

6th Semester		Process Dynamic & Control	L-T-P 3-0-0	3 CREDITS
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Module I: (12 Hrs)

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: (8 Hrs)

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

Module III: (10 Hrs)

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

Module IV: (10 Hrs)

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:

1. Process Systems Analysis and Control, 3rd ed. by D R Coughanowr and S E LeBlanc, McGraw-Hill.
2. 1. Chemical Process Control: An Introduction to Theory and Practice by G Stephanopoulos, PHI.

Reference Books:

1. Process Dynamics & Control by J M Douglas, PHI.
2. Computer Aided Process Control by S K Singh, PHI.
3. Outlines of Chemical Instrumentation Process Control, 3rd ed. by A Suryanarayana, Khanna Publishers.

Digital learning resources:

1. Process Control and Instrumentation by Dr. P.K. Saha, Department of Chemical Engineering, IIT Guwahati, Link: <https://nptel.ac.in/courses/103/103/103103037/>
2. Process Control and Instrumentation by Dr. A.K. Jana and Dr. D. Sarkar, Department of Chemical Engineering, IIT Kharagpur, Link: <https://nptel.ac.in/courses/103/105/103105064/>
3. Chemical Process Control by Prof. Sujit Jogwar, Department of Chemical Engineering, IIT Bombay, Link: <https://nptel.ac.in/courses/103/101/103101142/>