

Semester-II, Paper-4
INSTRUMENTATION FOR AGRICULTURE, FOOD &
PHARMACEUTICAL INDUSTRY

Teaching scheme

Lectures: 4 Hrs / Week

Practical: 2 Hrs/ week

Examination scheme

Theory: 100 Marks

Term work: 25 Marks

Unit 1.

(10 Hrs, 20 Marks)

Introduction: necessity of Instrumentation and control for agriculture, food processing and pharmaceutical industries, Sensor requirement remote sensing biosensors in agriculture standards for food quality.

Soil science and sensor: pH conductivity resistively temp. Soil moisture and salinity ion concentration measurement, methods of soil analysis.

Instruments for environments conditioning of seed germination and growth.

Unit 2.

(10 Hrs, 20 Marks)

Flow Diagram of sugar plant sensors and Instrumentation set up for it. Flow diagram of fermenter and control (batch process), Oil extraction plant and instrumentation set up, Pesticides Manufacturing Process and control, a) Flow diagram of dairy and confectionery industry and instrumentation set up, Juice Extraction control set up.

Unit 3.

(10 Hrs, 20 Marks)

Application of SCADA for dam parameters and control, Water distributions and management control auto drip irrigation systems, Irrigation Canal Management upstream and downstream control systems

Green houses and Instrumentation: Ventilation cooling and heating wind speed temp. and humidity rain gauge carbon dioxide enrichment measurement and control.

Unit 4.

(10 Hrs, 20 Marks)

Automation in earth moving equipment and farm implements pneumatic hydraulic and electronic control circuits in harvesters cotton pickers tractors etc. Application of SCADA and PLC in Packing industry.

Leaf area length evapotranspiration temp, Wetness and respiration measurement and data logging electromagnetic radiations photosynthesis infrared and UV Bio sensor methods in agriculture, Agrometeorological Instrumentation weather stations.

Unit 5.

(10 Hrs, 20 Marks)

Speciality bioproducts for agricultural, food and pharmaceutical industries: Biopesticides, biofertilizers and plant growth factors. Natural biopreservatives (nisin), biopolymers (xanthan gum pi single cell protein.

Enzymatic bioconversion processes: Production of synthetic penicillins and cephalos racemically pure drug intermediates. Steroid bioconversion. High-fructose corn syrup. Bioconversion of vegetable

Biological waste treatment processes: Objectives of biological waste treatment processes. A brief overview of various aerobic and anaerobic processes for removal of organic waste.

References:

1. Industrial Instrumentation, "Patranabis" , TMH.
2. Instrumentation handbook-Process Control, "B.G.Liptak", Chilton.
3. Process Control and Instrumentation technology, "C.D.Johnson",PHI.
4. Wills B.A., "Mineral Processing Technology", 4th Ed., Pergamon Press.

List of Experiments:

Term work shall consist of at least **eight** experiments based on above topics.