PCE6I102 PROCESS DYNAMICS AND CONTROL

Module I:
Response of first order systems, Physical examples of first order systems Response of first order systems in series, Response of Second order systems, Transportation lag. Control System, controllers and final control elements, Block diagram of a Chemical Reactor Control system, Closed loop transfer functions, Transient response of simple control systems.

Module II:
Stability, Root locus, Frequency response, Control system design by frequency response.

Module III:
Cascade control, feed forward control, ratio control, Dead time compensation, internal model control, controller tuning and process identification, control valves.

Module IV:
Introduction to sampled data controllers, sampled data control of a first order process with transportation lag, Design of sampled data controllers, Digital computer simulation of control systems.

Text Books and Reference Books:

1. *Process Systems Analysis and Control, 3rd ed. by D R Coughanowr and S E LeBlanc, McGraw-Hill.*
2. *Chemical Process Control: An Introduction to Theory and Practice by G Stephanopoulos, PHI.*
3. *Process Dynamics & Control by J M Douglas, PHI.*
4. *Computer Aided Process Control by S K Singh, PHI.*
5. *Outlines of Chemical Instrumentation Process Control, 3rd ed. by ASuryanarayana, Khanna Publishers.*

PROCESS CONTROL LAB

1. *To study the response of a single tank with step change in inlet flow and to find out time constant graphically.*
2. *To study the transient response of two interacting tanks with step change in inlet flow rate and to find out the time constant graphically.*
3. *To study the transient response of two non-interacting tanks with step change in inlet flow rate and to find out the time constant graphically.*
4. *To study the open loop response and the operation of ON-off electronic temperature controller and determination of its performance to control the temperature of a system having capacity to store thermal energy.*
5. *To study the open loop response and the operation of ON-OFF electronic pressure controller and determination of its performance to control the pressure of a pressure vessel.*
6. *To study of effect of PD, PI and PID controller on a temperature control trainer.*
7. *To study of effect of PD, PI and PID controller on a pressure control trainer.*
8. *To study the stability of a temperature control trainer.*
9. *To study the stability of a pressure control trainer.*
10. *To study the dynamic characteristics of a mercury in glass thermometer.*