

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA,
BHOPAL**

**CURRICULUM
FOR
DIPLOMA IN AUTOMOBILE ENGINEERING**

(THIRD SEMESTER)

Scheme: JUL.2008
Implemented from session 2008-09

Under semester system



JULY 2008

**CURRICULUM DEVELOPMENT CENTRE
MECHANICAL ENGINEERING DEPARTMENT
BHIM RAO AMBEDKAR POLYTECHNIC COLLEGE,
GWALIOR**



RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER: THIRD SEMESTER SCHEME: JUL. 2008
COURSE CODE: 301 COMMON WITH PROGRAMMES:
NAME OF THE COURSE: MATERIALS M02, R01
TECHNOLOGY PAPER CODE:

RATIONALE

The knowledge of materials, their properties and behavior is essential for people associated with engineering activities. Materials technology plays an important role in design and production of product from the point of view of reliability and performance of product.

The curriculum of the subject emphasizes upon understanding the properties and behavior of materials in correlation with their structure and external environmental effects. The range of materials available for engineering use is quite vast, hence only the basic groups of materials such as ferrous, non-ferrous non metallic materials along with their general characteristic and application have been stressed.



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COURSE CODE: **301** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **MATERIALS M02, R01**
TECHNOLOGY PAPER CODE:

Lectures: 04 Hrs. per Week

Practical: 03 Hrs. per Week

SCHEME OF STUDIES

S. No	Topics	Theory Hrs	Practical Hrs	Total Hrs
1	Requirement of Engineering materials, mechanical properties of materials and their testing	03	-	03
2	Structure of solid materials	02	-	02
3	Solidification of Metal and Ingot structure	04	-	04
4	Equilibrium Phase Diagram and phase transformation.	06	-	06
5	Practical Metallographic	02	09	11
6	Iron- carbon Equilibrium system.	06	09	15
7	Heat treatment of steels.	05	18	23
8	Ferrous metal and Alloys	05	09	14
9	Non- ferrous metals and alloys	05	-	05
10	Non- metallic materials	03	-	03
11	Plastics	06	-	06
12	Powder metallurgy	03	-	03
13	Metal preservations	06	-	06
14	Modern trends in material technology.	04	-	04
Total		60	45	105



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Lectures: 04 Hrs. per Week

Practical: 03 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
1	Requirement of Engineering materials, mechanical properties and their testing : Introduction to engineering materials, classification of engineering materials and their properties. Mechanical properties of materials, destructive including Tensile test, compression test, hardness test, impact test fatigue test, endurance limit, bending test, shear test and non- destructive testing methods.	03
2	Structure of Solid materials: Classification amorphous and crystalline states, unit cells and crystal structure (B.C.C., F.C.C. and H.C.P) allotropy. Crystal imperfection and their effects on properties	02
3	Solidification of Metal and ingot structure: Process of nucleation and grain growth, ingot solidification, dendritic and columnar structure, segregation of impurities, grain and grain boundaries.	04
4	Equilibrium Phase Diagrams and Phase Transformation : Equilibrium of phase Diagrams : Plotting of equilibrium diagrams, interpretation, phase rule and lever rule and its application Phase transformations – Eutectic Eutectoid, Peritectic and Peritectoid	06
5	Practical Metallography : Preparation of specimen, selecting the specimen, mounting the specimen, grinding , polishing, etching and etching reagents. The metallurgical microscope. Use and care of microscope.	02
6	Iron- Carbon Equilibrium System : The complete iron carbon diagram and its interpretation. The solidification and cooling of various carbon steels, structures produced, correlation of mechanical properties with carbon content.	06



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Practical: 03 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
7	Heat Treatment of Steels: Objective of heat treatment, thermal processes- annealing, normalizing, hardening and tempering. Hardening process : Surface hardening, flame hardening, case hardening methods, their scope, limitations and advantages, quenching mediums and their effect on hardness, Hardening defects due to improper quenching, hardenability, Jominy end quench test and interpretation of its results. T.T.T. curves interpretation and use, Isothermal heat treatment processes -martempering, austempering, spheroidising and patenting	05
8	Ferrous Metals and Alloys : Classification, types of cast irons their properties and uses, alloy cast-irons, various alloying elements used, their effects on properties and uses. Classification, composition and uses of plain carbon steels, effect of impurities, Alloy steels -various alloying elements, their effects on properties and uses. Alloy steel classification. Tool Steel : Typical compositions, requirements of tool steels, high speed steel, high carbon steel. Standardization of steels. Designation of steels as per B.I.S. codes.	05
9	Non- Ferrous Metals and Alloys : Copper : Its Properties and uses Copper Bases Alloys : Brasses, their classification, composition, properties and uses, designation of copper alloys as per B.I.S. aluminum its properties and uses. Aluminum Alloys : Their composition, Classification, properties and uses. Designation of Al- alloys as per B.I.S, Zinc, Nickel and lead their alloys properties and uses Bearing alloys - their composition and field of application.	05
10	Non- Metallic Materials : introduction to Ceramic Refractory, Rubbers Insulators and Lubricants	03



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Lectures: 04 Hrs. per Week
Practical: 03 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
11	Powder metallurgy :-Introduction and application. Description of process, manufacture and blending of metal powder compacting and sintering.	06
12	Metal Preservation : Corrosion meaning various mechanism effect of corrosion, methods of minimizing corrosion	03
13	Non- Ferrous Metals and Alloys : Copper : Its Properties and uses Cooper Bases Alloys : Brasses, their classification, composition, properties and uses, designation of copper alloys as per B.I.S. aluminum its properties and uses. Aluminum Alloys : Their composition, Classification, properties and uses. Designation of Al- alloys as per B.I.S, Zinc, Nickel and lead their alloys properties and uses Bearing alloys - their composition and field of application.	06
14	Non- Metallic Materials : introduction to Ceramic Refractory, Rubbers Insulators and Lubricants	04



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Lectures: 04 Hrs. per Week

Practical: 03 Hrs. per Week

LIST OF EXPERIMENTS

S.No.	NAME OF EXPERIMENT	PRACT. Hrs.
1	Preparation of micro specimen.	03
2	To study micro structural characteristics of gray cast iron white cast iron and malleable cast iron.	06
3	To study effect of normalising, annealing on the hardness and microstructure of high carbon steel.	06
4	To study the effect of carbon and temperature on hardening of steel.	06
5	To study the effect of temperature on the properties during tempering of steel.	06
6	To study the effect of quenching media on hardness of steel.	03
7	To study the carbonizing and case hardening of steel.	03
8	Joining hardenability test and its industrial use.	03
9	To Study the microstructure of some important brasses and bornzes.	03
10	To observe the micro structural characteristics and other properties of various cast irons and prepare a report there of, for industrial uses.	06



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TECHNOLOGY PAPER CODE:

Lectures: 04 Hrs. per Week
Practical: 03 Hrs. per Week

REFERENCES

- 1 Engineering physical Matallurgy-By Prof. Y Lakhtin MIR Publishers mascow
- 2 A Text Book of Material Science And Metallurgy by O.P. Khanna.
- 3 Material Science And Process. by S. K. Hazia Choudhry
- 4 Mechanical Metallurgy by Dieter (Tata Mcgrawhill)
- 5 Materials For Engineers by M.H.A. Kempsty
- 6 Introduction to Material Science And Engineeringby K.M. Ralls, T.H. Courtney, John Wuff (Wiley Eastern New Delhi)
- 7 Physical Matallurgy Principles by Read Hill (Affiliated East- West Press Pvt. Ltd. New Delhi.)
- 8 Engineering Metalluragy by R. Higgins (ENS).
- 9 Materials Science by B.S. Narang (Pub. CBS pub. & Distributions New Delhi)
- 10 Padarth Prodyogiki (Hindi) by P.N. Vijayvergiya (Deepak Prakashan, Gwalior) .



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DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER: **THIRD SEMESTER** SCHEME: **JUL. 2008**
COURSE CODE: **302** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **AUTOMOTIVE**
CHASSIS – I PAPER CODE:

RATIONALE:

In teaching fundamentals of Automobile Engineering, chassis is an essential topic. It is divided in two parts. In this part we have included components of power transmission. The student will learn about clutch, gear box, propeller shaft, universal joint, differential, rear axle, wheels & tyre.

OBJECTIVES:

1. To understand working of transmission components such as clutch, gear boxes, universal joint. Propeller shaft, differential.
2. To know the changes & development in modern vehicle from control & safety point of view.



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COURSE CODE: **302** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **AUTOMOTIVE**
CHASSIS – I PAPER CODE:

Lectures: 04 Hrs. per Week

Practical: 03 Hrs. per Week

SCHEME OF STUDIES

S. No	Topics	Theory Hrs	Practical Hrs	Total Hrs
1	Introduction	08	08	16
2	Transmission units	16	12	28
3	Drive line	12	10	22
4	Differential assembly	14	10	24
5	Wheels & Tyres	10	05	15
TOTAL		60	45	105



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NAME OF THE COURSE: **AUTOMOTIVE**
CHASSIS – I PAPER CODE:

Lectures: 04 Hrs. per Week
Practical: 03 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
1	INTRODUCTION Types of chassis layout with reference to power plant locations and drives.	08
2	TRANSMISSION UNITS Need of transmission system, Features of transmission components CLUTCH: - Requirements of clutches - Principle of friction clutch - Types: Cone clutch, Single-plate clutch, Diaphragm spring clutch, Multi-plate clutch, Centrifugal clutches, Electromagnetic clutch. Need of Fluid coupling – Principle, construction & working of fluid coupling. GEAR BOX: - Requirements of Gear boxes, Different types of gear boxes, construction & working of Sliding mesh, Constant mesh & synchromesh gear box. Transfer case assembly. Introduction to Torque converter, Hydrostatic transmission.	16
3	DRIVE LINE Need of universal joints, fluctuations in angular speed, construction & working of constant velocity universal joints, Need of propeller shaft, its construction & whirling speed. Need of rear axle & its types, construction & working of full floating, three quarter floating and semi floating rear axles.	12
4	DIFFERENTIAL ASSEMBLY: Differential-Its need, purpose & Principles, Theory of sun & Planet gears, Construction & working details of differential Unit, Limitation of differential, Non- slip differential, differential locks, single main gear & dual main gear type.	14
5	WHEELS & TYRES: Types of wheels, load distribution on front & Rear wheels, construction of wheel assembly. Spoked wheel, disc wheel & alloy wheel. Wheel balancing. Construction & material of solid, tubed & tubeless tyres. Types of tyre wear and their causes. Hot & cold retreading. Tyre rotation, Tyre specification and aspect ratio.	10



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NAME OF THE COURSE: **AUTOMOTIVE**
CHASSIS – I PAPER CODE:

Lectures: 04 Hrs. per Week
Practical: 03 Hrs. per Week

LIST OF EXPERIMENTS

S.No.	NAME OF EXPERIMENT	PRACT. Hrs.
1	Study of clutch assembly regarding its construction, components and operation.	06
2	Study of constant mesh, synchromesh and sliding mesh gear boxes regarding their construction, components and operation.	06
3	Study of universal joints regarding construction, components and operation.	06
4	Study of propeller shaft and slip joint regarding construction and operation.	06
5	Study of differential regarding construction, components and operation.	09
6	Study of rear axle of a vehicle regarding construction, bearing location, wheel feting and operation.	06
7	Study of wheel rims and tires their shape, size and specification.	06
	TOTAL	45



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NAME OF THE COURSE: **AUTOMOTIVE**
CHASSIS – I PAPER CODE:

Lectures: 04 Hrs. per Week
Practical: 03 Hrs. per Week

REFERENCES

1. Heldt.P.M.- “Automotive Chassis”- Chilton Co., New York-
2. K.K.Ramalingam - “Automobile Engineering” – Scitech Publication, Chennai
3. Steed W - “Mechanics of Road Vehicles”- Illiffe Books Ltd., London-
4. Newton Steeds and Garrot- “Motor Vehicles”- Butterworths, London-
5. Judge A.W- “Mechanism of the Car”- Chapman and Halls Ltd., London-
6. Giles.J.G- “Steering, Suspension and tyres”- Iiiffe Book Co., London
7. Crouse W.H- “Automotive Chassis and Body”- McGraw-Hill, New York-



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DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER: THIRD SEMESTER SCHEME: JUL. 2008
COURSE CODE: 303 COMMON WITH PROGRAMMES:
NAME OF THE COURSE: AUTOMOTIVE ENGINE-I PAPER CODE:

RATIONALE

The power plant or engine is the most important part of Automobile vehicle. This syllabus in Automobile Engine is prepared with the aim to develop average skill in understanding the subject. This subject is the core beginning of this career. The topics of basis fundamental importance such as concept of thermodynamics, laws of thermodynamics, thermodynamic processes & cycles. Their inclusion will prove useful to understand basic principles of thermodynamics it will develop the understanding of the student in application of the principles in Automobile system.

The course will facilitate the student to apply the principles for their further studies and the knowledge will be artful to them in practical field to.

OBJECTIVES:

1. To get familiar with the basic fundamentals of thermodynamics.
2. To get familiar with various engine components and systems used in SI engines
3. To acquire adequate knowledge to analyze results of power calculation.
4. To get familiarize with commercial specifications of various vehicles.



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COURSE CODE: **303** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **AUTOMOTIVE**
ENGINE-I PAPER CODE:

SCHEME OF STUDIES

Lectures: 04 Hrs. per Week

Practical: 03 Hrs. per Week

S. No	Topics	Theory Hrs	Practical Hrs	Total Hrs
1	Basic concept of thermodynamics	10	6	16
2	Engine Construction and Operation	14	12	26
3	Cooling and Lubrication System	12	10	22
4	SI Engine Fuel System	14	10	24
5	Combustion and Combustion Chambers	10	7	17
	Total	60	45	105



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ENGINE-I PAPER CODE:

Lectures: 04 Hrs. per Week

Practical: 03 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
1	BASIC CONCEPT OF THERMODYNAMICS: Introduction, System, Surrounding & Universe, Working substance, Thermodynamic Equilibrium, Heat, Work, Reversible & Irreversible Process. First law of Thermodynamics its Application and Limitations, Need of Second Law of Thermodynamics, Heat engine & Heat Pump. Representation of Basic Thermodynamic processes on PV & TS Plane & calculation of Heat Transfer & Work done for these processes. Air standard Otto cycle, its air standard efficiency & mean effective pressure, effect of compression ratio on Otto cycle efficiency, actual cycle for petrol engines.	10
2	ENGINE CONSTRUCTION AND OPERATION : Four stroke and two stroke petrol engine- working principle, construction and operation. Scavenging, comparison of four stroke and two stroke engine operation, firing order and its significance. Port Timing & Valve Timing diagram of petrol engines. Comparison of two & four stroke petrol engine.	14
3	COOLING AND LUBRICATION SYSTEM : Need for cooling system, Study of cooling system components, Types of cooling system: air cooling system, liquid cooling system, and pressurized cooling system, antifreeze mixture. Need of Lubrication system, properties of lubricating oil, additives, Types of lubrication system: pressure lubrication system, dry &, wet sump lubrication system.	12
4	SI ENGINE FUEL SYSTEM: Properties of Ideal gasoline, Fuel feed systems; mechanical and electrical fuel feed pumps. Carburetor Function & working principle, starting, idling, acceleration and normal circuits of carburetors. Study of Solex, S.U, Amal Carburetors. Concept of Petrol injection, MPFI.	14
5	COMBUSTION AND COMBUSTION CHAMBERS: Combustion in SI engine; stages of combustion, flame propagation, rate of pressure rise, delay period, abnormal combustion, Pre-ignition, knocking, Octane number, effect of engine variables on knocking, Fuel additives. Combustion chambers for petrol engines & its different types.	10



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NAME OF THE COURSE: **AUTOMOTIVE**
ENGINE-I PAPER CODE:

Lectures: 04 Hrs. per Week
Practical: 03 Hrs. per Week

LIST OF EXPERIMENTS

S.No.	NAME OF EXPERIMENT	PRACT. Hrs.
1	Study of two stroke petrol engine	4
2	Study of four stroke petrol engine.	4
3	Study of fuel feed system of petrol engine.	4
4	Study of lubrication system at petrol engine.	4
5	Study of cooling system of petrol engine.	4
6	To draw valve timing and port timing diagram.	4
7	Dismantling and assembling of multi cylinder engine	4
8	To draw sketches of major components.	4
9	To study working of major components of the engine	4
10	To open the oil pump, sketch and identify the components and assemble them.	3
11	To open the fuel pump, sketch and identify the components and assembly.	3
12	To open the carburetor, sketch and identify the components and assemble.	3
	TOTAL	45



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NAME OF THE COURSE: AUTOMOTIVE ENGINE-I PAPER CODE:

Lectures: 04 Hrs. per Week

Practical: 03 Hrs. per Week

REFERENCES

1. Heldt P.M., "High Speed Combustion Engines", Oxford IBH Publishing Co., Calcutta,
2. Obert E.F., "Internal Combustion Engines Analysis and Practice", International Text Books Co., Scrantron, Pennsylvania -
3. William H.Crouse, "Automotive Engines", McGraw-Hill Publishers,
4. Ellinger H.E., "Automotive Engines", Prentice Hall Publishers,
5. John B.Heywood, "Internal Combustion Engine Fundamental", McGraw-Hill, Pulkrabek "Engineering Fundamentals of the Internal Combustion Engines", Practice Hall of India,
6. Ganesan.V. "Internal Combustion Engines", Tata McGraw-Hill Publishing Co., New Delhi, M.L.Mathur and R.P.Sharma, "A course in Internal combustion engines", Dhanpat Rai & Sons Publications, New Delhi,
7. K.K.Ramalingam, "Internal Combustion Engines", Scitech Publications, Chennai



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DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER: **THIRD SEMESTER** SCHEME: **JUL. 2008**
COURSE CODE: 304 COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **MECHANICAL** **M02**
DRAFTING & AUTO CAD PAPER CODE:

RATIONALE

This course in mechanical Drafting has been prepared with a view to develop elementary drafting skill in the students. Looking to the professional needs of the technicians, more emphasis has been laid on the use of I.S. Code of practice and reading and interpretation of drawings. The topics on multi view representation dimensioning and tolerance, Free hand sketching and sections of M/c parts are included to build foundation for production drawing. The topic of pipe drafting will help the students to understand the importance and functions of piping system in industry.

Computer Graphics is a modern concept in Mechanical Drafting and knowledge of computer interface like AutoCAD is needed like primary education to draw and present drawing in electronic data form.



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COURSE CODE: 304 COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **MECHANICAL** **M02**
DRAFTING & AUTO CAD PAPER CODE:

Lectures: 02 Hrs. per Week

Practical: 06 Hrs. per Week

S.No	Topics	Theory Hrs	Practice Hrs.	Total Hrs.
1	Projections and multi view representation.	01	05	06
2	Sectional views.	01	05	06
3	Dimensioning, tolerance, machining and welding symbols.	01	05	06
4	Production drawing.	10	36	46
5	Introduction to Auto CAD	06	16	22
6	Application of Auto CAD	04	06	10
7	Presentation	02	05	07
8	Pipe Drafting	02	04	06
9	Gear Drawing	02	06	08
10	Graph and charts	01	02	03
	Total	30	90	120



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NAME OF THE COURSE: **MECHANICAL M02**
DRAFTING & AUTO CAD PAPER CODE:

Lectures: 02 Hrs. per Week
Practical: 06 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
1	Projection and multi view Representation: Projection orthographic projection. First and third angle projection, superfluous view, choice of views, auxillary views- views -full and partial, conversion of pictorial views in to orthographic views, conventional representation as per IS: 696.	1
2	Sectional Views : Full section, half section, partial or broken section, revolved section, removed section, offset section. Sectioning conventions, section lines. Hatching procedure for different materials as per IS code 686 1972. Sectional views of assembled parts. Choosing from IC engine parts, couplings, clutches, brackets, bearing etc. (Use 1st and 3rd angle projections both)	1
3	Dimensioning Tolerance, Machining And Welding Symbols : Types of dimensions (size and location) dimensioning terms and notations. (use of I.S.Code 696 & 2709) general rules for dimensioning and practical hints on dimensioning systems of dimensioning. Dimension of cylinder holes arcs of circle narrow space, angles, counter sunk hole, screw threads taper etc. Application of tolerances. (Use I.S. Code 696) Machining marks, finish marks, countersinking, counter boring spot facing, figures and notes for same. Representation of characteristics machining (circularity, Angularity etc .) (Ref IS 969) Representation of welded joints, welding symbols, tolerance of forms and positions. Procedure of drawing fits, limits, size, tolerance, clearance etc.	1



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DRAFTING & AUTO CAD PAPER CODE:

Lectures: 02 Hrs. per Week

Practical: 06 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
4	Production Drawing: Detailed drawing, assembly drawing, scale, finish tolerances, notes etc. Title block, tool list, gauge list. Preparation of production drawing for pattern shop. Forging shop, machine shop, preparation of assembly drawing from detailed drawing. exploded views, sectional pictorial views, assembly drawing of nut and bolt, plummer block, flange coupling, stepped pulleys, foot-step bearing, Universal coupling, connecting rod, piston of I.C. engines, cotter joint, Knuckle joint. Preparation of detailed drawing from assembly drawings and assembled pictorial views, Interpretation of production drawing.	10
5	Introduction to Auto CAD: Coordinate system. Draw command-line ,arc, circle rectangle, polygon, point, ellipse, hatch, table. Modify commands-erase, copy, offset, array, trim, extend, break, join, chamfer, fillet, move, rotate, scale, stretch, lengthen. Dimensioning Tray settings: snap, grid, ortho, polar, osnap Format commands: line type, point style, units, layers, drawing limit, dimension style	06
6	Application of Auto CAD: practice of assembly drawings using Auto CAD	04
7	Presentation: Block, creating layout, insert layout ,ploting/printing	02
8	Pipe Drafting : Various symbols used in pipe line work as per IS code of Practice, C.I. flanged joint, socket and spigot joint, gland and stuffing box, expansion joint, pipe fitting typical pipe bends, pipe supports and accessories.	02
9	Gear Drawing : Gear terminology such as pitch, pitch circle diameter module, addendum, root circle diameter, hole depth, blank diameter etc. construction of cycloidal, involute teeth profiles, pinion and rack mashing, spur gear mashing.	02



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COURSE CODE: **304** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **MECHANICAL M02**
DRAFTING & AUTO CAD PAPER CODE:

Lectures: 02 Hrs. per Week
Practical: 06 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
10	Graph and Charts : Introduction, Classification of chart, graphs and diagrams, quantitative and qualitative charts and graphs, Drawing and curve titles, legends notes etc. procedure for making a graphical representation in ink. Logarithmic graphs, semi logarithmic graphs, bar charts area (Percentage) charts, pie chart, alignment charts (Nomo graphs) Forms and construction, construction of functional scale, parallel scale charts for equations of the form $[f(t) + f(u) + f(v), (f(t) \times f(u) = f(v)]$ three scale alignment chart, graphical construction of a Z- chart, four variable relationship parallel scale alignment chart.	01



RAJIV GANDHI PROUDYOGIKI VISHWA VIDYALAYA, BHOPAL

DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER: **THIRD SEMESTER** SCHEME: **JUL. 2008**
COURSE CODE: **304** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **MECHANICAL** **M02**
DRAFTING & AUTO CAD PAPER CODE:

Lectures: 02 Hrs. per Week
Practical: 06 Hrs. per Week

SUGGESTED TERMS –WORK

S.No.	TOPIC	PRACT. SHEETS IN NOS.
1	Projection and multi views representation	02
2	Sectional views	02
3	Dimensioning, tolerance, machining and welding symbols	02
4	Production drawing	08
5	Pipe drafting	01
6	Gear Drawing	02
7	Graphs and charts	01
8	Computer graphics	05
	TOTAL	23 Plates



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REFERENCE BOOKS

- 1 Fundamentals of Engineering Drawing by Warren J. Luzadder (Prentice-Hall).
- 2 Mechanical Drawing by Giesecke, Mitchell, Spencer, Hill. (Collier Macmillan Internal Edition)
- 3 Engineering Graphics by Giesecke/Mitchell/ Spencer/ Hill/ Loving (Macmillan) .
- 4 Mechanical Drawing By N.D.Bhatt
- 5 Mechanical Drawing By P.S.Gill
- 6 Mechanical Drawing By R.K.Dhawan
- 7 Inside AUTO CAD by Daniel Raker and Harbest Rice(BPB Publisher)
- 8 Computer Graphics and CAD Fundamentals By Noel M Morris(Wheeler)



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DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER: THIRD SEMESTER SCHEME: JUL. 2008
COURSE CODE: 305 COMMON WITH PROGRAMMES:
NAME OF THE COURSE: STRENGTH OF
MATERIALS AND MECHANICS PAPER CODE:
OF MACHINES

RATIONALE

This curriculum has been prepared by integrating all important topics of strength of materials and mechanics of machines. These topics will form the basis of understand the working of general machines elements and to design in engineering field and will help to understand the design of different machine components. Portion of mechanics of machine will be helpful in understanding and solving many problems related to working and operation of mechanism of many kind of machines through out the carrier of automobile engineering technician. The knowledge of portion of strength of material is particularly essential for the technician working in field of design, maintenance of shop floor, Inspection and quality control and production departments.

OBJECTIVES:-

1. To understand the mechanisms employed in machines.
2. To solve problems regarding kinematics of machines.
3. To understand behavior of metals of under load.
4. To gain skill in metal testing.



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SEMESTER: **THIRD SEMESTER** SCHEME: **JUL. 2008**
COURSE CODE: **305** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **STRENGTH OF MATERIALS AND MACHINES** PAPER CODE:
OF MECHANICS

Lectures: 05 Hrs. per Week

SCHEME OF STUDIES

S. No	Topics	Theory Hrs	Practical Hrs	Total Hrs
1	Simple stresses & strains	10	-	10
2	Shear force and bending moment of beams.	12	-	12
3	Theory of simple bending	08	-	08
4	Torsion of circular shaft.	08	-	08
5	Simple mechanisms.	06	-	06
6	Transmission of power	10	-	10
7	Crank effort diagram and flywheel	10	-	10
8	Cams	11	-	11
	Total	75	-	75



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COURSE CODE: **305** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **STRENGTH OF**
MATERIALS AND MECHANICS PAPER CODE
OF MACHINES

Lectures: 05 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
1	Simple stresses and strains: Introduction, types of load and deformation types of stresses and strains, Hooke's law Elastic limit, Poisson's ratio, Modulus of Elasticity, Modulus of rigidity, Bulk Modulus, modular ration, temperature stresses, Hoop stress, State of simple shear, Relation between the Elastic constants, Volumetric strain, Rectangular bloc subjected to normal stresses. Strain energy of resilience, proof resilience modulus of resilience, types of loading, strain energy stored due to gradual, sudden and impact load.	10
2	Shear force and bending moment of beams: Types of beams types of loading, shear force, bending moment, relation between shear forces, and bending moment at section. Sign convention, shear force and bending moment diagrams for cantilever, simply supported and over hanging beam under concentrated load and uniformly distributed load point of contra flexure.	12
3	Theory of simple bending: Assumption, Bending stress, and bending equation, Natural layer, Neutral axis, moment of resistance and section modulus modulus of rupture, slope curvature and collection of beams, beams of uniform strength, solve simple problems of bending.	08
4	Torsion of circular shaft: Torsion of shaft, torsion Equation (without proof) solid and hollow circular shafts, problems on design of shafts subjected to pure torsion and combined bending and torsion.	08
5	Simple Mechanisms.: Introduction to mechanics of machine, definitions of kinematics, Dynamic, statics and kinetics, link, Kinematic pair, kinematic chain, mechanism machine, Inversion, Difference between mechanism and machine	06



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COURSE CODE: **305** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **STRENGTH OF MATERIALS AND MECHANICS OF MACHINES** PAPER CODE

Lectures: 05 Hrs. per Week

COURSE CONTENTS

S.NO	COURSE CONTENTS	STUDY Hrs.
6	Transmission of power: Introduction, Drives types of drives, belt rope chain and gear drives, relative merit and demerits of different drives. a) Belt drives: - Types of belts, Types of flat belt drive, belt material, and length of the belt calculation for open and cross belt drives. M.P. Transmitted effect of centrifugal force Centrifugal tension simple problems on velocity ratio b) Chain Drive: - Classification of chain and their applications. c) Gear Drive:- Classification types of gears and its application spur gear terminology, Interference, function of idler Lewis equation (without proof) problems on finding number of teeth, exact centre distance and power transmitted by gear drives.	10
7	Crank Effort Diagram and Flywheel: Dynamic of reciprocating engine mechanism, Inertia force due to reciprocating mass, piston effort, crank effort, and turning moment of crank shaft. Fluctuation of energy, Co-efficient of fluctuation of energy and speed flywheel and its functional calculation of moment of inertia and weight of flywheel for I.C. engine	10
8	Crank Effort Diagram and Flywheel: Dynamic of reciprocating engine mechanism, Inertia force due to reciprocating mass, piston effort, crank effort, and turning moment of crank shaft. Fluctuation of energy, Co-efficient of fluctuation of energy and speed flywheel and its functional calculation of moment of inertia and weight of flywheel for I.C. engine	11
	TOTAL	75



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NAME OF THE COURSE: **STRENGTH
OF MATERIALS AND MECHANICS
OF MACHINES** PAPER CODE

Lectures: 05 Hrs. per Week

REFERENCE BOOKS

- 1 Strength of Materials. by B.C. Punmia.
- 2 Strength of Materials . by R. S. Khurmi.
- 3 Strenght of Materials by Sadhu Singh.
- 4 Strength of Materials by K. D. Sexena.
- 5 Strength of Materials by S. Ramamuruthan.
- 6 Strength of Materials by I. B. Prasad.
- 7 Strength of Materials by G. H. Ryder.
- 8 Strength of Materials by Timoshenko & Young
- 9 Laboratory Experiments in Strength of Materials by B.D. Sharma.
- 10 Theory of machine by R.S.Khurmi
- 11 Theory of machine by S.S.Ratan
- 12 Dravya Samarthya (Hindi) by K. D. Saxena (Deepak Prakashan, Morar Gwalior)



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DIPLOMA IN AUTOMOBILE ENGINEERING

SEMESTER: **THIRD SEMESTER** SCHEME: **JUL. 2008**
COURSE CODE: **306** COMMON WITH PROGRAMMES:
NAME OF THE COURSE: **PROFESSIONAL M02, R01**
ACTIVITIES – I PAPER CODE:

Practical: **2 Hrs.** per week

RATIONALE

Professional Activities is not a descriptive course, as per conventional norms; therefore specific content for this course cannot be prescribed. It is a group of open-ended activities; where in variety of tasks are to be performed, to achieve objectives. However general guidelines for achieving the target and procedure for its assessment are given under the course content.

As the student has to practice this course in all the six semesters, the guidelines given therein are common and applicable to each semester.

OBJECTIVES:

- Ø To allow for professional development of students as per the demand of engineering profession.
- Ø To provide time for organization of student chapter activities of professional bodies) i.e. Institute of engineers, ISTE or Computer Society of India etc.)
- Ø TO allow for development of abilities in students for leadership and public speaking through organization of student's seminar etc.
- Ø To provide time for organization of guest lectures by expert engineers/ eminent professionals of industry.
- Ø To provide time for organization of technical quiz or group discussion or any other group activity.
- Ø To provide time for visiting library or using Internet.
- Ø To provide time for group discussion or solving case studies.
- Ø To provide time for personality development of students.
- Ø To provide time for working for social cause like awareness for environmental and ecology etc.



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NAME OF THE COURSE: **PROFESSIONAL M02, R01**
ACTIVITIES PAPER CODE:

Practical: **2 Hrs.** per week

DETAILED INSTRUCTIONS TO CONDUCT PROFESSIONAL ACTIVITIES

- A. Study hours, if possible should be given greater time slot with a minimum of two hrs/week to a maximum of four hrs/week.
- B. This course should be evaluated on the basis of grades and mark sheet of students, should have a separate mention of the grade awarded. There will be no pass/fail in professional activities (PA).
- C. Following grade scale of evaluation of performance in PA has been established.

<u>Grades</u>	<u>Level of performance</u>
A	Excellent
B	Good
C	Fair
D	Average
E	Below Expectations

- D. Grades once obtained in a particular examination shall become final and no chance of improvement in grades will be given to the students.
- E. Assessment of performance in PA is to be done internally by the Institution, twice in a Semester/Term through a simultaneous evaluation of the candidate by a group of three teachers, of the deptt. Concerned. Group of teachers will jointly award the grade to candidate in the assessment. Best of the grades obtained by the student in these two assessments shall be finally taken on the mark sheet of the respective Semester/Term.

Candidate abstaining from the prescribed course work and/or assessment planned at the Institute shall be marked **ABSENT** in the mark sheet, instead of any grade.



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ACTIVITIES PAPER CODE:

- F. While awarding the grades for performance in PA, examining teacher should reach the final consensus based on the attendance, punctuality, interest, presentation skills in seminar on the topic assigned (collection of relevant data, observations, analysis, findings/conclusion) and its written report, awareness of latest developments in the chosen programme of study.
- G. Institution shall maintain the record of grades awarded to all the students in PA for a period of 1 year.
- H. It shall be mandatory for students to submit a compendium for his PA in the form of a Journal.
- I. Compendium shall contain following:
 - I. Record of written quiz.
 - II. Report/write up of seminar presented
 - III. Abstract of the guest lectures arranged in the Institution.
 - IV. Topic and outcome of the group discussion held.
 - V. Report on the problems solved through case studies.
 - VI. Report on social awareness camps(organized for social and environmental prevention).
 - VII. Report on student chapter activities of professional bodies like ISTE, IE (India), CSI etc.
- J. PA is not a descriptive course to be taught in the classroom by a particular teacher. Various activities involved in the achievement of objectives of this course should be distributed to a number of teachers so that the talent and creativity of group of teacher's benefit the treatment of the course content. These activities should preferably be conducted in English language to maintain continuity and provide reinforcement to skill development. Small groups shall be formed like in tutorials, group discussion, case studies, seminar, project methods, roll play and simulation to make the development of personality affective.



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NAME OF THE COURSE: PROFESSIONAL M02, R01
ACTIVITIES PAPER CODE:

Lectures: 02 Hrs. per Week

Treatment of PA demands special efforts, attention, close co-operation and creative instinct on the part of teachers of department concerned. Since this course is totally learner centered, many of the activities planned under this course shall come out from the useful interaction of student, among themselves and with the teachers. The guide teacher/s shall best act as a facilitator of these creative hunts/ exercises, which unfold many of the hidden talents of the students or bring out greater amount of confidence in