

VEER NARMAD SOUTH GUJARAT UNIVERSITY

Post Graduate Diploma In Instrumentation

PAPER- IV

Optical, Analytical, Biomedical, Environmental Instrumentation

Laser Instrumentation, principals of laser types of lasers construction of laser, application of laser in distance measurement communication holography etc.

Fiber Optics, principles of optical fibers, materials for optical fibers, production of optical fibbers, sources,detectors,couplings, application of fiber optics, illuminators, endoscopy, communication etc.

Analytical Instrumentation :

Introduction to instrumentation system, need for an integrated approach

Analytical Instruments :

Working principles, operation and data analysis of the following instruments Spectrophotometers, Atomic AAS, Electron Microscopes.

Nuclear Magnetic Resonance Spectrometer.

Principal of operation, sample preparation and data analysis, stability of magnetic fields and electronics.

Mass Spectrometer :

Application Area, Working Principles of static and dynamic instruments, analysis of data.

X-ray techniques and their application to radiography fluorescence and differactometry Interpretation of data.

Moss Bauer spectrometers :

Principles of operation, measurement of radioactivity and analysis of data.

Biomedical Instrumentation :

Introduction to transducer and their application, recording electrodes.

EEG,ECG and other potentials :

Working principles and precaution.

Blood pressure instruments, introduction to homodynamic.

Introduction to ultra sound and topographic techniques.

Introduction of data and precaution for measurements.

Introduction to working principles and operation of pacemakers.

defibrillators heart-lung and other ICU instrumentation.

Environmental Instrumentation:

1. **General introduction to physical environment :**
Physical aspects like pressure, temperature, humidity, noise, visibility, air quality and water quality.
2. **Humid atmosphere, Hygrometers and dew point instruments, controlled humidity environment.**
3. **Thermal comfort meter, heat stress monitor and temperature monitors.**
4. **Air Velocity and effect on dispersion of pollutants.**
Hot-wire anemometer, radar
5. **Sound level meters, type recorders, noise dosimeters, sound level monitors and acoustical calibrators.**
6. **Solar flux, Pyrometers and pyrhemometers.**
7. **Water quality by turbidity meter, calorimeter, PH meter. microscopes, atomic absorption spectroscopy.**
8. **Air quality measurement using gas chromatography, high-pressure liquid chromatography, gas chromatography, mass spectrometry, conductivity meter.**
9. **Particulate matter in air, soiling index and visibility.**
10. **Congenial environment for work, artificial lighting acoustic consideration and air conditioning.**

RECOMMENDED BOOKS :

1. **Air pollution-physical and chemical fundamentals. J.H.Seinfeld. Mc Graw Hill NY 1975.**
2. **Meteorological instruments, W.E.Knowles Middleton and A.S.Spilhans, University Toronto Press 1953.**
3. **H.Willard, L.L. Merrit, J.A.Dean, F.A. Settle. Instrumental methods of analysis VI Edn.**
4. **Environmental instrumentation Frichtschen, L.J.and Gay, L.W.**
5. **Thermal comfor Fanger, P.O. 1982.**
Robert E. Krieger Publishing Company, Malbar, FL.