

Introduction to continuous and discontinuous process

1. **Course number and name:** 020PROCS2 Introduction to continuous and discontinuous process

2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours

3. **Names of instructors:** Mansour Tawk

4. **Instructional materials:**

- Course handouts
- Solved exercises
- References:
 - Chemical Process Control : An Introduction to Theory and Practice 1st Edition, George Stephanopoulos
 - Process Dynamics and Control, 4th Edition , Dale E. Seborg, Thomas F. Edgar, Duncan A. Mellichamp, Francis J. Doyle III

5. **Specific course information**

a. **Catalog description:**

Introduction: difference between continuous, discontinuous, multiproduct, multifunctional processes. Transitional assessments. Dynamics of continuous and discontinuous processes. Application to reactors. Gantt chart. Description of the problems of design, planning and scheduling of discontinuous workshops: Presentation of the different criteria. Short-term planning: concept of recipe, representation of recipes (SSN STN), associated mathematical model and optimization. Simulation of discontinuous processes.

b. **Prerequisites:** None

c. **Required/Selected Elective/Open Elective:** Required

6. **Specific goals for the course**

a. **Specific outcomes of instruction:**

- Understand the dynamics of systems and processes in transient state (continuous, discontinuous, multi-product, multifunctional)
- Introduce transfer functions to model a dynamic response (balance equation)
- Apply the dynamics of continuous and discontinuous systems and processes for control and command
- Describe the problems of designing, planning and scheduling discontinuous Job-shop

b. **PIs addressed by the course:**

PI	1.3	2.1	2.3
Covered	x	x	x
Assessed	x	x	x

7. Brief list of topics to be covered

- Introduction to chemical process control
- Modeling the dynamic and static behavior of dynamic process
- Laplace transform (Solution of linear differential equation)
- Transfer function
- Dynamic behavior of first order systems
- Dynamic behavior of second order systems
- Instrumentation and process security
- Gantt chart