CURRICULLUM OF 4th SEMESTER

For

DIPLOMA IN AUTOMOBILE ENGINEERING

(Effective FROM 2019-20 Sessions)

STATE COUNCIL FOR TECHNICAL EDUCATION & VOCATIONAL TRAINING, ODISHA, BHUBANESWAR

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 4th Semester (Automobile Engg)(wef 2019-20)

Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
		Theory							
Th.1		Theory of Machine	4		-	20	80	3	100
Th.2		Manufacturing Technology	4		-	20	80	3	100
Th.3		Hydraulic and Pneumatic control	4		-	20	80	3	100
Th.4		Automotive Engine	4			20	80	3	100
		Total	*16*			*80*	*320*	-	*400*
		Practical							
Pr.1		Auto Engine Lab-I	-	-	6	25	75	3	100
Pr.2		Auto Machines Shop-I	-	-	6	25	75	3	100
Pr.3		Workshop-III	-	-	6	50	50	4	100
Pr.4		Technical Seminar			2	50			50
		Student Centred Activities(SCA)		-	3				
		Total	-	-	23	150	200	-	350
		Grand Total	**16**	**-**	**23**	**230**	**520**	**-**	**750**

Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%

SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc. ,Seminar and SCA shall be conducted in a section.

There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester

Th.1 THEORY OF MACHINES

Name of the Course: Diploma in **Mech/Auto/Aero & Other Mechanical Allied Branches**			
Course code:		Semester	4th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONAL:

Mechanical and automobile engineering is involved with design , manufacturing and use of various types of machines. Each machine consists of a large number of static and moving parts called mechanisms. Theory of machines is study of such different kind of mechanisms .

B. COURSE OBJECTIVES:

Students will develop ability towards

- Understanding machine as a system consisting of different link assemblies as components
- Comprehending Working principle of machine components such as clutch, brakes, bearings based on friction
- Comprehending working principles related to power transmission systems and predicting the work involved and efficiency
- Comprehending working principles in speed and torque regulating devices such as governor and flywheels
- Determination of amount and position of masses required towards static and dynamic balancing
- Comprehending types and causes of vibration in machines and predicting remedial measures

C.TOPICWISE DISTRIBUTION OF PERIODS

Sl. No.	**Topic**	**Periods**
01	Simple Mechanism	08
02	Friction	12
03	Power Transmission	12
04	Governors and Flywheel	12
05	Balancing of Machine	08
06	Vibration of machine parts	08
	Total Period:	**60**

D. COURSE CONTENT

1.0 Simple mechanism

1.1 Link, kinematic chain, mechanism, machine
1.2 Inversion, four bar link mechanism and its inversion
1.3 Lower pair and higher pair
1.4 Cam and followers

2.0 Friction

2.1 Friction between nut and screw for square thread, screw jack

2.2 Bearing and its classification, Description of roller, needle roller & ball bearings.
2.3 Torque transmission in flat pivot & conical pivot bearings.
2.4 Flat collar bearing of single and multiple types.
2.5 Torque transmission for single and multiple clutches
2.6 Working of simple frictional brakes.
2.7 Working of Absorption type of dynamometer

3.0 Power Transmission

3.1 Concept of power transmission
3.2 Type of drives, belt, gear and chain drive.
3.3 Computation of velocity ratio, length of belts (open&cross) with and without slip.
3.4 Ratio of belt tensions, centrifugal tension and initial tension.
3.5 Power transmitted by the belt.
3.6 Determine belt thickness and width for given permissible stress for open and crossed belt considering centrifugal tension.
3.7 V-belts and V-belts pulleys.
3.8 Concept of crowning of pulleys.
3.9 Gear drives and its terminology.
3.10 Gear trains, working principle of simple, compound, reverted and epicyclic gear trains.

4.0 Governors and Flywheel

4.1 Function of governor
4.2 Classification of governor
4.3 Working of Watt, Porter, Proel and Hartnell governors.
4.4 Conceptual explanation of sensitivity, stability and isochronisms.
4.5 Function of flywheel.
4.6 Comparison between flywheel & governor.
4.7 Fluctuation of energy and coefficient of fluctuation of speed.

5.1 Balancing of Machine

5.2 Concept of static and dynamic balancing.
5.3 Static balancing of rotating parts.
5.4 Principles of balancing of reciprocating parts.
5.5 Causes and effect of unbalance.
5.6 Difference between static and dynamic balancing

6.1 Vibration of machine parts

6.1 Introduction to Vibration and related terms (Amplitude, time period and frequency, cycle)
6.2 Classification of vibration.
6.3 Basic concept of natural, forced & damped vibration
6.4 Torsional and Longitudinal vibration.
6.5 Causes & remedies of vibration.

CHAPTERS TO BE COVERED UP TO IA- 1, 2, 3

Learning Resources:

Sl No.	Name of the Book	Author Name	Publisher
1.	Text Book of Theory of Machine	R.S Khurmi	S.Chand
2.	Text Book of Theory of Machine	R.K. Rajput	S.Chand
3.	Text Book of Theory of Machine	P.L.Ballany	Dhanpat Rai
4.	Text Book of Theory of Machine	Thomas Bevan	Pearsion

Th2. MANUFACTURING TECHNOLOGY

Name of the Course: Diploma in **Mech/Auto/Aero & Other Mechanical Allied Branches**			
Course code:		Semester	4th
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONAL:

Engineering basically means production of goods and services for human consumption. The major function of mechanical engineering is to manufacture various products using machineries, production processes and production management techniques. Therefore this is one of the most important subjects to be learned by a mechanical and automobile engineer.

B.COURSE OBJECTIVES:

Students will develop ability towards

- Comprehending required material properties for cutting tools
- Comprehending machining mechanism principle and factors affecting machining performance
- Comprehending working principle and components in machining tools including lathe, milling, shaping, planning, slotting machines
- Comprehending requirement of surface finish and realize principles involved in grinding and super finishing operations

C.TOPICWISE DISTRIBUTION OF PERIODS

Sl. No.	**Topic**	**Periods**
01	Tool Materials	04
02	Cutting Tools	06
03	Lathe Machine	08
04	Shaper	06
05	Planning Machine	06
06	Milling Machine	08
07	Slotter	06
08	Grinding	06
09	Internal Machining operations	06
10	Surface finish, lapping	04
	Total Period:	**60**

D. COURSE CONTENT

1.0 Tool Materials

1.1 Composition of various tool materials

1.2 Physical properties & uses of such tool materials.

2.0 Cutting Tools

2.1 Cutting action of various hand tools such as Chisel, hack saw blade, dies and reamer

2.3 Turning tool geometry and purpose of tool angle

2.5 Machining process parameters (Speed, feed and depth of cut)

2.6 Coolants and lubricants in machining and purpose

3.0 Lath Machine

3.1 Construction and working of lathe

- Major components of a lathe and their function
- Operations carried out in a lathe (Turning, thread cutting, taper turning, internal machining, parting off, facing, knurling)
- Safety measures during machining

3.2 Capstan lathe

- Difference with respect to engine lathe
- Major components and their function
- Define multiple tool holders

3.3 Turret Lathe

- Difference with respect to capstan lathe
- Major components and their function

3.4 Draw the tooling lay out for preparation of a hexagonal bolt & bush

4.0 Shaper

4.1 Potential application areas of a shaper machine

4.2 Major components and their function

4.3 Explain the automatic table feed mechanism

4.4 Explain the construction & working of tool head

4.5 Explain the quick return mechanism through sketch

4.6 State the specification of a shaping machine.

5.0 Planning Machine

5.1 Application area of a planar and its difference with respect to shaper

5.2 Major components and their functions

5.3 The table drive mechanism

5.4 Working of tool and tool support

5.5 Clamping of work through sketch.

6.0 Milling Machine

6.1 Types of milling machine and operations performed by them

6.2 Explain work holding attachment

6.3 Construction & working of simple dividing head, universal dividing head

6.4 Procedure of simple and compound indexing

6.5 Illustration of different indexing methods

7.0 Slotter

7.1 Major components and their function

7.2 Construction and working of slotter machine

7.3 Tools used in slotter

8.0 Grinding

8.1 Significance of grinding operations

8.2 Manufacturing of grinding wheels

8.3 Criteria for selecting of grinding wheels

8.4 Specification of grinding wheels with example Working of

- Cylindrical Grinder
- Surface Grinder
- Centre less Grinder

9.0 Internal Machining operations

Classification of drilling machines

9.1 Working of

- Bench drilling machine
- Pillar drilling machine
- Radial drilling machine

9.2 Boring

- Basic Principle of Boring
- Different between Boring and drilling

9.3 Broaching

- Types of Broaching (pull type, push type)
- Advantages of Broaching and applications

10 Surface finish, lapping

10.1 Definition of Surface finish

- Define super finishing

10.2 Description of lapping & explain their specific cutting.

CHAPTERS TO BE COVERED UP TO IA – 1,2,3,4,5

Learning Resources:

Sl No.	Name of the Book	Author Name	Publisher
1.	Text Book of Workshop Technology	Hazra Choudhury Vol-I & II	MPP Pvt. Ltd.
2.	Text Book of Workshop Technology	W.A.S Chapman	
3.	Text Book of Manufacturing Process	P.N Rao	TMH

Th3. HYDRAULICS & PNEUMATIC CONTROL

Name of the Course: Diploma in AUTOMOBILE ENGINEERING			
Course code:		Semester	4TH
Total Period:	60	Examination	3 hrs
Theory periods:	4 P/W	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONAL:

To provide basic understanding about hydraulic and Pneumatic control systems. To provide basic for the students to gain skills in operating and maintaining various hydraulic & pneumatic systems.

B. COURSE OBJECTIVE:

Student will be able to:

1. Understand the basic properties of fluid, important principles of hydraulics with their applications and hydraulic devices used in practice.
2. Identify fluid power system components
3. Select appropriate tools to dismantle & assemble the components.
4. Diagnose probable causes of failure of component of hydraulic & pneumatic circuit.
5. Verify the conditions of fittings, OTC, pipes, seals & packing of hydraulic systems in automobile vehicles.
6. Construct the hydraulic & pneumatic circuits for various applications.

C. Topic wise distribution of periods

Sl. No	Topic	Periods
1	Fluid Mechanics	8
2	Hydro dynamics	10
3	Hydraulic devices	14
4	Basic Components of Hydraulic & Pneumatic System	10
5	Accessories of hydraulic & Pneumatic Circuit	8
6	Hydro Pneumatic System & Circuits	10
	TOTAL PERIODS	**60**

D. COURSE CONTENTS:

1. Fluid Mechanics

1.1 Fluid properties.

Define fluid, description of fluid properties like Density, Specific weight, specific gravity, specific volume , Dynamic viscosity, kinematic viscosity, surface tension Capillary phenomenon. Solve simple numerical.

1.2 Measurement of pressure

Concept of atmospheric pressure, gauge pressure, absolute pressure, pressure gauges- Piezometer tube, simple & differential monometer, Micro-Manometer (simple problems on manometers) Bourdon tube pressure gauge.

2. Hydro dynamics.

2.1 Law of continuity and its application.

2.2 Bernoulli's Theorem.

Energy possessed by the liquid in motion, Bernoulli's theorem and its applications such as venturimeter, orifice meter &pitot tube (Analytical treatment with derivation for measurement of discharge is expected)

2.3 Hydraulic Coefficients.

Concept of vena contract.

Coefficient of contraction, coefficient of velocity, coefficient of discharge, relation between the hydraulic coefficients.

2.4 Types of fluid flow.

Steady, unsteady, rotational, irrotational, laminar, turbulent, one, two & three dimensional flow, uniform & non uniform flow.

3. Hydraulic Devices.

3.1 Simple Hydraulic devices.

Working principles, construction and applications of hydraulic jack, hydraulic Ram, hydraulic lift, hydraulic press.

3.2 Centrifugal Pumps.

Types, construction & working of centrifugal pump. Types of casing. Need of priming, Heads, Losses & efficiencies of centrifugal pump (NO analytical treatment). Net positive suction head, fault finding &remedies, pump selection.

3.3 Reciprocating Pumps.

Constriction and working of single & double acting reciprocating pump, positive & negative slip.

Air vessels- their function & advantages.

Power & efficiencies of reciprocating pump. Reasons of cavitations & separation.

4. Basic components of Hydraulic & Pneumatic systems.

4.1 Hydraulic & Pneumatic system components

4.2 Air Motors

4.3 Hydraulic Actuator – single and double cylinder

4.4 Valves: Classification of valves, pressure control, directional control, sequencing, synchronizing and flow control valve.

5. Accessories of hydraulic & pneumatic circuit.

5.1 Filters: Type, functions, construction.

5.2 Hoses & connectors: Type, construction and applications.

5.3 Seals and gaskets: Types, function, construction

6. Hydro Pneumatic Systems & Circuits

6.1 Comparison of Hydraulic and Pneumatic circuits.

6.2 Hydraulic Circuits:

Meter in, Meter out, Bleed off, Sequencing, Applications of hydraulic circuits

6.3 Simple Pneumatic Circuits.

Speed Control Circuits, Sequencing circuits, Application of Pneumatic Circuits

CHAPTERS TO BE COVERED UP TO IA- 1,2,3

Learning Resources:

Sl No	Name of Authors	Title of Book	Name of the Publisher
1.	S.R. Mujumdar	Oil Hydraulic System- Principleand Maintenance	Tata McGraw Hill Co.
2.	S.R. Mujumdar	Pneumatics System- Principle and Maintenance	Tata McGraw Hill Co.
3.	K.Shanmuga Sundaram	Pneumatic and Hydraulic Control system	S Chand
4.	R. K. Bansal	Fluid Mechanics and Hydraulic Machines	S Chand

Th4. AUTOMOTIVE ENGINE

Name of the Course: Diploma in AUTOMOBILE ENGG
Period/Week:4 Examination: 3Hrs
Total period: 60 End exams: 80 marks
IA:20 marks

A. RATIONALE:

Automobile engineers must have the knowledge of auto engines which is the heart of any automobile. The subject deals with function & constructional details of automobile engines, properties of fuel, lubricants and cooling system.

B. COURSE OBJECTIVES:

On completion of the subject students will be able to explain

1. Principle and working of petrol engine.
2. Principle and working of diesel engine.
3. Properties of fuel, details of combustion and control of knocking.
4. Process of fuel being supplied to petrol & Diesel engine.
5. Types of engine cooling and working principle of cooling system.
6. Types, properties, requirement of lubricants &process of lubrication.
7. Performance of engine.

C. TOPICE WISE DISTIBUTION OF PERODS

Sl. No.	Topic	Periods
1.	Petrol engines & its constructional details	10
2.	Diesel engine & its constructional details.	10
3.	Performance of I.C engine	10
4.	Fuel feed system for petrol & diesel engine	14
5.	Cooling system	08
6.	Lubrication system	08
	TOTAL PERIODS-	**60**

D. COURSE CONTENTS:

1 Petrol engine and its constructional details

1.1 Working principle of two stroke & four stroke petrol engine.

1.2 Constructional details of petrol engine with materials. Engine components like piston, cylinder block, valve, connecting rod, crank shaft, crank slot.

1.3 Cylinder arrangement: inline and v-type engine firing order of multi cylinder engine.

1.4 Side valve actuating mechanism over head valve actuating mechanism.

1.5 I, F & T type valve arrangement, valve clearance.

1.6 Timining gear, vibration damper, inlet & exhaust manifold.

2. Diesel engine and its constructional details

2.1 Working principle two strokes & four stroke diesel engine.

2.2 Types, advantages & limitations of diesel engine over petrol engine.

2.3 Function & types of combustion chamber.

2.4 Direct injection type combustion chamber, pre combustion chamber, turbulence chamber. Their advantages & disadvantages.

3. Performance of I.C engine

3.1 Define mechanical efficiency, Indicated thermal efficiency, Relative Efficiency, brake thermal efficiency overall efficiency Mean effective pressure &specific fuel consumption.

3.2 Define air-fuel ratio & calorific value of fuel.

3.3 Morse – test and preparation of heat balance sheet

3.4 Work out problems to determine efficiencies & specific fuel consumption.

4. Fuel feed system for petrol & diesels engine

4.1 Line diagram of petrol engine fuel supply system.

4.2 Components of petrol engine fuel supply system like fuel tanks, fuel lines, fuel pumps, (mechanical & electrical) fuel filter.

4.3 Requirements and working principle of carburetors. Air fuel ratios for different conditions in carburettors.

4.4 Circuits of various types of carburetor, like down draught carburetor ,side draught carburetor.

4.5 Description of motorcycle carburetor

4.6 line diagram of diesel engine fuel supply system.

4.7 Requirements and types of fuel injection system.

4.8 Air injection, solid injection individual pump system injection common rail system injection

4.9 TBL system MPFI system PFI system ECM control functions

4.10 Constructional details of fuel pump.

4.11 Fuel injectors.

4.12 Governing system of fuel: Mechanical governor pneumatics governor. Hydraulic governor.

5.Cooling System

5.1 Necessity & types of engine cooling.

5.2 Constructional details of air cooling & water cooling (thermo siphon & pump air circulation)

5.3 Advantages and limitations of air cooling.

5.4 Water pump thermostat, radiator.

5.5 Anti-freezing and anti-corrosive additives.

6. Lubrication System

6.1 Types, requirements and properties (flash point & fire points) of lubricants.

6.2 Types of lubrication system gravity type, Splash type, pressure type, dry sump type, semi pressure type etc.

6.3 Parts of lubricating system like oil sump, oil cooler, oil filter, oil pressure gauge, oil pressure indicating light ,oil label indicator.

6.4 Oil filters and its types – full flow filter and bypass filter. Crank case ventilation.

CHAPTERS TO BE COVERED UP TO IA – 1,2,3

BOOKS RECOMMENDED

1. Automobile engineering Vol, Vol-II by Kirpal Singh std . Publishers.
2. Automobile engineering by N.H. Crouse. Mc. Graw Hills.
3. Automobile engineering by G.B.S. Narangs, Khanna pub.
4. The automobile- by H.S.Reyat. S. Chand & Co.
5. Automobile engineering by W.H. Course. Mc Graw Hill
6. I.C. engine by Mathur and Sharma.
7. Automobile engineering by R.B. Gupta. Satya Prakashan.
8. Automobile engineering by C.P. Nakra.

Pr.1 AUTO ENGINE LAB-I

Name of the Course: Diploma in AUTOMOBILE ENGINEERING			
Course code:		Semester	4th
Total Period:	90	Examination	3 hrs
Lab. periods:	6 P/W	Term Work	25
Maximum marks:	100	End Semester Examination:	75

A. AIM:

Automobile students should have practical knowledge skill about various parts and systems involved in automobiles . This will positively help them in practical field to work.

B. OBJECTIVES:

After completion the course students will be able to

1. Calculate IHP, BHP and FC of single cylinder, multicylinder petrol and diesel engines.
2. Understand various parts and systems present in automobiles

SL NO	CONTENT
1	Study of constructional details and working principle of petrol engine.
2	Study of constructional details and working principle of diesel engine.
3	Determine the brake thermal efficiency of a single cylinder petrol engine.
4	Determine the brake thermal efficiency of a single cylinder diesel engine
5	Determine B.H.P , I.H.P, BSFC of a multi cylinder engine by Morse test.
6	Study of fuel feed system of petrol and diesel engine
7	Testing of fuel injection system and adjustment of pressure of a fuel injector.
8	Identification of various units of a vehicle
9	Study of different types of cooling system used in a vehicle.
9	Study of lubrication system of a vehicle.
10	Study of different types of engines, adjustment of tappet, clearance of valve, timing adjustment etc.
11	Calibrating and phasing of fuel pump through calibrating machine.
12	Testing the Valve spring by spring tester.
13	Study of hydraulic control system and pneumatic control system
14	Assembling engine parts such as F.I. pump, injector, fuel filter & other accessories.
15	Adjustment of valve tappet clearance (four cylinder/six cylinder engine)
16	Study of Air Compressor

Pr2. AUTO MACHINE SHOP-I

Name of the Course: Diploma in AUTOMOBILE ENGINEERING			
Course code:		Semester	4th
Total Period:	90	Examination	3 hrs
Lab. periods:	6 P/W	Term Work	25
Maximum marks:	100	End Semester Examination:	75

A. RATIONALE:

Automobile engineers should know the use of measuring tools for automobile parts, they should also know about intricate machining and finishing of automobile parts.

B. OBJECTIVES:

Student should be able to operate different machine tools required in an automobile machine shop and use relevant measuring instruments.

Sl No	Content
1	Checking flatness and squareness using a try square and filling the Same if not leveled.
2	Sharpening of cutting tools like chisels, twist drill bit and punch through double ended grinder.
3	Internal threading of hole/ blind holes using hand taps.
4	Measurement of hole and slots using telescopic gauges and inside micrometer
5	Measurement of size / depth and roundness of a object with a Vernier calliper
6	Measurement of crank pins, main journal of crank shaft.
7	Measurement of cylinder bore by inside micrometer
8	Determination of ovality and taper by using dial gauge.
9	Measurement of fillet radius.
10	Operating various Workshop equipment such as: Valve refacing M/C, Cylinder Honing M/C, Twin head M/C, Horizontal Boring bar, Surface grinding M/C, Crank shaft Grinding M/C.

Pr3. WORK SHOP PRACTICE-III

Name of the Course **Mech/Auto/Aero & Other Mechanical Allied Branches**			
Course code:		Semester	4th
Total Period:	90	Examination	4 hrs
Lab. periods:	6 P/W	Term Work	50
Maximum marks:	100	End Semester Examination:	50

A. Course Objectives:

Students will develop an ability towards

- Preparing components and jobs using foundry, welding and machining
- Realizing process parameters involved and their effects

1		**Machining Practices**
	1.1	Job involving drilling, boring
	1.2	Internal/External threading on Turning jobs
	1.3	Job involving use of Capstan turret lathe (Taper Turning & Chamfering)
	1.4	All gear lathe, CNC Lathe Trainer Practice
2		Job involving all turning process on MS Rod & **Metal Machining**
	2.1	Shaper
	2.2	Milling Machine
		Preparation of Spur gear on CI or MS round

Pr4. TECHNICAL SEMINAR

Name of the Course: Diploma in AUTOMOBILE ENGINEERING			
Course code:		Semester	4^{th}
Total Period:	30	Examination	-
Lab. periods:	2 P/W	Term Work	50

A . OBJECTIVES:

Each student has to select a recent topic of latest technology in the area of Automobile engineering and present a seminar in front of all students of the class. He/She has to prepare a PowerPoint presentation of the selected topic of minimum 10 slides are the total presentation will be approximately 10 minutes duration .There will be interactive session between the presenter and rest of the students including the faculty members of the dept at the end of presentation .A student has to present at least 2 nos.of seminar during a semester and to submit the report for evaluation.

List of Equipments of Machine Shop

Sl. No.	Name of Apparatus	QUANTITY
01	VERNIER CALLIPER	04 Nos.
02	MICROMETER	04 Nos.
03	VERNIER HEIGHT GAUGE	02 Nos.
04	SLIP GAUGE	02 Nos.
05	SINE BAR	02 Nos.
06	DIAL GAUGE	02 Nos.
07	TELESCOPIC GAUGE	01 No.
08	FILLER GAUGE	02 Nos.
09	TRY SQUARE AND FILES	02 Nos.
10	PORTABLE HAND GRINDER	01 No.
11	DOUBLE ENDED GRINDER	01 No.
12	CRANK SHAFT GRINDING M/C	01 No.
13	CYLINDER HONING M/C	01 No.
14	VALVE REFACING M/C	01 No.
15	TWIN HEAD M/C	01 No.
16	HORIZONTAL BORING BAR	01 No.

List of Equipments of Workshop Practice-III

Sl. No.	Name of Apparatus	QUANTITY
01	RADIAL DRILL MACHINE	01 No
02	ALL GEAR LATHE	06 Nos.
03	CAPSTAN LATHE	01 Nos.
04	CNC LATHE TRAINER	01 Nos.

List of Equipments of Auto Engine lab

Sl. No.	Name of Apparatus	QUANTITY
01	COMPLETE MODEL OF A VEHICLE WITH ENGINE , TRANSMISSION SYSTEM,SUSPENSION SYSTEM, ELECTRIC SYSTEM, COOLING SYSTEM, LUBRICATION SYSTEM	01 Nos.
02	TWO STAGE AIR COMPRESSOR	01 Nos.
03	MODEL OF TWO STROKE PETROL ENGINE	02Nos.
04	MODEL OF TWO STROKE DIESEL ENGINE	02Nos.
05	MODEL OF FOUR STROKE PETROL ENGINE	02Nos.
06	MODEL OF FOUR STROKE DIESEL ENGINE	02
07	CALIBRATING M/C	01
08	SPRING TESTER	01
09	HYDRAULIC CONTROL SYSTEM	01
10	PNEUMATIC CONTROL SYSTEM	01
11	MODEL OF DIESEL ENGINE FUEL FEED SYSTEM	01
12	INJECTOR TESTING MACHINE	01
13	SINGLE CYLINDER PETROL ENGINE TEST RIG	01
14	SINGLE CYLINDER DIESEL ENGINE TEST RIG	01
15	MORSE TEST APPARATUS	01
16	SPRING TESTER	01
17	HYDRAULIC JACK	01