

SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)



SYLLABUS

For

**Diploma in Mechanical Engg.
Semester -VI**

**Swami Vivekanand University, Sironja Sagar
2014-2015**

SWAMI VIVEKANAND UNIVERSITY, SAGAR(M.P)

PROGRAMME NAME :MECHANICAL ENGG(DIPLOMA)

Scheme of Studies and Examinations for : SIXTH SEMESTER

COURSE CODE	COURSE TITLE	PAPER CODE	THEORY COMPONENT							PRACTICAL COMPONENT					GRAND TOTAL OF MARKS			
			LECTURES	CONTINUOUS EVALUATION		END OF THE TERM/ SEMESTER EVALUATION			THEORY CREDIT	PRACTICAL Hrs. Per Week	CONTINUOUS EVALUATION	END OF THE TERM/ SEMESTER EVALUATION		PRACTICAL CREDIT		TOTAL CREDIT		
				Hrs. Per Week	TERM WORK QUIZ, ASSIGNMENT	MID TERM TEST (TWO)		THEORY PAPER				LAB. WORK QUIZ, ASSIGNMENT	PRACTICAL / ORAL EXAMINATION (VIVA)					
			I			II	NO.	MARKS	DURATION (Hrs)	NO.	MARKS		DURATION (Hrs)					
DME601	DESIGN OF MACHINE ELEMENTS	6264	04	10	10	10	01	70	3 hrs	04	04	20	01	30	3hrs	2	06	150
DME602	AUTOMOBILE ENGINEERING	6065	03	10	10	10	01	70	3 hrs	04	04	20	01	30	3hrs	2	06	150
DME603	REFRIGERATION AND AIR CONDITIONING	6266	02	10	10	10	01	70	3 hrs	04	04	20	01	30	3hrs	2	06	150
DME604	PROJECT										04	100	01	150	4hrs	4	08	250
	Professional activities										02							
	total		09	30	30	30		210		12	18	160		240		10	26	700

Theory Credits	:20	Theory Marks	:210
Practical Credits	:10	Practical Marks	:240
Total Credits	:30	Quiz, Mid Term, Lab. Work	: 250
		Total	: 700

(Theory & Minimum Pass Grade in Practical'D')
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ME-601 DESIGN OF MACHINE ELEMENTS

Introduction to Machine Design: Machine and machine elements, bolt, nut, axle, shaft, bearing, coupling, clutch, belt, rope, chain, gear etc. Specific purpose of piston connecting rod, crank shaft, turbine blade etc. Factors influencing design of machine elements - Strength stiffness, light weight, wear resistance minimum size, availability, processability, safety, compliance with standards. Basic design procedure. Selection of mechanism, material, shape and size. Preliminary design, applying checks, revision of design final design. Factors influencing selection of materials. Type of failures, types of forces. Types of loading. Safe design stress and factors of safety

Design of Machine Elements Subjected to Direct and Shear

Loads: Introduction members subjected to direct loads – bolt, column, rod, cotter and knuckle joints, members subjected to shear loads rivet, cotter knuckle pin, root of threaded bolt, coupling, bolt, key. Function, application and design of knuckle and cotter joint.

Design of Riveted Joint: Type of fastening - temporary and permanent, types of riveted joint - lap and butt joint, definition of common terms like pitch, back pitch, efficiency, margin. Modes of failure of riveted joints.

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Design of Simple Welded Joints: Definition of welding advantages of welding over riveted joints, types of welded joints, strength of the butt weld, types of fillet joints and strength of fillet joint problem solving.

Design of Threaded Joints: Types of threads and their proportions, Types of bolts, proportion of nut and bolt dimensions, design of bolt, designation of threads as per I.S. codes

Design of Clutch: Pivots and Collars friction. Horse power lost assuming uniform pressure and uniform wear. Clutch- need, classification and construction and working of single and multi plate clutches, horse power transmitted by single and multi plate clutches

Selection of Rolling and Sliding contact Bearing: Types of rolling contact bearing, Ball bearing Roller bearing, bearing designation, bearing installation. Application of bearing. Basic principle of Hydro dynamic and Hydro static bearing. Bearing modulus and Bearing characteristics number

REFERENCE BOOKS

1. Machine Design by Sharma and Agrawal.
2. Machine Design by R.K. Jain.
3. Machine Design by Shigley..
4. Machine Design by R S Khurmi
5. Introduction to Machine Design by Bhandari Tata Mcgraw Hill
6. Machine Design by Pandya and Shah

ME-602 AUTOMOBILE ENGINEERING

Introduction: Meaning of automobile, elements of automobile, classification of automobile, layout of chassis, various operating systems used in automobile

Auto Engines: Meaning of I.C. Engines, Classification on the basis of cycle, fuel used, ignition system, number of cylinders, number of strokes etc. Otto/ Diesel cycles. Two stroke and four stroke engines, merits and demerits, scavenging comparison of petrol and diesel engines. Cooling systems, firing order. Valve timing diagrams. Engine rating. Lubrication, factors affecting lubrication, Lubrication systems, Fuel Supply system, fuel pump - SPU electric pump. Carburettor, air fuel ratio, Solex and amal carburetor

Auto Electric System: Wiring diagram of a car and functions of various components used in the electric circuits, function and working principle of a starter and generator, function of voltagecurrent regulator, ignition timing, spark plugs- their classification, gap setting and common ignition troubles, their causes and remedies Automobile battery - construction and working, electronic ignition system of modern vehicles

Transmission System: Clutch : necessity, function of its components, Types –single & multi plate and centrifugal clutches, clutch actuating mechanism and fluid flywheel. Gear Boxes : necessity, Types of gear boxes and their working. Importance of gear shifting mechanism, gear box troubles, their causes and remedies.

Final Drives System: Drive mechanism in cars, purpose and working of propeller shaft, construction of propeller shaft. Types of universal joints. Rear axle assembly : function of differential - constructional features and working. Arrangement of semi floating and fully floating rear axle, and their troubles.

Braking system: Introduction, classification of brakes, construction & working of mechanical brake, hydraulic brake, Electric brake , advantages and disadvantages of each type of brakes, Servo brake system.

Front Axle and Steering: Function of front axle, axle type, wheel alignment and its elements toe- in, toe -out. King pin inclination. Ackerman steering principle. Camber and castor angle . Elements of steering - types and working ,Under and over steering, power steering and advanced steering systems

Frame and Suspension: Frames : necessity, function, Classification, suspension system, types, leaf, coil spring. Telescopic shock absorber. Air suspension, independent suspension system. Tyres : structure of tyre section, rating of tyres, tyre- pressure measurement, material and specification. Tyre wear and remedies

Reference Book

- 1 Automobiles Engineering Vol. I & II by Dr. Kirpal Singh. (Standard Publisher)
- 2 Automobiles Engineering by R.S. Gupta (Satya Prakashan)
- 3 Automobile mechanism by Joseph Heither
- 4 Automobile Engineering by R. P. Sharma (Dhanpat Rai & Sons)
- 5 Automobile Mechanism by William H. Crouse
- 6 I.C. Engines by Dr. A.C. Rad and S.B. Bechar
- 7 Automobile Engineering- T.R. Banga & Nathu Singh (Khanna Publicers)
- 8 Automobile Engg. – RB. Gupta
- 9 Automobile Engg. – K.M. Agrawal (Vol. I & II)
- 10 Automobile Engineering by Prof. S.M. Pande and K.K. Jain (Deepak Prakashan, Morar Gwalior)

ME-603 REFRIGERATION & AIR CONDITIONING

Introduction to Refrigeration: History of refrigeration, meaning and need of refrigeration, difference between refrigeration and Cryogenics, production of refrigeration by various methods. Refrigeration systems and their classification on the basis of use, size and application

Thermodynamics of Refrigeration: Revision of I and II law of thermodynamics, comparison between heat engine, heat pump and refrigerator using heat reservoir, heat source, sinks & work. Unit of refrigeration, refrigeration effect, work input, co-efficient of performance, Reversed Carnot cycle with gas and vapour as working substance. P-V, T-S and schematic diagrams. Calculation of refrigeration effect, work C.O.P and Heat rejection. Practical difficulties with Carnot cycle with gas and vapour as working substance. Vapour compression refrigeration cycle its schematic diagram and representation on P-V, T-S and P-H diagrams. Wet, dry and superheated vapour compression. Use of tables and charts of common refrigeration for calculating work input, refrigeration effect and C.O.P deviation of actual vapour compression system from theoretical cycle and reasons for deviation. Effect of sub-cooling and superheating on vapour compression system.

Basic Components of Vapour Compression Refrigeration Systems: Basic components of vapour compression refrigeration system and their function- compressor, condenser, expansion device and evaporator. Compressor : Classification, reciprocating- open and hermetically sealed rotary, and their field of application. Working of single and double acting reciprocating compressor. Working of hermetically sealed compressor. Condenser : Types (Water cooled, air- cooled evaporative) and their field of application and brief description. Expansion: Types of evaporators (Dry expansion and flooded type, and principle of their working and application.

Vapour Absorption Refrigeration System: Comparison between vapour compression and vapour absorption system, the theoretical and practical vapour absorption system, Lithium bromide- water absorption system. Three fluid system. (Electrolux systems

Properties of Commonly Used Refrigerants: Definition, primary and secondary refrigerants, designation of refrigerant, examples of each type. Desirable properties of good refrigerant Azeotropic mixtures. Environmental problems related to halogenated hydrocarbons as refrigerants. New developments

Refrigeration Plants: Layout and working of Ice plant, cold storage. Water cooler and household refrigerator

Refrigeration Fittings, Tools, Charging and Leak Detection: Tubing, Materials heat treatment specifications.

Tools: Use and types of cutter, spring and mechanical benderflaring and swaging tools pinch of tool, wrenches, Pliers etc.

Fittings: Flared tube fittings, unions, elbows tee.

Joints: Making soldered and brazed joints. Installation and removal of servicing gauge and testing manifold: Working of suction and discharge compressor service valves.

Charging of Refrigerant: evacuating a refrigeration system, removing, refrigerant form a refrigeration system leak detection methods.

Introduction to Air Conditioning : Meaning of air conditioning, application of Air conditioning in theatres, community halls, industry, restaurants, hospitals and windows air conditioner.

Psychometry: psychometric - definition, terminology, psychometric charts and tables, using psychometric charts for solving simple problems.

Air Conditioning Systems: Central and unit air conditioning, residential and commercial air conditioning system. Types of fans and ducts - air distribution systems. Thermal insulator, methods and insulation cladding

Maintenance and Repairing of Refrigeration and Air

Conditioning Units: Fault location in vapour compression system and air conditions. Repair and maintenance of house hold refrigerators. Water coolers and air conditioners

BOOKS.

- 1 Refrigeration and Air Conditioning by C.P. Arora (Tata Mc Graw Hill)
- 2 Ashrae Guide and Data Book by Ashrae (Ashrae)
- 3 Andels Refrigeration and Air Conditioning Guide. by E.P. Anderson (Tarapowala)
- 4 Practical Refrigeration
- 5 Refrigeration and Air Conditioning by A.S. Sarao & P.C. Gaabi (Satya Prakashan)
- 6 Modern Refrigeration Practice by G.P. King (McGraw Hill)
- 7 A Course in Refrigeration & Air Condition by S. Lomkkundwar & S.C. Arora (Dhanpat Rai & Sons)
- 8 Refrigeration and Air Conditioning by R.C. Jorden & S.B. Priester (Prentice Hall)
- 9 Basic Refrigeration and Air Conditioning by D. Hazre & D.N. Chakravarty (Dhanpat Rai & Sons)
- 10 Principles of Refrigeration by R. W. Marsh (Taraporwala)
- 11 Refrigeration and Air Conditioning by P.L . Ballancey. (Khanna Publishers)