



MEASUREMENTS AND INSTRUMENTATION AN OVERVIEW



CONTENTS



Objectives

**Scope for
M&I**

**Design and
Engineering**

**Course
Description**



BALDOR
A MEMBER OF THE ABB GROUP

Honeywell



Bharat Bijlee

Schneider
Electric



YASKAWA



IS THERE ANY SCOPE FOR MEASUREMENTS AND INSTRUMENTATION ENGINEER?

Stark
MOTORS
An ISO 9001 company

HTE
HINDUSTHAN
TRANSFORMERS

Century

Formerly A. O. Smith Electrical Products Company
A Regal Beloit Company



MAGNETEK



WEG

SIEMENS



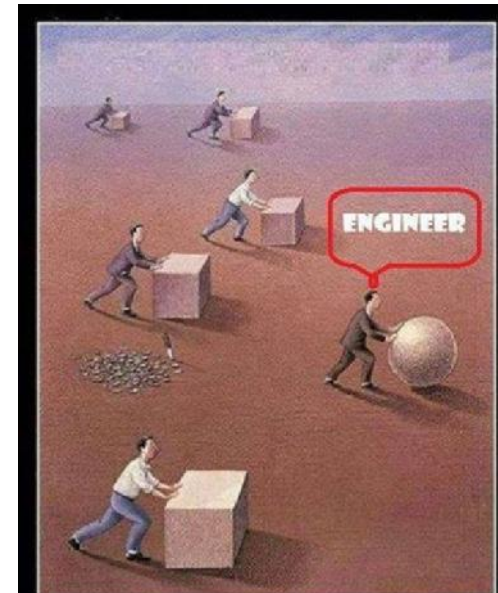
C.R.I. PUMPS
Pumping trust. Worldwide.



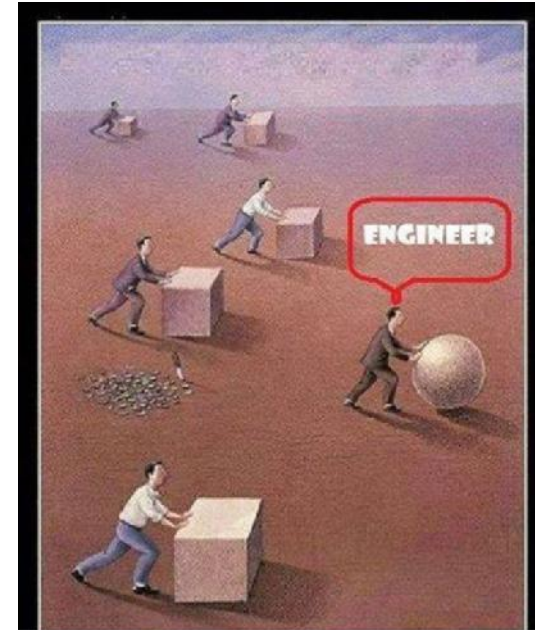
SUGUNA
PUMPS & MOTORS

SHARP





Engineering is the economical application of _____ to practical design problems.

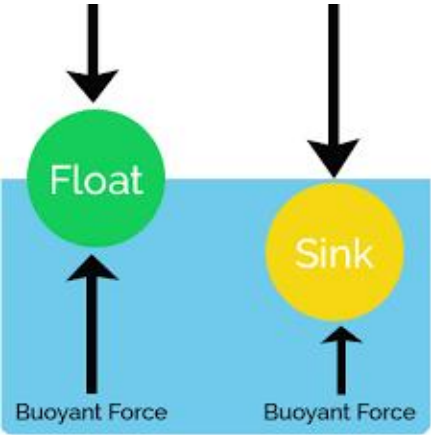


Engineering is the economical application of scientific principles to practical design problems.



What is

DESIGN



Physical Realization of Theoretical Concepts

Example?



COURSE DESCRIPTION



COURSE WEBSITE

www.snssoftware.org



COURSE DESCRIPTION



AIM

To expose the students to the concept of Measurements and Instrumentation.

OBJECTIVES

- Illustrating the different functional elements, characteristics and standards of measuring instruments.
- Promoting the construction and principles of various Electrical and Electronics instruments.
- Equipping the comparison methods for measurements.
- Exposing the performance and operation of display and storage devices.
- Inculcating the types of transducers and elements of data acquisition system.



COURSE DESCRIPTION



COURSE OUTCOMES

- Differentiate the functional elements, characteristics and standards of measuring instruments.
- Summarize the construction and principles of Electrical and Electronics instruments used for measurement of Electrical quantities.
- Categorize the different comparison methods for measurements.
- Compare the performance and operation of display and storage devices.
- Identify different types of transducers and elements of data acquisition system.



COURSE DESCRIPTION



TEXT BOOKS

1. ***A.K. Sawhney, 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2004.***
2. J. B. Gupta, 'A Course in Electronic and Electrical Measurements', S. K. Kataria & Sons, Delhi, 2003.
3. Doebelin E.O. and Manik D.N., Measurement Systems – Applications and Design, Special Indian Edition, Tata McGraw Hill Education Pvt. Ltd., 2007.

REFERENCES

1. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw Hill, II Edition 2004.
2. D.V.S. Moorthy, 'Transducers and Instrumentation', Prentice Hall of India Pvt Ltd, 2007.
3. A.J. Bouwens, 'Digital Instrumentation', Tata McGraw Hill, 1997.
4. Martin Reissland, 'Electrical Measurements', New Age International (P) Ltd., Delhi, 2001.
5. Alan. S. Morris, Principles of Measurements and Instrumentation, 2nd Edition, Prentice Hall of India, 2003.



UNIT-I INTRODUCTION



- Functional elements of an instrument
- Static and dynamic characteristics
- Errors in measurement
- Statistical evaluation of measurement data
- Standards and calibration.



UNIT-II ELECTRICAL AND ELECTRONICS INSTRUMENTS



- Principle and types of analog and digital voltmeters, ammeters, multimeters
- Single and three phase wattmeters and energy meters
- Magnetic measurements
- Determination of B-H curve and measurements of iron loss
- Instrument transformers
- Instruments for measurement of frequency and phase



UNIT-III COMPARISON METHODS OF MEASUREMENTS



- D.C & A.C potentiometers
- D.C & A.C bridges
- Transformer ratio bridges
- Self-balancing bridges.
- Interference & screening
- Multiple earth and earth loops
- Electrostatic and electromagnetic interference
- Grounding techniques



UNIT-IV STORAGE AND DISPLAY DEVICES



- Magnetic disk and tape
- Recorders, digital plotters and printers
- CRT display, digital CRO
- LED, LCD & dot matrix display
- Data Loggers



UNIT-V TRANSDUCERS AND DATA ACQUISITION SYSTEMS



- Classification of transducers
- Selection of transducers
- Resistive, capacitive & inductive transducers
- Piezoelectric, Hall effect, optical and digital transducers
- Elements of data acquisition system
- A/D, D/A converters
- Smart sensors



THANK YOU