

| <b>GANPAT UNIVERSITY</b>  |  |    |                 |    |                                     |                               |    |     |       |
|---|--|----|-----------------|----|-------------------------------------|-------------------------------|----|-----|-------|
| <b>FACULTY OF ENGINEERING AND TECHNOLOGY (DIPLOMA PROGRAMMES)</b>   |  |    |                 |    |                                     |                               |    |     |       |
| Programme   | DIPLOMA  |    |                 |    | Branch/Spec.                        | Electrical/ Civil Engineering |    |     |       |
| Semester  | I & II   |    |                 |    | Version                             | 1.0.0.0                       |    |     |       |
| Effective from Academic Year  | 2018-19  |    |                 |    | Effective for the batch Admitted in | June 2018                     |    |     |       |
| Subject code  | 1ES113   |    | Subject Name    |    | Elements Mechanical Engineering     |                               |    |     |       |
| Teaching scheme   |  |    |                 |    | Examination scheme (Marks)          |                               |    |     |       |
| (Per week)  | Lecture(DT)  |    | Practical(Lab.) |    | Total                               |                               | CE | SEE | Total |
|   | L  | TU | P               | TW |                                     |                               |    |     |       |
| Credit  | 02   | 00 | 01              | 00 | 03                                  | Theory                        | 40 | 60  | 100   |
| Hours   | 02   | 00 | 02              | 00 | 04                                  | Practical                     | 30 | 20  | 50    |
| Pre-requisites:   |  |    |                 |    |                                     |                               |    |     |       |
|   |  |    |                 |    |                                     |                               |    |     |       |
| Learning Outcome:   |  |    |                 |    |                                     |                               |    |     |       |
| <p>The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.</p> <ol style="list-style-type: none"> <li>1. Identify mechanical related basic components and their uses.</li> <li>2. Describe the type of power transmission, different types of couplings, and general safety norms.</li> <li>3. Explain different welding and gas cutting operations.</li> <li>4. Explain working of boilers and prime movers.</li> <li>5. Explain different fluid properties, construction working and applications of centrifugal and reciprocating pumps</li> <li>6. Select proper material handling equipment for a given situation.</li> </ol> |  |    |                 |    |                                     |                               |    |     |       |
| Theory syllabus   |  |    |                 |    |                                     |                               |    |     |       |
| Unit  | Content  |    |                 |    |                                     |                               |    |     | Hrs   |
| 1.  | <b>INTRODUCTION</b><br>Introduction and use of mechanical engineering, various general items used in mechanical engineering and their identification, major types, specifications and applications: such as bolts, nuts, washers, bearings, bushes, belts, springs, levers, couplings, brakes, screws, rivets, keys, o' rings, oil seals, gears, pulleys, shafts, axles, etc. Pipes and pipe fittings- Types, specifications and uses, of pipes and pipe fittings, Hand and power tools: Types, specifications and uses of spanners such as fix, ring, box, pipe, Allen, adjustable, etc. Types, specifications and uses of hand tools such as pliers, screw drivers, saws, hammers, chisels, cutters, planes, etc. Types, specifications and uses of power tools such as drill, chipper, etc. |    |                 |    |                                     |                               |    |     | 4     |
| 2.  | <b>POWER TRANSMISSION &amp; SAFETY</b><br>Introduction of power transmission and Importance of power transmission, explain various types of Modes such as belt drives, rope drives, chain drives and gear trains, Types of belts, Gear train-concept, transmission ratio, Applications, Types and applications of couplings in power transmission, Causes and remedies of general accidents in power transmission, Safety norms to be followed for preventing accidents and damage in power transmission, Safety norms to be followed in mechanical based industries / shop floors.  |    |                 |    |                                     |                               |    |     | 7     |
| 3.  | <b>PROCESSES ON MATERIAL</b><br>Define welding and its varioustypes, various welding equipments and Working principle of arc and gas welding. Types of work carried out by welding, Precautions and safety during arc and gas welding. Define Brazing and Soldering, General set up, Applications, Gas cutting, Working setup, accessories and consumables, Types of work carried out, Precautions and safety during gas cutting, Foundry, Concept, Process of getting cast  |    |                 |    |                                     |                               |    |     | 8     |

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|                          | material, Applications, explain metal forming and cutting operations, bending, shearing-concept and applications, Basic machine tools, Working principle of hacksaw, lathe, drill and milling machines, Types of operations jobs which can be performed on machine tools listed above.   |   |
| 4.                       | <b>STEAM GENERATION AND PRIME MOVERS</b><br>Introduction of Steam Generation process, Properties of steam, Define boiler and theory of Boilers, Classification, Working, Accessories and mountings-types and applications, Regulations and safety requirements, Common troubles and remedies, Prime movers, Meaning, Classification, Working, Steam turbine-working, Gas turbine-types and applications, Common troubles and remedies.   | 4 |
| 5.                       | <b>HYDRAULIC AND PNEUMATIC DEVICES</b><br>Define fluid, Concept of fluid flow and its various types, General properties of fluids, introduction of Pump, Working principle and its types. Working principal of centrifugal and reciprocating pumps, Main parts of pumps and their functions, Common troubles and remedies of pumps, working principle of Water turbines, types and applications, Common troubles and remedies of water turbine, introduction of Air compressor, Working principle, | 4 |
| 6.                       | <b>MATERIAL HANDLING</b><br>Introduction of material handling, Need of material handling, various types of material handling systems, principle of working and applications of material handling equipments, Hoisting equipments, Conveying equipments, Surface & overhead equipments, Earth moving machineries, Construction machineries, Criteria for selection of material handling equipments,   | 3 |
| <b>Practical content</b> |  |   |
| 1                        | To study about power transmission systems.   |   |
| 2                        | To study about gas and arc welding.  |   |
| 3                        | To study about steam boilers.  |   |
| 4                        | To study about boiler mountings and accessories.   |   |
| 5                        | To study about water turbines.   |   |
| 6                        | To study about finding faults, reasons and remedies of various types of pumps.   |   |
| 8                        | To study about material handling equipment.  |   |
| 9                        | Assignment   |   |
| <b>Text Books</b>        |  |   |
| 1.                       | Element of mechanical engineering by Pravin Kumar, Pearson education   |   |
| 2.                       | Fundamental of mechanical engineering G.S. Sawhney, PHI Publication New Delhi  |   |
| <b>Reference Books</b>   |  |   |
| 1.                       | Theory of Machines - By R. S. Khurmi and J. K. Gupta   |   |
| 2.                       | Hydraulic machines - By Jagdishlal   |   |
| 3.                       | Elements of Workshop Technology ( Vol. 1,2) - By Hazara Chaudhary  |   |
| 4.                       | Pumps operation and maintenance - By Tyler and Hicks   |   |
| 5.                       | Material Handling equipment - By M. Rundenko   |   |