TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATIONPERFORMANCEREVIEW:PROGRAMMEREVIEW

COURSE SPECIFICATION

ThisCourseSpecificationprovidesaconcisesummary ofthemainfeaturesofthe course and the learning outcomes that a typical student might reasonably be expected toachieve and demonstrateif he/she takesfulladvantage of thelearning opportunities thatare provided.It shouldbe cross-referencedwith theprogramspecification.

1. TeachingInstitution	University of Technology
2. UniversityDepartment/Centre	Chemical Engineering Department
3.Course title/code	Process Control/ CE.443
4.Programme(s) towhichitcontributes	CE.2
5.Modesof Attendance offered	Fall time
6.Semester/Year	2 semester/year
7. Number ofhourstuition(total)	3
8. Dateof production/revision of this Specification	
9. Aimsof the Course	
Study of Dynamics and Control of Chemical Processes	

10·LearningOutcomes, Teaching,LearningandAssessmentMethod

A-Knowledge andUnderstanding

A1.Basic information ,concepts and terminology of the general principles of Control Process

A2. Demonstrating a broad and integrated knowledge and a deep understanding of issues related to Control processes in a chemical Engineering and important role it plays in the success of the process.

A3. Ability to design Control process for the effective solution of intended problem.

B. Subject-specific skills

B1. Gain and/or improve their ability to synthesize, integrate and utilize process information in solving Control process problems.

B2. Analyze Control process issue, when necessary, design experiments to gain new data.

B3. Give an awareness and understanding of professional responsibilities concerned mainly with Control process that take place in industrial units, and, in particular, with determining the factors that influence on it.

B4.Use laboratory, engineering and measuring equipment to provide data in support of theoretical understanding

TeachingandLearningMethods

Lectures, Tutorials , Example Classes

Assessmentmethods

Midterm exams ,Final exam ,Quizzes, Weekly homework

C. ThinkingSkills

C1.An ability to apply effective, creative and innovative solutions, both independently and cooperatively, to current and future problems inControl process.

C2. Apply course concepts in solving interdisciplinary problems, solve the problems through logic and improve their ability to work effectively in a group of peers.

C3.Present and evaluate information and ideas in the handling of Control process issues.

C C4.Analyze and solve engineering problems often on the basis of limited and contradictory information.

TeachingandLearningMethods

Lectures, Tutorials , Example Classes

Assessmentmethods

Midterm exams,Final exam,Quizzes, Weekly homework.

D.GeneralandTransferable Skills(otherskillsrelevanttoemployabilityand personaldevelopment).

D1.Work together in same-discipline teams to solve engineering problems.

D2.Becreative, particularly and analytical in the formulation and solution of problems.

D3. Speed intuitive, predictability and evaluate information and ideas in the handling of Control process issues.

E. Identify, formulate, and solve engineering problems

An ability to identify and solve innovative solutions, both independently and cooperatively, to current and future problems in Control process.

K. Use the techniques, skills, and modern engineering tools necessary for engineering practice.

Have ability and skills to use modern control tools inthe operational units in factories and refineries.

11.Course Structure

Week	Hours	ILOs	Unit/Moduleor Topic Title	Teaching Method	Assessment Method
1st semester					
1	3	Response of First-order Systems,		Lectures, Example Classes, Practical Applications.	**Quiz**
2	3	Transfer Function		Lectures, Example Classes, Practical Applications.	
3	3	Transient Response Dynamic behavior of 1st order system		Lectures, Example Classes, Practical Applications.	
4	3	Transient Response Dynamic behavior of 1st order system		Lectures, Example Classes, Practical Applications.	**Quiz**
5	3	Dynamic behavior of 1st order system		Lectures, Example Classes, Practical Applications.	
6	3	Linearization.		Lectures, Example Classes, Practical Applications.	
7	3	Non-interacting System, Interacting System		Lectures, Example Classes, Practical Applications.	
8	3	2nd order Under-damped System		Lectures, Example Classes, Practical Applications.	
9	3	2nd order Over-damped System Transportation Lag		Lectures, Example Classes, Practical Applications.	**Quiz**

10	3	Controllers ,P		Lectures, Example Classes, Practical Applications.	
11	3	Controllers ,PI,PD	-	Lectures, Example Classes, Practical Applications.	
12	3	Controllers ,PID		Lectures, Example Classes, Practical Applications.	
13	3	Final Control Elements		Lectures, Example Classes, Practical Applications.	
14	3	Overall Closed-Loop Transfer Functions		Lectures, Example Classes, Practical Applications.	
15	3	Overall Closed-Loop Transfer Functions		Lectures, Example Classes, Practical Applications.	**Quiz**
2nd semester					
16	3	Transient Response of Simple Control Systems		Lectures, Example Classes, Practical Applications.	
17	3	Transient Response of Simple Control Systems		Lectures, Example Classes, Practical Applications.	
18	3	Stability		Lectures, Example Classes, Practical Applications.	
19	3	Introduction to Frequency Response, Bode Diagrams		Lectures, Example Classes, Practical Applications.	
20	3	System Design by Frequency Response		Lectures, Example Classes, Practical Applications.	**Quiz**
21	3	Ziegler-Nichols Controller Settings.		Lectures, Example Classes, Practical Applications.	
22	3	Pneumatic Controller Mechanisms		Lectures, Example Classes, Practical Applications.	
23	3	Industrial Pneumatic Controller		Lectures, Example Classes, Practical Applications.	
24	3	Control of Complex Processes		Lectures, Example Classes, Practical Applications.	
25	3	Control of Distillation Column		Lectures, Example Classes, Practical Applications.	

26	3	Control of Heat Exchanger		Lectures, Example Classes, Practical Applications.	
27	3	Control of Chemical Reactor		Lectures, Example Classes, Practical Applications.	
28	3	Feed-forward Control, Ratio Control		Lectures, Example Classes, Practical Applications.	**Quiz**
29	3	Adaptive Control, Selective Control Systems.		Lectures, Example Classes, Practical Applications.	
30	3	Computer Control Loops		Lectures, Example Classes, Practical Applications.	

12.Infrastructure	
Requiredreading: ·CORETEXTS ·COURSEMATERIALS ·OTHER	o Lecturers o Book -References o D.R. Coughanowr and S. LeBlanc, Process Systems Analysis and Control, McGraw-Hill, 3nd edition, 2008. o Stephanopoulos G., “Chemical Process Control-An Introduction to Theory and Practice, "Prentice -Hall, New Jersey, 1984. o Luyben W. L., “Process Modeling, Simulation and Control for Chemical Engineers,” McGraw-Hill, New York, 2nd Ed., 1990 .
Specialrequirements(include for example workshops,periodicals, ITsoftware, websites)	websites
Community-based facilities (include forexample,guest Lectures, internship,field studies)	

13. Admissions

Pre-requisites	Before undertaking this module the student should have undertaken the following: Basic Principles of chemical engineering I and II, mathematics I and II ,mass transfer ,heat transfer, reactors as well simultaneous courses:- Thermodynamics , and applied mathematics
Minimumnumber ofstudents	Central Admission
Maximumnumber ofstudents	Central Admission