answer the following. **E**ach question carries **Three** marks Marks: 2 X 3M= 6 M
and answer should not exceed 1 page.

5. a). Draw a neat sketch of constant mesh gear box?

OR

b). Briefly explain about transfer case ?

6. a) Write the important of final drive ?

OR

b) Briefly explain about trans axle?.

PART – C

Answer the following. **E**ach question carries **five** marks Marks: 2 X 5M = 10 M
and answer should not exceed 2 pages.

7. a). Explain the construction and working of fluid coupling with a sketch?

OR

b). Explain the principle and working of free wheel unit with a sketch ?

8. a). Explain working principle of self locking differential with a sketch?

OR

b). Explain the working principle of four wheel drive with aid of chart?

(Model Question Paper)

Semester End Exam

Subject Name : **Automobile Power Train**

Subject Code: **18A-304C**

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

PART – A

Answer **ALL** questions and each question carries **ONE** mark. Marks: 8 X 1M = 8M
and answer should not exceed ¼ page.

1. List types of governors in diesel engine?
2. Write the function of propeller shaft?
3. Define the term live axle?
4. List any two types of carburettors?
5. List any two causes of tyre wear?
6. List any two types of construction of tyres?
7. List any two types construction of stub axles?
8. List types of rear axle housing?

PART – B

Answer the following. **E**ach question carries **Three** marks. Marks: 4X 3M= 12M
and answer should not exceed 1 page.

9. a).Explain briefly about inter cooler in fuel system ?

OR

b). List types of tyre wear ?

10. a) What are the advantages of fluid coupling over conventional gear box ?

OR

b) Draw a next sketch of front axle and label the parts ?

11. a) Write any three properties of a tyre?

OR

b) What are the advantages of nitrogen for tyre inflation ?

12. a) Differentiate live axle and dead axle?

OR

b) Write any three loads acting on rear axle?

PART – C

Answer the following. **E**ach question carries **five** marks Marks: 4 X 5M = 20 M
and answer should not exceed 2 pages.

13. a). Explain direct injection type CI engine combustion chamber with a next sketch?

OR

b). Explain the Combustion features of cross-ply and radial-ply?

14. a). Explain the constructional working of synchromesh gear box?

OR

b). Explain Hotchkiss types of rear axle drive with a net sketch?

15. a). Explain tyre rotation of a four wheeler with a net sketch?

OR

b). Explain the procedure of puncture and repair of tube less tyre ?

16. a). Explain the construction of torque tube drive with a sketch?

OR

b). Explain constructional features of rear axle housing?

Thermal Engineering -I

Course Title	**: Thermal Engineering - I**	Course Code	**: 18A-305C**
Semester	**: III**	Course Group	**: Core**
Teaching Scheme in Periods (L:T:P)	**: 40:20:0**	Credits	**: 3**
Methodology	**: Lecture + Tutorial**	Total Contact Hours :	**: 50 Hours/ 60 Periods**
CIE	**: 20+20+20 = 60 Marks**	SEE	**: 40 Marks**

Course Content and Blue Print of Marks for SEE

Unit Sl No	Unit Name	Questions for SEE					Periods
		R			U	A	
1	Basic Thermodynamics	4	1		9(a)	13(a)	12
2	Laws of perfect gases						08
3	Thermodynamic Processes		2		10(a)	14(a)	12
4	Air Standard Cycles						10
5	Fuels and combustion		3	5, 6	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	08
6	Laws of perfect gases			7,8	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	10
Total Questions		8			8	8	60

R-Remembering, U-Understanding, A- Application type questions each carrying 1, 3 and 5 Marks respectively.

Pre requisites

This course requires the basic knowledge of Basic Physics and Mathematics at Secondary school level

Course Outcomes

On successful completion of the course student should able to:

CO1 :	Summarize the basic concepts of Thermodynamics.
CO2 :	Explain the basic behavior of gases.
CO3 :	Outline the processes required for energy conversion from heat to work, to build a thermodynamic cycle.
CO4 :	Identify the importance of Air standard cycles, to appraise the theoretical performance of a cycle and to Compare the performance of various cycles for energy production.
CO5 :	Explain the basics of combustion of fuel and energy liberation
CO6 :	Evaluate the basic performance of an Internal combustion engine and to know about Mass and energy balance in Internal combustion engines.

Course Content:

UNIT- 1: Basic Thermodynamics **Duration: 12 Periods (L: 8 – T: 4)**

Definitions: System - Boundary, Surrounding, Working medium,.-Types of thermodynamic systems – Open, Closed and isolated systems with examples - Properties of a system- Intrinsic and Extrinsic properties with examples - State of a system - Definitions for properties like Pressure, Absolute Pressure, Volume, Specific Volume, Temperature , Absolute Temperature - Forms of Energies - Heat , Specific heat, Specific heats of a gas , - Thermodynamic work , Internal energy , Enthalpy and their units – Concept of thermodynamic Process, Change in state, Path, Reversible Process, Irreversible Process – Thermodynamic cycle - Definitions for Quasi-static Process, Flow-work, Non-Flow work, Steady flow energy equation - Zeroth, First, Second laws of thermodynamics (Statements only), Simple problems on conversion of Heat into Work and vice versa - Simple problems of elementary type on Steady flow energy equation.

UNIT-2: Laws of perfect gases **Duration: 08 Periods (L: 6 – T: 2)**

Definition of Perfect gas - Brief explanation of perfect Gas Laws – Boyle's law, Charle's Law – Avagadro's law, Joule's law and Regnault's law- Derive characteristic gas equation - Universal gas constant, Gas constant and their relationship with molecular weight of a gas - Universal gas equation- Reasons for two Specific heats for a gas - Derivation for the relationship between the two specific heats of a gas and the gas constant - Simple problems.

UNIT-3: Thermodynamic Processes **Duration: 12 Periods (L: 8 – T: 4)**

Types of thermodynamic processes - Isochoric, Isobaric, Isothermal, Isentropic, Polytropic and throttling processes – Concept of Entropy – Derivations for P,V,T relations, Heat Transfer, Work Transfer, Change in Enthalpy, Change in Internal Energy, Change in entropy during these processes - Simple problems on the above processes.

UNIT – 4: Air Standard Cycles **Duration: 10 Periods (L: 7 – T: 3)**

Definition of Air standard cycles - Applications - Reversible and Irreversible cycles – Assumptions made for Air Standard Cycles – Representation of Carnot cycle, Otto cycle and Diesel cycles on P-V and T-S Diagrams, the Description of the cycle and Derivation for Efficiency of these cycles - Reasons for the highest efficiency of Carnot cycle over other cycles working between same temperature limits – Simple Problems.

UNIT -5: Fuels and Combustion **Duration: 08 Periods (L: 5 – T: 3)**

Combustion of fuel - Dulong's formula for calculating Heating value for given Composition of Fuel - Bomb calorimeter - Junker's Gas calorimeter –Calculation of minimum air required for the complete combustion of unit mass/unit volume of fuel having a given composition – Products of combustion.

UNIT 6: Performance of I.C Engines **Duration: 10 Periods (L: 6 – T: 4)**

Need for Engine performance testing –Testing of I.C Engines: Using Rope Brake dynamometer, Morse Test - Mean effective Pressure - Indicated, Brake and Friction Power - Mechanical Efficiency, Thermal Efficiency and Volumetric Efficiency – Specific Fuel Consumption - Heat Balance- Problems pertaining to Performance of I.C Engines and Heat balance.

Recommended Books

1. Thermal Engg.Vol I & Vol II - Mathur & Mehta
2. Heat Engines - R. C. Patel & Karamchandani
3. I. C. Engine - Heywood
4. Engineering Thermodynamics - P. K. Nag
5. Engineering Thermodynamics - C. P. Arora
6. Thermal Engineering - R. S. Khurmi
7. Thermal Engineering - Kumar & Vasundari.

Suggested Learning Outcomes

1.0 **Basic Thermodynamics**

1. 1 Define the various terms associated with the Thermodynamic System.

1. 2 Name the types of thermodynamic Systems.

1. 3 Explain the closed system with Examples.

1. 4 Explain the open system with examples

1. 5 Explain the isolated system with Examples.

1. 6 List the thermodynamic Properties of System.

1. 7 Define the various thermodynamic properties.

1. 8 Write examples for each type of property and its units of measurement.

1. 9 Know the forms of energy transfers to and from a system.

1. 10 Represent the state of a system on a P-V Diagram.

1. 11 Define Process, Path, Reversible Process, Irreversible Processes and Thermodynamic cycle.

1. 12 State the Zeroth law of thermodynamics.

1. 13 State the first law of thermodynamics.

1. 14 State the second law of thermodynamics.

1. 15 Solve problems dealing with conversion of heat into work and vice – versa.

1. 16 Write steady flow energy equation

1. 17 Write Non-flow energy equation.

1. 18 Solve simple problems on Heat to Work Conversions and Steady flow energy equation.

2. 0 **Laws of perfect gases**

2. 1 Define the term 'Perfect Gas'.

2. 2 State "Boyle's Law".

2. 3 State "Charle's Law".

2. 4 State "Avagadro's Law".

2. 5 State "Regnault's Law".

2. 6 State "Joule's Law".

2. 7 Derive Characteristic gas equation

2. 8 Write the Universal Gas Equation.

2. 9 State relationship between characteristic gas constant , Universal gas constant and molecular weight .

2. 10 Define "Specific heat at constant pressure" (C_p).

2. 11 Define "Specific heat at constant volume (C_v).

2. 12 Infer why gases have two specific heats

2. 13 Derive the relationship connecting the C_p , C_v and R .

2. 14 Solve simple problems using gas laws.

3. 0 **Thermodynamic Processes**

3. 1 List out the different thermodynamic processes.

3. 2 Derive P,V,T relations, Heat Transfer, Work Transfer, Change in Enthalpy, Change in Internal Energy, Change in Entropy in Iso-choric process.

3. 3 Derive P,V,T relations, Heat Transfer, Work Transfer, Change in Enthalpy, Change in Internal Energy, Change in Entropy in Iso-baric process.

3. 4 Derive P,V,T relations, Heat Transfer, Work Transfer, Change in Enthalpy, Change in Internal Energy, Change in Entropy in Iso-Thermal process.

3. 5 Derive P,V,T relations, Heat Transfer, Work Transfer, Change in Enthalpy, Change in Internal Energy, Change in Entropy in Isentropic process.

3. 6 Derive P,V,T relations, Heat Transfer, Work Transfer, Change in Enthalpy, Change in Internal Energy, Change in Entropy in Polytropic process.

3. 7 Infer that Isothermal process is the same as hyperbolic process for gases.

3. 8 Justify that work done in throttling process is Zero.

3. 9 Sketch P-V and T - S diagrams for the above thermodynamic processes.

3. 10 Solve simple problems on these thermodynamic processes.

4. 0 **Study of air standard cycles**

4. 1 Define the term ‘Air Standard cycle’

4. 2 Define the terms ‘Reversible Cycle’ and ‘Irreversible Cycle’

4. 3 State the assumptions made for Air Standard cycles.

4. 4 Explain Carnot Cycle with the help of P -V and T-S diagrams.

4. 5 Derive the formula for the air standard efficiency of Carnot cycle.

4. 6 Solve simple problems on Carnot Cycle.

4. 7 Explain Otto Cycle with the help of P-V and T-S diagram.

4. 8 Derive the formula for air standard Efficiency of an Otto Cycle.

4. 9 Solve simple problems on Otto Cycle.

4. 10 Explain Diesel cycle with the help of P-V and T-S diagram.

4. 11 Derive the formula for Air Standard Efficiency of Diesel Cycle.

4. 12 Solve the simple problems on Diesel Cycles.

4. 13 State the Reason for the highest efficiency of Carnot cycle over other cycles working between same temperature limits

5. 0 **Fuels and Combustion**

5. 1 Know different analysis of fuel – Ultimate and Proximate analysis.

5. 2 Estimate calorific value of fuel from Dulong’s formula.

5. 3 Compare solid, liquid and gaseous fuels.

5. 4 Know the components of a Bomb calorimeter, to explain the sequence of procedure for determination of calorific value using Bomb Calorimeter for a given liquid of solid fuel.

5. 5 Know the components of a Junker's gas calorimeter, to explain the sequence of procedure for determination of calorific value using Junker's gas calorimeter.

5. 6 Define combustion of fuel.

5. 7 Know the expression for minimum air required for complete combustion of a given fuel.

5. 8 Know the products of combustion.

6. 0 **Performance of I.C.Engines**

6. 1 Define I.P, B.P and F.P

6. 2 Define Indicated mean effective pressure and Break mean effective pressure.

6. 3 Compute I.P, B.P and F.P

6. 4 Compute Mechanical efficiency, Indicated and Brake Thermal Efficiency and Volumetric Efficiency.

6. 5 Compute Indicated and Brake Specific Fuel consumption.

6. 6 Prepare Heat Balance sheet for a given test result of an I.C. engine.

Suggested Student Activities

1. Demonstrate the Concept of Zeroth law of thermodynamics using a glass tube mercury thermometer.
2. List the combustion products of an automobile engine and their effects on human health.
3. Compare Brake Power of two wheelers engines of same cubic capacity.
4. Prepare a data sheet for comparing Brake Power of four wheelers engines of same cubic capacity.
5. Quiz on energy and its conservation.
6. Group discussion responsibility of engineers in building the society.
7. Prepare a leaflet narrating the effects of vehicular pollutants on the environment.
8. Group discussion on energy addition to the universe.

Suggested E-Learning references

www.learnengineering.org
www.sae.org

www.nptel.ac.in

Introduction and fundamental concepts of thermodynamics:

https://www.youtube.com/watch?v=9GMBpZZtjXM

Introduction to thermodynamics and fundamental concepts:
https://www.youtube.com/watch?v=9GMBpZZtjXM&list=PLD8E646BAB3366BC8

Zeroth Law of thermodynamics and fundamental concepts:
https://www.youtube.com/watch?v=xQwi9fveGTQ&index=2&list=PLD8E646BAB3366BC8

First Law of Thermodynamics and its applications:
https://www.youtube.com/watch?v=sUDfpFD0xX4&index=4&list=PLD8E646BAB3366BC8

Heat and Thermodynamic Work:
https://www.youtube.com/watch?v=-42JmVBdlM4

1st Law of Thermodynamics:
https://www.youtube.com/watch?v=lbPEaaKiCww

2nd Law of Thermodynamics:
https://www.youtube.com/watch?v=gg-dlrbXxzI

Boyle's Law:
https://www.youtube.com/watch?v=Xto88gMmDzw

Charle's Law:
https://www.youtube.com/watch?v=7ZpuMBkf1Ss

Gay Lussac's Law:
https://www.youtube.com/watch?v=0Oq7bCSDPxE

Carnot Cycle:
https://www.youtube.com/watch?v=pucd2b7jZJw

Otto Cycle:
https://www.youtube.com/watch?v=K8RzTmeVWfM

Diesel Cycle:
https://www.youtube.com/watch?v=fyadfj7NQqI

Diesel Cycle and Limited Pressure cycle:
https://www.youtube.com/watch?v=YNGtJo-VspE

Bomb Calorimeter:
https://www.youtube.com/watch?v=NG41IbDtd44

Junkers' Gas Calorimeter:
https://www.youtube.com/watch?v=HeofLEQ6wuA

CO PO Mapping Matrix:

Course Outcome		CL	Linked PO	Teaching Periods
CO1 :	Summarize the basic concepts of Thermodynamics.	R,U	2,3,5,6	12
CO2 :	Explain the basic behavior of gases.	R,U	2,3,5,6	08
CO3 :	Outline the processes required for energy conversion from heat to work, to build a thermodynamic cycle.	R,U,A	2,3,5,6	12
CO4 :	Identify the importance of Air standard cycles, to appraise the theoretical performance of a cycle and to Compare the performance of various cycles for energy production.	R,U,A	2,3,5,6	10
CO5 :	Explain the basics of combustion of fuel and energy liberation	R,U,A	2,3,5,6	08
CO6 :	Evaluate the basic performance of an Internal combustion engine and to know about Mass and energy balance in Internal combustion engines.	R,U,A	2,3,5,6	10

Mid Semester Examination Blueprint of Questions and Marks:

MID SEM-I EXAM Max. Marks: 20

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 Max.Marks: 20

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	

R-Remembering, U-Understanding, A- Application type questions each carrying 1, 3 and 5 Marks respectively.

MID SEM –I
MODEL QUESTION PAPER
C-18, DIPLOMA IN AUTOMOBILE ENGINEERING
Subject Name: Thermal Engineering - I
Subject Code: 18A-305C

Time: 1hr **Max Marks: 20**

PART-A Short answers questions

Answer All Questions. Each question carries ONE mark **4 x1 = 4 Marks**

1. Define 'Thermodynamic System' and 'Surrounding'?
2. Define 'Process and Path'?
3. State Boyle's Law?
4. What is Gas Constant, how it is related to Universal Gas Constant?

PART-B Essay type questions

Answer any TWO Questions by choosing either (a) or (b) from each question.
Each question carries THREE marks **2 x 3 = 6 Marks**

5. (a) Explain Reversible and Irreversible Processes?
5. (b) State and explain both the statements of Second Law of Thermodynamics with necessary sketches?
6. (a) Derive the relationship between the two specific heats of a gas and the gas constant?
6. (b) Infer why gases have two specific heats?

PART-C Application type questions

Answer any TWO Questions by choosing either (a) or (b) from each question.
Each question carries THREE marks **2 x 5 = 10 Marks**

7. (a) A fluid is confined in a cylinder by a spring loaded, frictionless piston so that the pressure in the fluid is a linear function of the volume as $p = a + b.V$. If the fluid changes from the initial state of 170 kPa, 0.03 m^3 to final state of 400 kPa, 0.06 m^3 with no work other than that done by the piston. Find the direction and magnitude of the work?
7. (b) In a steady-flow open system, a fluid substance flows at the rate of 4 kg/s. It enters the system at a pressure of 600 kN/m^2, a velocity of 220 m/s, internal energy 2200 kJ/kg and specific volume 0.42 m^3/kg. It leaves the system at a pressure of 150 kN/m^2, a velocity of 145 m/s, internal energy of 1650 kJ/kg and specific volume 1.5 m^3/kg. During its passage through the system, the substance has a loss by heat transfer of 40 kJ/kg to the surroundings. Determine the power of the system, stating whether it is from or to the system. Neglect any gravitational potential energy?
8. (a) A mass of air has an initial pressure of 1.3 MN/m^2, Volume of 0.014m^3 and temperature 135^oC. It is expanded until its final pressure is 275 kN/m^2 and its volume becomes 0.056 m^3. Determine (a) Mass of air (b) Final temperature of air. ?
8. (b) Derive the relationship between characteristic gas constant (R), Universal gas constant (G) and molecular weight (M).

MID SEM –II
MODEL QUESTION PAPER
C-18, DIPLOMA IN AUTOMOBILE ENGINEERING
Subject Name: Thermal Engineering - I
Subject Code: 18A-305C

Time: 1hr **Max Marks: 20**

PART-A Short answers questions

Answer All Questions. Each question carries ONE marks **4 x 1 = 4 Marks**

1. Represent Adiabatic Process on P-V and T-S diagrams?
2. What is 'Throttling Process'?
3. Define 'Air Standard Cycles'?
4. Write any two assumptions made for Air standard Cycles?

PART-B Essay type questions

Answer any TWO Questions choosing either (a) or (b) from each question.

Each question carries FIVE Marks **2 x 3 = 6 Marks**

5. (a) Deduce the P,V,T relations for an Iso-Thermal Process?
5. (b) Derive the equation for work done in constant pressure process?
6. (a) Show a Carnot Cycle on P-V and T-S diagrams and list the processes in the cycle?
6. (b) State the reason for highest efficiency of Carnot cycle over other cycles working between same temperature limits?

PART-C Application type questions

Answer any TWO Questions choosing either (a) or (b) from each question.

Each question carries FIVE Marks **2 x 05 = 10 Marks**

7. (a) Derive equations for P,V,T relations, Work transfer, Heat Transfer, Change in Enthalpy and Change in Internal Energy for an Adiabatic Process?
7. (b) From measurements taken from two points on the compression curve of an oil engine indicator diagram the following are recorded.

   (a) Pressure 140 kN/m^2, Volume 12 litres
   (b) Pressure 2.8 MN/m^2, Volume 2.01 litres

   Determine the index 'n' for the curve between the two points and hence calculate the work between points. Assuming the temperature of 100°C at first point, calculate the temperature at the second point and hence find the change of internal energy between two points. Take R = 0.287 kJ/kg K ; Cv = 0.717 kJ/kg K.

8. (a) Explain an Otto cycle on P-V and T-S diagrams and also deduce the equation for efficiency of the cycle?
8. (b) Explain an Diesel cycle on P-V and T-S diagrams and also deduce the equation for efficiency of the cycle?

SEMESTER END EXAMINATION
MODEL QUESTION PAPER
C-18, DIPLOMA IN AUTOMOBILE ENGINEERING
Subject Name: Thermal Engineering - I
Subject Code: 18A-305C

Time: 2hrs **Max Marks: 40**

PART-A

Answer all Questions. Each question carries One mark **8 x 1 = 8 Marks**

1. Define 'Thermodynamic State' and 'Thermodynamic Process'?
2. Represent Iso-Thermal Process on P-V and T-S diagrams?
3. Define Break Specific Fuel Consumption?
4. What is a 'Perfect Gas'?
5. Define a Fuel and Name any four fuels?
6. Define calorific/heating value?
7. Write the relation between I.P, F.P and B.P?
8. Define 'Mechanical Efficiency'?

PART-B

Answer any FOUR questions choosing either (a) or (b) from each question. **4 x 3 = 12 Marks**

9. (a) 0.2 kg of gas is subjected to change of temperature from 288 K to 458 K at constant pressure. Find the heat transfer, change of internal energy and change of enthalpy? Assume Cp = 1.0 kJ/kg K and Adiabatic index = 1.4

9. (b) Find the higher calorific value of the fuel whose composition by mass is as follows: Carbon = 91%, Hydrogen = 3%, Sulphur = 0.8%, the reminder is ash?

10. (a) List various thermodynamic Processes?
    (b) Explain the need of Engine performance Test?
11. (a) Calculate the minimum air required for complete combustion of 1 kg of carbon.
    (b) Compare solid and gaseous fuels in three aspects?
12. (a) What is Heat balance sheet?
    (b) Define volumetric efficiency and Thermal efficiency?

PART-C

Answer any FOUR questions choosing either (a) or (b) from each question. **4 x 5 = 20 Marks**

13. (a) In a steady-flow open system, a fluid substance flows at the rate of 4 kg/s. It enters the system at a pressure of 600 KN/m^2, a velocity of 220 m/s, internal energy 2200 Kj/kg and specific volume 0.42 m^3/kg. It leaves the system at a pressure of 150 KN/m^2, a velocity of 145 m/s, internal energy of 1650 Kj/kg and specific volume 1.5 m^3/kg. During its passage through the system, the substance has a loss by heat transfer of 40 Kj/kg to the

surroundings. Determine the power of the system, stating whether it is from or to the system. Neglect any gravitational potential energy?

(b) Describe the procedure for determination of calorific value of a given solid fuel of known mass using bomb calorimeter.

14. (a) A diesel engine has a compression ratio of 14 and expansion ratio of 8. Find its air standard efficiency and heat supplied, if the net work done is 340 kJ?

(b) The following data refers to a test on a petrol engine.

Indicated Power = 30 kW, Brake power = 26 kW

Engine speed= 1800 RPM Brake specific fuel consumption = 0.35 kg/kWh

Calorific value of fuel = 44100 kJ/kg.

Calculate Mechanical Efficiency, Indicated thermal efficiency and Brake thermal efficiency?

15. (a) With the aid of a neat diagram explain the procedure for finding the heating value of a gaseous fuel using Junker's Gas Calorimeter?

(b) The composition of a fuel on mass basis is as follows: C=90%, H_2=3.5%, O_2=1%, S=0.5% and Ash=5%. Calculate,

(i) Min air required for complete combustion of 1 kg of this fuel.

(ii) The composition of dry flue gases on mass basis if 50% excess air is supplied.

16. (a) Explain the procedure for preparation of heat balance sheet for an I.C. Engine.

(b) A single cylinder diesel engine yielded the following data after a performance test

I. Fuel consumption = 10.5 kg/hr
II. Calorific value = 43000 kJ/kg
III. Mass of air consumption = 3.6 kg /min
IV. Speed = 2000 rpm
V. Brake torque produced = 190 N-m
VI. Mass of Coolant used = 15.5 kg/min
VII. Temp rise of coolant = 32^{o}C
VIII. Exhaust gas temperature = 400^{o}C
IX. Room Temperature = 24^{o}C
X. Cp for exhaust gases = 1.18 kJ / kg.K

Calculate the data required and draw up heat balance sheet.

MACHINE DRAWING

Course title:	MACHINE DRAWING	Course Code:	18A-306P
Semester:	III	Credits:	1.5
Teaching scheme in Hrs (LTP): Type of course: Lecturer+Practical	7.5:00:37.5	Total contact Periods :	**45 Periods**
CIE:	60 Marks	SEE:	40 Marks

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Periods	Questions for SEE			Marks Weightage			Weightage
			R	U	A	5M	30M	total	(%)
1	Introduction, Fastening Devices,	15		4		2		10	
2	ASSEMBLY-I Assembly drawings of Gib and Cotter joint ,Knuckle Joint, Muff couplings, universal coupling, Screw Jack	15			1		1	30	
3	ASSEMBLY-II Assembly Drawings of Bearings (Journal bearing, Foot step Bearing, Plummer block),	15			1		1		
	Total	45						40	

Pre requisites

This course requires the basic knowledge of Engineering Drawing

Course Outcomes (CO)

Upon successful completion of the course, the students will be able to attain the following Course Outcomes (CO):

COURSE OUTCOMES	
CO1	Apply the principles of screw threads and draw thread patterns
CO2	Identify the need of temporary joints and permanent joints and draw the rivet joints
CO3	Able to draw the couplings and draw the muff, knuckle joint, and screw jack assembly
CO4	Acquire the knowledge and draw assembly of different engineering components

COURSE CONTENT

1.0 Introduction

Importance of Machine Drawing - Brief revision of 1st and 3rd angle projections - Understand the concepts of Orthographic projections and Sectional views.

Fastening Devices.

Temporary and Permanent fastenings and their areas of application-thread nomenclature, forms of screw thread profiles, metric, B.A., Acme, Knuckle, etc.

Bolts and Nuts: Specification of bolts and nuts, Different types of bolted joints (like using through bolts, studs, screws etc.,) in different applications. Purpose of lock nuts and their Types -.

Keys - draw different types of Keys.

Rivets and Riveted joints: Types and proportions and specification of rivets: Different types of riveted joints: Lap, butt-single row, double row etc., chain and zigzag riveting – calculation of diameter of rivet: Pitch and arrangement of rivets in row – use – of standard proportions.

Exercises:1

1. Thread Nomenclature and forms of screw thread profiles.
2. Exercises in drawing – bolted connections using standard proportions.
3. Drawing of various types of lock nuts & types of keys indicating their proportionate dimensions.
4. Drawing of various types of screws with proportionate dimensions.
5. Exercise in drawing riveted joints using standard proportions: Single row, double row (chain and zigzag) in lap and butt joints (single & double strap).
6. Draw the keys and types of keys with standard proportions.

2.0 Assembly Drawings-I

Need and functions of assembly and detailed drawings - Steps in preparing assembly drawings -. - Exercises in preparing assembly drawings of commonly available engineering components.

Cotter joints-screw jack

Exercise: 2

Draw the views / sectional views of

1. Different types of Knuckle and Cotter joints.
2. Screw jack assembly.

3.0 Assembly Drawings-II

With the knowledge gained by the above exercises the students shall be able to draw exercises on protective type flanged coupling, flexible coupling, Journal bearing ,foot step bearing, Plummer block.

Exercise: 3

Draw the views / sectional views of

1. Draw various types of shaft couplings
2. Draw various types of shaft bearings

Recommended Books

1. T.S.M & S.S.M in respect of Technical Drawing by TTTI, Madras
2. Machine Drawing by A.C. Parkinson.
3. Machine Drawing by Jones & Jones.
4. Machine Drawing by N.D. Bhatt.

Suggested Learning Outcomes

Key competencies to be achieved by the student

Topic	Key competency
Nuts and Bolts	Differentiate the temporary and permanent joints and their applications Acquaint with the nomenclature of thread profile Draw the bolts, screws, nuts with standard proportions
Rivets and riveted joints	Differentiate the temporary and permanent joints and their applications Acquaint with the specifications of rivets Draw the rivets and types of riveted joints with standard proportions
Keys	Acquaint with the specifications of rivets Draw the keys and types of keys with standard proportions
Assembly drawing-I & II	Understand function, working principle and field of application for the machine and its parts Study the external and internal features of each part Put the overall dimensions Prepare the table of parts giving part number, its name, material and quantity

Suggested Student Activities

1. Demonstrate the working of screw jack..
2. List the types of bolts and nuts used in Automobiles.

3 Prepare a data sheet of specifications of various rivets used in machinery.

Suggested E-Learning references

www.learnengineering.org
www.sae.org

www.nptel.ac.in

CO PO Mapping Matrix

Course Outcome		**CL**	**Linked PO**
CO1	Apply the principles of screw threads and draw thread patterns	U/A	1,2,3,8,10
CO2	Identify the need of temporary joints and permanent joints and draw the rivet joints	R/U	1,2,3,8,10
CO3	Able to draw the couplings and draw the muff, knuckle joint, and screw jack assembly	U	1,2,3,8
CO4	Acquire the knowledge and draw assembly of different engineering components	U	1,2,3,8

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I		1,2,3,4,5,6		**Answer any four questions**

MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-II			1,2	**Answer any one question**

MID –I MODEL PAPER

18A306 P MACHINE DRAWING

TIME: 1 HOUR **Max.Marks:20**

Instructions: Answer any four questions .Each question carries Five Marks

4 x 5=20

1. Draw Square thread with appropriate dimensions.
2. Draw Pan rivet head with appropriate dimensions.
3. Draw Sunk taper key with appropriate dimensions.
4. Draw Hollow saddle key head with appropriate dimensions.
5. Draw Buttress thread with appropriate dimensions.
6. Draw Flat saddle key with appropriate dimensions.

MID –II MODEL PAPER

18A306 P MACHINE DRAWING

TIME: 1 HOUR **Max.Marks:20**

Instructions: Answer any ONE questions .Each question carries TWENTY Marks

1. Draw the sectional front view of the Knuckle joint as given part drawing
2. Draw the sectional front view of the gib and cotter joint as given part drawing

State Board of Technical Education and Training, Telangana

Semester End Examination Model Question paper

DME III semester MACHINE DRAWING Examination

Corse Code:18A306P

Course Name: MACHINE DRAWING

Max.Marks:40 **Duration:2 hours**

PART-A 5 X 2 = 10

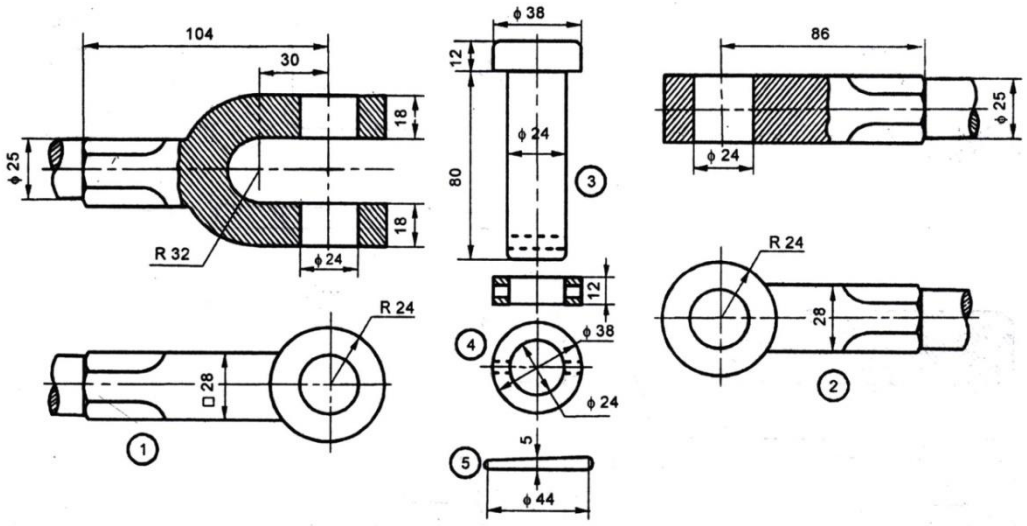
INSTRUCTIONS: (1) Answer any two Questions
(2) Each question carries FIVE Marks.
(3) Answer should be neat & clear with all the necessary Dimensions.
(4) All Dimensions are in mm. Choose suitable Scale.

1. Draw Square thread with appropriate dimensions.
2. Draw Pan rivet head with appropriate dimensions.
3. Draw Sunk taper key with appropriate dimensions.
4. Draw Hollow saddle key head with appropriate dimensions.
5. Draw Ellipsoid rivet head with appropriate dimensions.
6. Draw Sunk taper key with appropriate dimensions.

PART –B 30

INSTRUCTIONS: (1) Answer any ONE question.
(2) Each question carries thirty Marks.
(3) All Dimensions are in mm and assume missing Dimensions if any and choose suitable scale.

7. Assemble all the parts of the KNUCKLE JOINT and Draw the
   (a) Sectional Front View 20
   (b) Top View 10

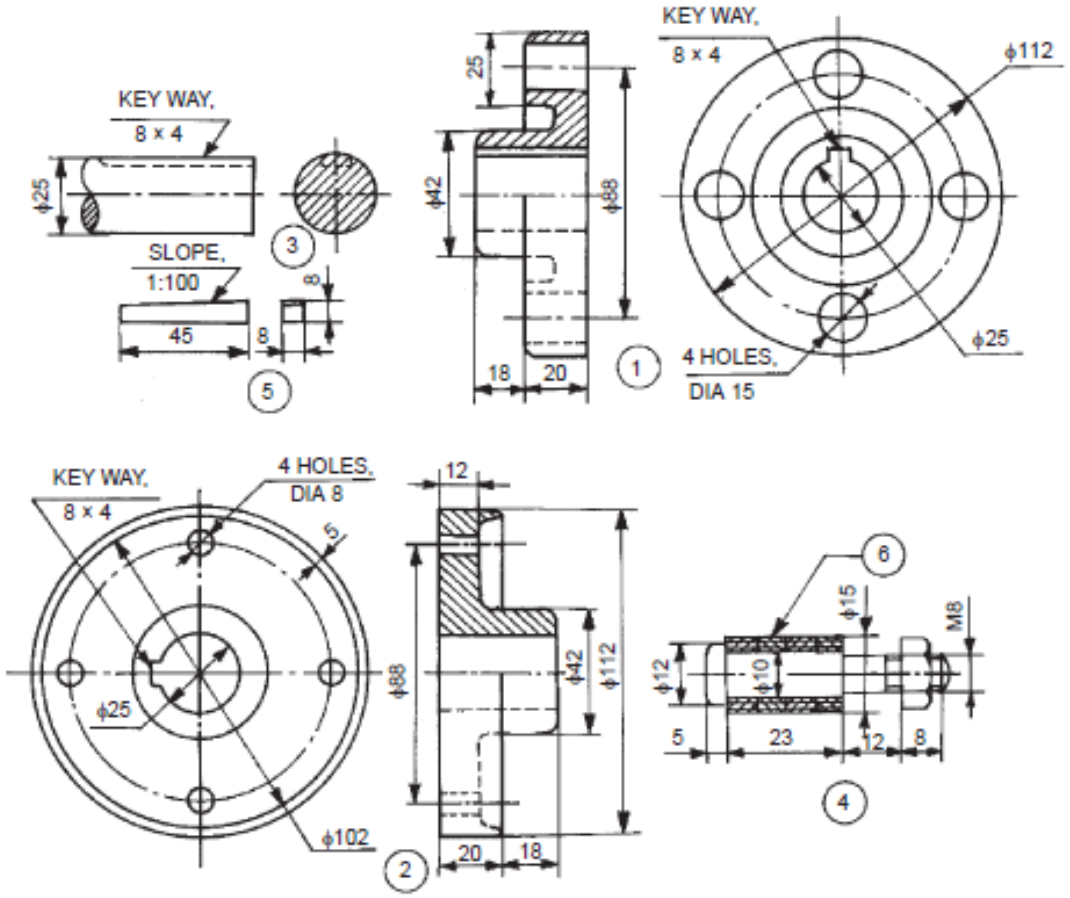


Parts list

No.	Name	Matl	Qty
1	Fork end	F S	1
2	Eye end	F S	1
3	Pin	M S	1
4	Collar	M S	1
5	Taper pin	M S	1

KNUCKLE JOINT

8. Assemble the Oldham's coupling which components showing in the following figure



Parts list

Sl. No.	Name	Matl.	Qty.
1	Flange	CI	1
2	Flange	CI	1
3	Shaft	MS	2
4	Pin with nut	MS	4
5	Feather key	MS	2
6	Bush	Nylon	16

MECHANICAL MACHINE SHOP

Course Title :	**MECHANICAL MACHINE SHOP**	Course Code	**18A-307P**
Semester	**III**	Course Group	**:Core**
Teaching Scheme in Periods(L:T:P)	**7.5:00:37.5**	Credits	: **1.5**
Methodology	**Lecture + Practical**	Total Contact Hours :	**: 45 Periods**
CIE	**60 Marks**	SEE	**40 Marks**

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Hours/ Periods	Marks for SEE			Marks weightage	%Weightage
			Handling	Manipulation	Precision		
1.	**Hands on practice on Lathe**	15	10	15	15	40	100
2.	**Hands on practice in welding**	15	10	15	15	40	100
3.	**Hands on practice in foundry processes**	15	10	15	15	40	100
	Total	45					

Pre requisites

This course requires the knowledge in basic manufacturing technology

Course Outcomes

On successful completion of the course student should able to:

Course Outcome	
CO1	Leaning the operation and safety precautions of lathe and performing certain lathe operations
CO2	Basic knowledge in operating welding equipment and performing some welding operations.
CO3	Basic knowledge in special machinery.
CO4	Safety precautions in operating the workshop equipment.

COURSE CONTENT

1. Special Machines

1.1 Shaping (Preparation of Groove)
1.2 Milling (Gear Cutting Operation)
1.3 Planning (Surface finishing Operation)

2 Machine Shop (Turning)

2.1 Plain Turning
2.2 Step Turning
2.3 Taper Turning
2.4 Turning Collars
2.5 Knurling
2.6 Facing

3. Welding

3.1 Layout of Beads

3.2 Butt joints.

3.3 Lap joints.

SUGGESTED LEARNING OUTCOMES

Up on the completion of the course the student shall able to

- Hands on practice on Special Machines
- Plane the Surface of a given component
- Practice to hold a given component in a Milling Arbour
- Practice to run a given Planer Machine
- Practice the operation of Lathe
- Perform a plain turning operation on a lathe machine.
- Select proper tool to perform the job.
- Centre the job by dial gauge
- Select the suitable speed for different operations
- Use various measuring instruments for taking dimensions.
- Perform step turning operation on lathe.
- Calculate the taper angle.
- Practice different taper turning methods on lathe
- Turn the required tapers by swivelling the compound rest.
- Produce articles of industrial application such as ring gauges, plug gauges, handle etc.
- Tapper turning – Hands on experience in swivelling the compound rest method
- Practice the joining of metals in Arc Welding, Gas welding, brazing
- Prepare the edges for welding
- Select the suitable electrode, voltage and current
- Handle the Electrode Holder for laying welding beads.
- Operate the welding transformer and generator.
- Perform various weld joint operations.

KEY competencies to be achieved by the student.

Title of the experiment	Key competency
Shaping	• Prepare the work surface • Holding the component on a T slotted table fixed to the vice and check thedistance with respect to the work piece to maintain tool clearance • Shape the component on given sides
Milling	• Prepare the work surface • Position the given milling cutter • Hold the work piece at suitable position and maintain thedistance with respect to the milling cutter to attain milling operation • Clean the machine before and after use
Planning	• Prepare the work surface • Position the tool head • Hold the work piece at suitable position and maintain thedistance with respect to the cutting tool to attain planning operation • Clean the machine before and after use
Plain turning	- Check the centering of the work piece using dial gauge - Fix the cutting tool at proper inclination - Select the suitable speed, feed and depth of cut for rough and finishing operations - Check the dimensions
Step turning	• Check the centering of the work piece using dial gauge • Fix the cutting tool at proper inclination • Select the suitable speed, feed and depth of cut for rough and finishing operations • Check the dimensions
Taper turning	• Just an introduction of 4 methods. Student is expected to show how they work on machine. • Hands on exposure to swiveling compound rest method

Title of the experiment	Key competency
Collar turning	• Check the centring of the work piece using dial gauge • Fix the cutting tool at proper inclination to turn the work piece • Select the suitable speed, feed and depth of cut for rough and finishing operations • Check the dimensions
Knurling	• Check the centring of the work piece using dial gauge • Fix the cutting tool at proper inclination to turn the work piece • Select the suitable speed, feed and depth of cut for rough and finishing operations • Check the dimensions • Fix the knurling tool and selecting the suitable speed and feed
Thread Cutting	• Centering of the work piece using dial gauge • Fixing the cutting tool at proper inclination • Selecting the suitable speed, feed and depth of cut for rough and finishing operations • Checking the dimensions • Fixing the knurling tool and selecting the suitable speed and feed
Welding Layout of beads	• Perform Edge preparation • Hold the electrode at suitable angle and distance with respect to the work piece to maintain the arc • Check the bead
Lap joint	• Perform Edge preparation • Hold the electrode at suitable angle and distance with respect to the work piece to maintain the arc • Check the bead
Butt joint	• Perform Edge preparation • Hold the electrode at suitable angle and distance with respect to the work piece to maintain the arc • Check the bead

Suggested Student Activities

1. Visit fabrication centre and Collect the information fabrication methods employed.
2. prepare data of machinery used in machine shop .
3. Student inspects the available equipment in the Laboratory to identify the components.
4. Student should watch video lessons related to the latest trends in the course.

5. Student should participate in Quiz
6. Student should participate in Group discussion
7. Surprise test

Suggested E-Learning references

1. www.learnengineering.org
2. www.sae.org
3. www.nptel.ac.in

CO PO Mapping Matrix:

Course Outcome		Linked PO
CO1	Leaning the operation and safety precautions of lathe and performing certain lathe operations	1,2,3,4,5,6,9,10
CO2	Basic knowledge in operating welding equipment and performing some welding operations.	1,2,3,4,5,6,9,10
CO3	Basic knowledge in sand preparation for moulds and making the moulds ready for casting operation.	1,2,3,4,5,6,9,10
CO4	Safety precautions in operating the workshop equipment.	1,2,3,4,5,6,9,10

(Model Question Paper)

Mid Sem-I

Answer one Questions. Each question carries 20 marks **1 x 20 = 20 M**

1. Perform a plain turning operation of a given metal piece on a lathe machine.
2. Conduct an experiment Calculate the taper angle of a given material.
3. Conduct an experiment to prepare the edge of a given material in arc welding
4. Prepare the model as per given specifications on a shaping machine.

(Model Question Paper)

Mid term-II

Automobile Testing and Reconditioning Laboratory& Driving Practice

Answer one Questions. Each question carries 20 marks **1 x 20 = 20 M**

1. Perform a plain turning operation of a given metal piece on a lathe machine.

2. Conduct an experiment Calculate the taper angle of a given material.
3. Conduct an experiment to prepare the edge of a given material in arc welding
4. Prepare the model as per given specification on a milling machine.

(Model Question Paper)

End exam

Automobile Testing and Reconditioning Laboratory& Driving Practice

Answer one Questions. Each question carries 40 marks **1 x 40 = 40 M**

1. Perform a plain turning operation of a given metal piece on a lathe machine.

2. Conduct an experiment Calculate the taper angle of a given material.
3. Conduct an experiment to prepare the edge of a given material in arc welding
4. Prepare the given model as per given specification on a milling machine.

COMPUTER AIDED DESIGN 3D LAB

Course Title :	**COMPUTER AIDED DESIGN 3D LAB**	Course Code	**18A-308P**
Semester	**III**	Course Group	**:Core**
Teaching Scheme in Periods(L:T:P)	**7.5:00:37.5**	Credits	: **1.5**
Methodology	**Lecture + Practical**	Total Contact Periods:	**: 45 Periods**
CIE	**60 Marks**	SEE	**40 Marks**

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Hours/ Periods	Questions for SEE			Marks weightage	%Weightage
			Handling	**Manipulation**	**Precision**		
1.	1.0 View entities in three dimensions	**02**	**10**	**10**	**20**	**40**	**100**
2.	2.0 Create three-dimensional entities	**18**	**10**	**10**	**20**	**40**	**100**
3.	3.0 Edit in three dimensions	**06**	**10**	**10**	**20**	**40**	**100**
4.	4.0 Edit three dimensional solids	**10**	**15**	**15**	**10**	**40**	**100**
5.	5.0Practice the selection of material from library	**03**	**15**	**15**	**10**	**40**	**100**
6.	6.0 Appreciate the importance of Solid Modeling software like PRO-E / UNIGRAPHICS / CATIA	**06**	**15**	**15**	**10**	**40**	**100**
	Total	**45**					

Pre requisites

This course requires the basic knowledge of manufacturing process.

COURSE OUTCOMES

At the end of the course the students will have the ability to :	
CO 1	List the commands of 3D
CO2	Create three-dimensional entities using different methods
CO3	Practice on Primitives with 3d Basics
CO4	Apply edit tools on Primitives
CO5	Apply the selection of material from library
CO6	Create the part drawing with a given geometry using Solid Modeling software

COURSE CONTENT

Viewing entities in three dimensions

- Setting a new viewing direction
- Dynamically setting a view direction

Creation of three-dimensional entities using different methods

- Drawing of two dimensional entities in three dimensional space
- Converting two dimensional planar entities into three dimensional entities by applying elevation and thickness
- Converting two dimensional planar entities into three dimensional entities by revolving or extruding.

Creation of three-dimensional faces, rectangular meshes, ruled surface meshes, extruded surface meshes, revolved surface meshes, three dimensional entities such as boxes, Cylinders, Cones, Spheres, wedges, torus, Regions, extruded solids, revolved solids, composite solids, intersect solids.

Editing in three dimensions

Rotating in three dimensions, Array in three dimensions (Rectangular and polar)

Mirroring in three dimensions, Aligning in three dimensions

Editing of three dimensional solids

Sectioning and Slicing of solids, hiding, shading and rendering

Selection of material from library

Enable the material library, Editing materials and material library

The importance of Solid Modeling software like PRO-E / UNIGRAPHICS / CATIA

Use any of the solid modelling packages stated above and generate a solid model of a machine component for different 3D components

Suggested learning outcomes :

Upon completion of the course the student shall be able to understand the concepts of 3D

- View entities in three dimensions
- To set a new viewing direction
- To dynamically set a view direction

Create three-dimensional entities using different methods

- Draw two dimensional entities in three dimensional space
- Convert two dimensional planar entities into three dimensional entities by applying elevation and thickness
- Convert two dimensional planar entities into three dimensional entities by revolving or extruding.
- Create three-dimensional faces
- Create rectangular meshes
- Create ruled surface meshes
- Create extruded surface meshes
- Create revolved surface meshes
- Create three dimensional entities such as boxes, Cylinders, Cones, Spheres, wedges, torus, Regions,
- Create extruded solids
- Create revolved solids
- Create composite solids
- Create intersect solids

Edit in three dimensions

- Rotate in three dimensions
- Array in three dimensions (Rectangular and polar)
- Mirror in three dimensions
- Align in three dimensions

Edit three dimensional solids

- Practice Sectioning and Slicing solids
- Practice hiding, shading and rendering

Practice the selection of material from library

- Enable material library
- Edit materials and material library

Appreciate the importance of Solid Modeling software like CREO (PRO-E)

UNIGRAPHICS / CATIA

- Use any of the solid modelling packages stated above and generate a solid model of a machine component for different 3D components

Key Competencies to achieved by the student – CAD 3D lab practice

Exercise	Key components	Periods
1.0 View entities in three dimensions	A. Set a new viewing direction B. Set dynamically view direction	**02**
3.0 Create three-dimensional entities	A. Create three-dimensional faces B. Create rectangular meshes, ruled surface meshes, extruded surface meshes, revolved surface meshes C. Create three dimensional entities such as boxes, Cylinders.	**18**
3.0 Edit in three dimensions	A. Rotate in three dimensions B. Array in three dimensions (Rectangular and polar) C. Mirror in three dimensions D. Align in three dimensions	**06**
4.0 Edit three dimensional solids	A. Practice Sectioning and Slicing solids B. Practice hiding, shading and rendering	**10**
5.0Practice the selection of material from library	A. Enable material library B. Edit materials and material library	**03**
6.0 Appreciate the importance of Solid Modeling software like PRO-E / UNIGRAPHICS / CATIA	A. Use any of the solid modelling packages stated above and Generate a solid model of a machine component for different 3D components using Solid modelling packages	**06**
Total		**45**

Suggested Student Activities

1.Visit service station and Collect the information about type of gear box and gear ratios used in four 1. 1.

1.prepare CAD drawings of automobile components.

2. Student should watch video lessons related to the latest trends in the course.

3. Student should participate in Quiz

4. Student should participate in Group discussion

5. Surprise test

Suggested E-Learning references

1. www.learnengineering.org
2. www.sae.org
3. www.nptel.ac.in

CO-PO MATRIX

Course outcome		**CL**	**Linked PO**
CO 1	List the commands of 3D	U/A	2,3,4,8
CO2	Create three-dimensional entities using different methods	U/A	2,3,4,8
CO3	Practice on Primitives with 3d Basics	U/A	2,3,4,8
CO4	Apply edit tools on Primitives	U/A	2,3,4,8
CO5	Apply the selection of material from library	U/A	2,3,4,8
CO6	Create the part drawing with a given geometry using Solid Modeling software	U/A	2,3,4,8

MODEL QUESTION PAPER
C-18, DIPLOMA IN AUTOMOBILE ENGINEERING

MID SEM-I & II

Time: 2 Hour **Total Marks: 20 M**

1. Draw two dimensional entities in three dimensional space
2. Convert two dimensional planar entities into three dimensional entities by applying elevation and thickness
3. Convert two dimensional planar entities into three dimensional entities by revolving or extruding.
4. Create three-dimensional faces
5. Create rectangular meshes
6. Create ruled surface meshes
7. Create extruded surface meshes
8. Create revolved surface meshes
9. Create three dimensional entities such as boxes, Cylinders, Cones, Spheres, wedges, torus, Regions,
10. Create extruded solids
11. Create revolved solids
12. Create composite solids
13. Create intersect solids

MODEL QUESTION PAPER
C-18, DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER END EXAM

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

1. Draw two dimensional entities in three dimensional space
2. Convert two dimensional planar entities into three dimensional entities by applying elevation and thickness
3. Convert two dimensional planar entities into three dimensional entities by revolving or extruding.
4. Create three-dimensional faces
5. Create rectangular meshes
6. Create ruled surface meshes
7. Create extruded surface meshes
8. Create revolved surface meshes
9. Create three dimensional entities such as boxes, Cylinders, Cones, Spheres, wedges, torus, Regions,
10. Create extruded solids
11. Create revolved solids
12. Create composite solids
13. Create intersect solids

Automobile Power Train laboratory

Course Title :	**Automobile Power Train laboratory**	Course Code	**18A-309P**
Semester	**III**	Course Group	**:Core**
Teaching Scheme in Periods (L:T:P)	**7.5:00:37.5**	Credits	: **1.5**
Methodology	**Lecture + Practical**	Total Contact Periods:	**: 45 Periods**
CIE	**60 Marks**	SEE	**40 Marks**

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Hours/ Periods	Questions for SEE			Marks weightage	%Weightage
			Handling	**Manipulation**	**Precision**		
1.	Engine Dismantling and assembling	**6**	**10**	**10**	**20**	**40**	**100**
2.	Lubrication System of a Multi Cylinder Engine	**3**	**10**	**10**	**20**	**40**	**100**
3.	Cooling System of a Multi Cylinder Engine	**3**	**10**	**10**	**20**	**40**	**100**
4.	Gear box dismantling and assembling	**6**	**15**	**15**	**10**	**40**	**100**
5.	Differential dismantling and assembling	**6**	**15**	**15**	**10**	**40**	**100**
6.	Practice on adjusting/changing the different control cables and drive chain of two wheelers	**6**	**15**	**15**	**10**	**40**	**100**
7.	Wheel removal and refitting	**3**	**10**	**10**	**20**	**40**	**100**
8.	Identification of major components in Two-wheeler	**3**	**10**	**10**	**20**	**40**	**100**
9.	Driving Practice Two wheeler	**9**	**10**	**10**	**20**	**40**	**100**
	Total	**45**					

Pre requisites

This course requires the basic knowledge of Basic Automobile Engineering Laboratory

Course Outcomes

At the end of the course student should be able to :

CO1 :	Perform sequential dismantling and assembling of Engine and inspect the parts.
CO2 :	Identify the components of gear box after dismantling inspect and assemble.
CO3 :	Adjust the control cables and drive chain of two wheeler.
CO4 :	Perform driving of two wheeler.

Course Content

LIST OF EXPERIMENTS

1. Dismantle a given I.C. Engine and identify various basic components such as Cylinder, Cylinder block, Cylinder heads, Piston, Piston rings, Connecting rod, Crank shaft, Valves and various Valve actuating mechanisms, Timing gears, Crankcase, Spark plug, Fuel pump, Carburetor, Fuel Injector, Fuel Injection pump.
2. Demonstrate the lubrication system of a multi cylinder engine with the aid of a chart or simulator.
3. Demonstrate the cooling system of a multi cylinder engine with the aid of a chart or simulator.
4. Dismantling and Assembling of a gear box (synchromesh)
5. Dismantling and Assembling of a Differential
6. Practice on adjusting/changing the different control cables and drive chain of two wheelers.
7. Practice on removing and refitting of wheel from vehicle and identify tyre and disc specifications.
8. Identification of major components in Two-wheeler.
9. Driving Practice-of two wheeler.

Suggested Learning Outcomes

The competencies and key competencies to be achieved by the student :

S NO	TITLE OF THE EXPERIMENT	KEY COMPETENCIES	COMPETENCIES
1	Engine Dismantling and assembling	1)Dismantle the Engine 2)Assembling the Engine 3)Check the Running Condition Of the engine.	1)Identify the tools required for Dismantling. 2)Use Of appropriate tools dismantle the engine parts and keep the parts without damage in order. 3)Clean all the parts with appropriate tool / medium. 4)Assemble all the parts in order. 5)Check the running condition of the engine.
2	Lubrication System of a Multi Cylinder Engine	Identify the major components of Lubrication system of a multi cylinder engine.	1)Draw a line diagram of a Lubrication System of a given Multi Cylinder Engine
3	Cooling System of a Multi Cylinder Engine	Identify the major components of Cooling system of a multi cylinder engine.	1)Draw a line diagram of a Cooling System of a given Multi Cylinder Engine
4	Gear box dismantling and assembling	Identifying proper meshing of gears	1)Identify the tools required for dismantling the component. 2)Use of appropriate tools dismantle the component 3)Keep the dismantled parts with out any damage in order 4)clean all the parts with appropriate tool / medium 5)Assemble the component 6) Check and bring to the operating condition
5	Differential dismantling and assembling	Identify the components of differential	
6	Practice on adjusting/changing the different control cables and drive chain of two wheelers	Dismantle the components	Identify the tools required for dismantling the component.

7	Wheel removal and refitting	Practice to loosen and fasten the wheel nuts in correct order	Identify the proper jack locating points for lifting the vehicle. Identify the specifications of tyre and disc.
8	Identification of major components in Two-wheeler	Identify the various 2-wheelers	Identify the various components of 2-wheelers
9	Driving Practice Two wheeler	1) Operate Controls 2) Driving Controls 3) Operate all the above Controls Simultaneously	1)Identify the Controls of a two Wheeler i.e, accelerator,brake and clutch 2)State the Purpose of controls. 3)Operate the controls efficiently 4)Operate the steering efficiently 5)Operate to change of gear by gear Shift lever 6)Identify the various accessories like Horn,lights and Indicators. 7) Operate all the above Controls Simultenously.

Suggested Student Activities

1.Visit service station and Collect the information about type of gear box and gear ratios used in four wheelers.

2.Case study of major Indian models of motorcycles and scooters.

3. Student inspects the available equipment in the Laboratory to identify the components.

4.Student should watch video lessons related to the latest trends in the course.

5. Student should participate in Quiz

6. Student should participate in Group discussion

7.Surprise test

Suggested E-Learning references

1. www.learnengineering.org
2. www.sae.org
3. www.nptel.ac.in

CO PO Mapping Matrix

Course Outcome		CL	Linked PO
CO1	Perform sequential dismantling and assembling of Engine and inspect the parts.	U/A	1,2,3,8,10
CO2	Identify the components of gear box after dismantling inspect and assemble.	R/U	1,2,3,8,10
CO3	Adjust the control cables and drive chain of two wheeler.	U	1,2,3,8
CO4	Perform driving of two wheeler.	U/A	1,2,3,8

MID SEM-I&II

Time: 2 Hour **Total Marks: 20 M**

PART – A

1. Dismantle a given multi cylinder engine, clean, inspect and indent all components and assemble the engine?
2. Inspect and identify the components of the lubrication system of multi cylinder engine on a given engine?
3. Inspect and identify the components of cooling system of multi cylinder engine on a given engine?
4. Dismantle clean and inspect different components for a given gear box of vehicle, note different gear ratios and assemble the gear box.
5. Dismantle, clean and inspect different components for a given differential and assemble the same?
6. Perform adjusting\changing the different control cables and drive chain of two wheelers?
7. Practicing wheel removal and refitting of wheels of a vehicle?
8. Identify, inspect transmission components of a two wheeler?
9. Perform driving practice by following the traffic signs and traffic rules on a given two wheeler?

END EXAM

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

PART – A

1. Dismantle a given multi cylinder engine, clean inspect and indent all components and assemble the engine?
2. Inspect and identify the components of the lubrication system of multi cylinder engine on a given engine?
3. Inspect and identify the components of cooling system of multi cylinder engine on a given engine?
4. Dismantle clean and inspect different components for a given gear box of vehicle, note different ratios and assemble the gear box.
5. Dismantle, clean and inspect different components for a given differential and assemble the same?
6. Perform adjusting\changing the different control cables and drive chain of two wheelers?
7. Practicing wheel removal and refitting of wheel of a vehicle?
8. Identify, inspect transmissions components of a two wheeler?
9. Perform driving practice by following the traffic signs and traffic rules on a given two wheeler

Communication Skills and Life Skills

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

Rationale:

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

Prerequisites:

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

Course Outcomes:

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

Life Skills – I	Think positively. Develop positive attitude. Overcome negative attitude. Know the importance of setting goals. Set goals using SMART features.
Life Skills – II	Know the reasons for a problem. Learn to overcome problems. Learn the various techniques to solve the problems. Learn to make proper decisions on time. Think 'out of the box'. Learn to be creative. Think innovatively. Think critically.
Life Skills – III	Know how to be a leader. Learn the qualities of a good leader. Learn the qualities of a good team. Learn the advantages and disadvantages of a team. Manage time effectively. Learn various time management techniques. Learn the importance of prioritisation.

CO-PO Matrix

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

Course Contents:

I. Listening Skills **Duration: 9**

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

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

3. Introducing Oneself
4. Describing Objects

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

5. Talking About the Past
6. Just A Minute

IV. Life Skills – I **Duration:6**

7. Attitude
8. Goal Setting

V. Life Skills – II **Duration:9**

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

VI. Life Skills – III **Duration:9**

11. Leadership and Teamwork
12. Time Management

Suggested Student Activities:

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

- Five-minute activities on Life Skills
- Watching videos on life skills and making presentations
- Case studies

Evaluation Pattern:

I. Continuous Internal Examination: 60 Marks

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

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

c. **Internal assessment**: 20 marks

i. Seminars: 10 marks
ii. Assignments: 5 marks
iii. Lab record submission: 5 marks

II. Semester End Examination : 40 Marks

a. Listening: 10 Marks
b. JAM or Role plays: 15 Marks
c. *Viva Voce* on any life skills topic : 15 Marks

References:

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

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

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

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

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

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.

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

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

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

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

E-Learning Resources:

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

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

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

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

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

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

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

BOARD DIPLOMA EXAMINATION (C-18)

THIRD SEMESTER 18 COMMON-310P

COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - I

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

Part – A **10 marks**

1. Listening Comprehension: 5 X 2 = 10

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

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

Questions:

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

PART- B **10 Marks**

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

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

BOARD DIPLOMA EXAMINATION (C-18)

THIRD SEMESTER 18 COMMON-310P

COMMUNICATION SKILLS AND LIFE SKILLS

MID SEM - II

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

Part – A **10 marks**

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

1. Describe how you have spent your summer vacation.

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

Part – B **10 marks**

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

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

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

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

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

Part – A **10 marks**

1. Listen to the following passage and answer the questions give below it**. 5 X 2 = 10**

(Teacher should give the questions before reading the passage)

Answer the following questions after teacher reads the following paragraph.

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

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

Questions:

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

Part – B **15 marks**

2. JAM / Role Plays

Part – C **15 marks**

3. Viva Voce on Life Skills topics