ENGINEERING WORKSHOP

Course Code: 22ES11EW

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1	0	4	3

Note: Part A is common to all branches and Part B is specific to the respective branch.

PART-A
(Common to all branches)
(Any SIX exercises with at least ONE from each section to be carried out)

Course Outcomes: At the end of this course, the student will be able to

CO1: demonstrate Wood working and Sheet metal working skills (L3)
CO2: demonstrate Fitting trade and House wiring skills (L3)
CO3: demonstrate 3-D Printing and Engraving skills (L3)

Wood working:
1. Preparation of half – lap joint using wooden pieces
2. Preparation of Mortise and Tenon joint using wooden pieces

Sheet metal working:
1. Preparation of a tapered tray using sheet metal
2. Preparation of a conical funnel using sheet metal

Fitting:
1. Preparation of a V-fit using mild steel pieces
2. Preparation of a semi-circular fit using mild steel pieces

House wiring:
1. Wiring of two bulbs in Parallel and Series
2. Wiring to control a lamp with two-way switches
3. Wiring to control a fluorescent tube light with one-way switch

Modern manufacturing methods:
1. Manufacture of components by 3-D Printing
2. Engraving / Cutting with laser beam

PART-B

For CHEMICAL ENGINEERING

List of experiments (Any six of the following Experiments should be carried out)

CO4: Demonstrate the importance of unit operations such as fluid flow, Mechanical operations, heat transfer and mass transfer. (L3)
CO5: Determine the factors that influence the rate of momentum and heat transfer. (L3)
CO6: Illustrate the mass transfer operations in Gas-Liquid-Solid phases. (L3)

1. Identify laminar and turbulent flows – concept of Reynolds number
2. Demonstrate manometers with different manometric fluids to measure pressure drop – relate the pressure drop to fluid properties.
3. Contrast different instruments to measure volumetric flow rates of liquids.
4. Demonstrate the working of equipment for mixing and transportation of solid particles.
5. Compare heat transfer by conduction in different metals – identify in which case the heat transfer is faster and suggest the reasons.
6. Demonstrate free and forced convective heat transfer – identify the variables affecting the heat transfer rates.
7. Classification of various mass transfer operations in Gas-Liquid-Solid phases.
8. Explain concept of diffusion of mass transfer in Gas- Liquid, Liquid –Liquid , Gas-Solid phases and identify the factors affecting the rate of mass transfer.

Reference Books:

1. McCabe W.L., Smith J.C. and Harriot P., *"Unit Operations of Chemical Engineering"*, 7th Edition, McGraw-Hill, 2005
2. Kenneth A Solen & John.N.Harb, *"Introduction to Chemical Engineering",* 5th Edition, John Wiley, 2011.

For CIVIL ENGINEERING
(Any six experiments should be carried out)

CO4: Construct a brick wall with English and Flemish bond (L3)
CO5: Illustrate assembling of a pipeline as per the piping layout using pipes and accessories (L3)
CO6: Show the building plan in the field by using chain / tape and other accessories (L3)

List of Experiments /Activities:

1. Masonry works hands-on practice for different types of bonds in brick masonry.
2. Demonstration on installation of simple sanitary fittings and fixtures like Tap, T-joint, Elbow bend, Threading, etc..
3. Finding the discharge and velocity in a water pipeline.
4. Hands-on practice of assembling of truss elements to form the truss (King post or Queen post truss).
5. Hands-on practice for assembling of single cover / double cover bolted butt joint.
6. Preparing a model (Bridge/ Tank / Truss, etc.) using wood/ aluminum.
7. Setting out of a single room building as per the given building plan.
8. Computation of Centre of gravity and Moment of inertia of a given rolled steel section by actual measurements.

REFERENCES:

1. Rangawala, *Engineering Materials, Materials Science*, 43rd Edition, Charotar Publishing house, 2019.
2. Punmia, B.C., Ashok K Jain, Arun, K. Jain, *Building Construction*, 11th Edition, Laxmi Publications (P) Ltd., 2017.
3. Mimi Das Saika, Bargab Mohan Das, Madan Mohan Das, *Elements of Civil Engineering*, 1st Edition, PHI Learning Private Limited, 2011.
4. Varghese, P.C., *Building Materials*, 2nd Edition, Prentice- Hall Publication, 2015.

(Any **Six** activities should be carried out)

Course Outcomes: At the end of the Course the student shall be able to

CO4: demonstrate the installation of Operating Systems and identify the components of the
　　　Computer. (L3)
CO5: use MS office tools in crafting word documents, spreadsheets, and PowerPoint
　　　presentations. (L3)
CO6: use Latex tools to prepare documents.(L3)

List of Activities:

1. Demonstrate the peripherals of a computer or laptop. Prepare a report containing the block diagram of the CPU along with the configuration of each peripheral.

2. Demonstrate the installation operating systems like Linux and MS windows on the personal computer. Configure the system as dual boot with both Windows and Linux.

3. a) Using MS word perform the following:
   Inserting Tables, Borders, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs, Mail Merge.

   b) Using MS Excel perform the following:
   Formulae in spreadsheet – sum, average, standard deviation, Charts, count function, sorting, Conditional formatting, Pivot, HLOOKUP, VLOOKUP.

4. Using MS Powerpoint perform the following:
   PPT Orientation, Slide Layouts, Auto Shapes, Lines and Arrows, Inserting Images, Tables, Charts, Hyperlinks and Adding animations in the slide.

5. Create a simple document using Latex that consists of Document Structure, Typesetting and Tables.

6. Create a simple document using Latex that consists of figures, Equations and References.

7. Create a newsletter using MS word.

8. Calculate GPA of all students in a class using Excel.

Reference Book:

1. Peter Norton, *Introduction to Computers*, 7th Edition, SIE Publishers, 2017.

Web References:

1. https://explorersposts.grc.nasa.gov/post631/2006-2007/computer_basics/ComputerPorts.doc
2. https://explorersposts.grc.nasa.gov/post631/2006-2007/bitsnbyte/Digital_Storage_Basics.doc
3. http://www.docs.is.ed.ac.uk/skills/documents/3722/3722-2014.pdf
4. https://www.vmware.com/pdf/VMwarePlayerManual10.pdf
5. https://support.microsoft.com/en-us/office

For ELECTRONICS AND COMMUNICATION ENGINEERING
(Any **SIX** of the experiments shall be conducted)

CO4: Describe electronic components, measuring and testing instruments (L2)
CO5: Illustrate about the battery charging circuits (L3)
CO6: Outline various sensors and actuators (L4)

List of Experiments:

1. Study of datasheets for various electronic components
2. Study of resistor colour codes, identification of active and passive electronic components
3. Study of multimeter, Cathode Ray Oscilloscope and Digital Storage Oscilloscope
4. Testing of Electronic Components
5. Assembling and Testing of simple electronic circuits on breadboards
6. Study of Function Generator and Regulated power supply
7. Soldering of Electronic components on PCBs
8. Study of Different types of batteries
9. Study of Battery Charging circuit
10. Installation of open source Operating System
11. Installation and demonstration of Linux based Office Tools
12. Demonstration of EDA Tools
13. Study of Sensors & Actuators
14. Mini Hobby project

For ELECTRICAL AND ELECTRONICS ENGINEERING
(Any **Six** of the experiments are to be conducted)

CO4: Demonstrate the electrical components, cables and battery specifications and measure the basic electrical parameters. (L3)
CO5: Discuss the troubleshooting of the electrical equipment and check for the continuity test. (L2)
CO6: Understand the wiring diagram of the electrical power distribution arrangement for domestic applications. (L2)

List of Experiments:
1. Demonstration, Identification and testing of various electrical components.
2. Identification of the value of the given resistor using colour code and Verify Ohm's Law using breadboard.
3. Determination of Insulation Resistance and Continuity test of wiring installation using Megger.
4. Wiring and Troubleshooting of ceiling Fan.
5. Measurement of Current and Voltage for a Series and Parallel AC/DC circuit.
6. Understand the measurement of signal parameters using cathode ray oscilloscope/ digital storage oscilloscope.
7. Identification of different electrical types of cables and wires with their specifications.
8. Understanding the battery specifications for charging and discharging.
9. Demonstrate the working of PV Cell
10. Wiring of power distribution arrangement using single phase MCB distribution board with Circuit breaker, Main switch and Energy meter.

Text Book:
1. D. Jayachandra, *Electrical Engineering Workshop Practice Lab Manual*, Falcon Publications, 2007.

For MECHANICAL ENGINEERING and MECHANICAL ENGINEERING (Robotics)
(Any SIX exercises with at least ONE from each section to be carried out)

CO4: Demonstrate preparation of sand casting molds and manufacturing of plastic components (L3)
CO5: Demonstrate lathe operations and make different welded joints (L3)
CO6: Demonstrate manufacturing of domestic utility components and assembling/disassembling of automobile components (L3)

Foundry practices:
       1. Preparation of a green sand mold using single piece pattern
       2. Preparation of a green sand mold with core using split piece pattern

Manufacture of a plastic components:
       1. Making of a plastic component (elbow/bottle cap) using injection molding machine
       2. Making of a fiber reinforced composite plate using hand layup method

Lathe operations:
       1. Performing facing and turning operations on a cylindrical stock on lathe machine
       2. Performing step turning and knurling operations on a cylindrical stock on lathe machine

Welding practices:
       1. Preparation of a butt joint using arc welding
       2. Preparation of T-joint using arc welding
       3. Preparation of a lap joint using gas welding
       4. Preparation of a butt joint using gas welding

Manufacture of domestic utility products with any material and assembling/disassembling practice of automobile components:
       1. Making of wooden curd stirrer
       2. Making of a wooden hanger stand
       3. Assembling and disassembling of Clutch and carburetor
       4. Assembling and disassembling of two wheeler engine