PROCESS DYNAMICS AND CONTROL

COURSE CODE:15CH1122　　　　**L　T　P　C**
　　　　　　　　　　　　　　　　　　　　3　0　0　3

COURSE OUTCOMES:

At the end of the course the student shall be able to

CO 1　Develop the transfer function for a first order system and obtain the response equation for a given forcing function.

CO 2　Compute the higher order transfer functions. Describe the controller system.

CO 3　Draw block diagram, analyze the responses for different modes of control and predict stability using Routh criterion.

CO 4　Apply Root Locus and frequency response methods to assess the stability of a control system.

CO 5　Create block diagram for different advanced control strategies. Discuss controller tuning and control valves characteristics.

UNIT-I　　　　　　　　　　　　　(6 LECTURES)

Response of first order system, Physical examples of first order systems, Response of first order systems in series

UNIT-II　　　　　　　　　　　　(14 LECTURES)

Higher order systems and transportation lag, Control systems, Controllers and final control elements

UNIT-III　　　　　　　　　　　(14 LECTURES)

Closed loop transfer functions, Transient response of simple control systems, Stability

UNIT-IV　　　　　　　　　　　(10 LECTURES)

Root locus, Introduction to frequency response: Bode diagrams of first and second order systems with and without lag, Control systems design by frequency response

UNIT-V   (6   LECTURES)

ADVANCED CONTROL STRATEGIES:

Cascade control, Feed forward control, Ratio control, Controller tuning and Process Identification, Control valves.

TEXT BOOKS:

1   D R Coughanowr, "Process systems Analysis and Control", 3rd Edition, McGraw Hill, 2013.

REFERENCES:

1. G. Stephanopoulos, "Chemical Process Control", PHI, 1998.