**GRAPHIC ERA UNIVERSITY, DEHRADUN**

**First Semester 2016-2017**

**Model Course Handout**

***Date:*** *23-07-2016*

**Course Code: TME 101**

**Course Title: BASIC MECHANICAL ENGINEERING**

**Instructor:**

* **Vipul Paliwal (Sec G)**
* **Ashish Bisht (Sec H)**
* **Ravi Verma (SEC I & K)**
* **Dr. Arindam Ghosal (Sec J & L)**

**Course Description:**

Introduction to thermodynamics and refrigeration and air conditioning, internal combustion engines, power transmission

& joining processes, engineering materials and machining, basic fluid mechanics.

**OBJECTIVE:**

Introduction to basic thermodynamic engineering and refrigeration and air conditioning process and their application, To know about the functioning of I.C. engine and their existing application areas, Basic knowledge of joining processes of metals (i.e. welding, brazing, and soldering), Introduction to production engineering (drilling and milling machines-working mechanism and their process and major parts), Basics of fluid mechanics and its application, To know the gear and belt drive functioning.

**Text Book:**

**TB 1.** A text book of Basic mechanical engineering- Basant Agarwal And C.M. Agrawal, Willey India Edition.

**TB 2.** A text book of Element of Mechanical Engineering- K.R. Gopalkrishna, Subhash Publishers, Bangalore

**Reference Books:**

**R1.** The Elements of Workshop Technology - Vol I & II , SKH Chowdhary,AKH Chowdhary , Nirjhar Roy, 11th edition 2001, Media Promotors and Publishers, Mumbai.

**R2.** Elements of Mechanical Engineering –Dr.A.S.Ravindra, Best Publications, 7Th edition 2009.

**R3.** Introduction to fluid mechanics- Fox and McDonald, Wiley Publications.8Th edition

**R4.** Thermodynamics an engineering approach- cengel and boles, 8th edition Mc Grow Hills.

**R5.** Manufacturing Science- Ghose and Malik, Second Edition, East West Press.

**Course Plan:**

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| **Lecture No.** | **Learning Objective** | **Topics to be covered** | **Reference Chap./Sec. (Book)** |
| 1-2 | Review of branch | Introduction |  |
| 3-4 | Basic concepts of Thermodynamics, Lawa of thermodynamics-Zeroth, First and Second Law(both the forms). | BASICS OF THERMODYNAMIC N IT’S LAW | CH. 9. (TB2) |
| 5-7 | Refrigeration - Definitions - Refrigerating effect, Ton of Refrigeration, Ice making capacity, COP, Relative COP, Unit of Refrigeration, Principle and working of vapor compression refrigeration, Principle and working of vapor absorption refrigeration | REFRIGERATION AND TYPES OF REFRIGERATOR | CH.4 (TB1) |
| 8-9 | Principles and applications of air conditioners, Room air conditioner (window), Refrigerants, List of commonly used refrigerants, Properties of refrigerants | AIR-CONDITIONER | CH.4 (TB1) |
| 10 | Introduction to Internal Combustion Engine and it’s Classification, I.C. Engines parts | I.C.ENGINE | CH.3 (TB1) |
| 11-15 | 2/4 – Stroke Petrol, 4- Stroke diesel engines. P-V diagrams of otto cycle, diesel cycle. | WORKING OF I.C.ENGINE | CH3. (TB1) |
| 16 | Dual cycles, carnot cycle. | THERMODYNAMIC CYCLE | CH.9 (TB2) |
| 17-22 | Introduction to power transmission and its various drives. Belt Drives - Classification and applications, stepped pulley and fast & loose pulley, Tensions in the drives and Derivations of ratio of tensions, Definitions - Velocity ratio, Creep and slip.  Gears - Definitions, Terminology, Types and uses. Gear drives, Gear Trains – Definitions and classifications | POWER TRANSMISSION | CH.9 (TB1) |
| 23-25 | Welding: Definitions. Classification, Brief description of arc welding, Brief description Oxy-Acetylene welding, Soldering: Method of Soldering, Types of solders and fluxes, Brazing: Method of Brazing, Types of solders and fluxes | JOINING PROCESSES | CH.7 (TB1) |
| 26 | Materials : definitions, classification, properties and applications. | ENGINEERING MATERIALS | CH.1 and CH.2 (TB2) |
| 27-29 | Drilling – Principle of working and classification of drilling machines. bench drilling Machine, Radial drilling machine. Operations on drilling machine -Drilling, Boring, Reaming, Tapping, Counter sinking, Counter boring and Spot facing. Specification of radial drilling machine. | MACHINING | CH.5 (TB1) |
| 30-32 | Milling : Classification of Milling machine, types of milling cutters, milling operations | MACHINING | CH.6 (TB1) |
| 33-39 | Properties of fluids, basic definitions-mass density, weight density, specific volume, specific gravity, viscosity, Newton’s law of viscosity, Pascal’s Law, Pressure variation with depth, hydrostatic law, energy and its form, continuity equation, Bernoulli equation for incompressible fluid. Introduction to viscous and turbulent flow. | BASIC FLUID MECHANICS | CH.7 (TB2) |

**Evaluation Scheme:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **EC No.** | **Component** | **Duration** | **Marks** | **Weightage (%)** | **Date & Time** | **Nature** |
|  | Mid term | **2 Hr** | **60** | **30** |  |  |
|  | End term | **3 Hr** | **100** | **60** |  |  |
|  | Class participation |  | **10** | **10** |  |  |
|  | Assignments |  |  |  | See **Note1\*** |  |

**\*Note1:** A total of three assignments will be given in the entire semester.

**Chamber Consultation Hour:**

**Mr. Vipul Paliwal**

|  |  |
| --- | --- |
| **Day** | **Timing** |
| **Mon** | **4:00-5:00** |
| **Tue** | **2:00-5:00** |
| **Wed** |  |
| **Thu** | **2:00-5:00** |
| **Fri** | **2:00-4:00** |
| **Sat** | **4:00-5:00** |

**Mr. Ashish Bisht**

|  |  |
| --- | --- |
| **Day** | **Timing** |
| **Mon** | **9:00-12:00** |
| **Tue** | **10:00-1:00** |
| **Wed** | **9:00-12:00** |
| **Thu** | **11:00-1:00** |
| **Fri** | **10:00-1:00** |
| **Sat** | **9:00-12:00** |

**Mr. Ravi Verma**

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| --- | --- |
| **Day** | **Timing** |
| **Mon** | **12:00-1:00 & 2:00-5:00** |
| **Tue** | **11:00-1:00 & 3:00-5:00** |
| **Wed** | **12:05-1:00 & 2:00-4:00** |
| **Thu** | **11:00-1:00 & 2:00-4:00** |
| **Fri** | **11:00-1:00** |
| **Sat** | **3:00-5:00** |

**Dr. Arindam Ghosal**

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| --- | --- |
| **Day** | **Timing** |
| **Mon** | **9:00-12:00** |
| **Tue** | **9:00-11:00 & 1:00-5:00** |
| **Wed** | **9:00-1:00** |
| **Thu** | **9:00-12:00 & 2:00-5:00** |
| **Fri** | **10:00-1:00 & 2:00-4:00** |
| **Sat** | **9:00-1:00 & 3:00-5:00** |

**Note: Above chamber consultation hour is based on First year time table.**