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aikui Zou, Lei Zhang, Jianfeng Chen, Kyriakos
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- 课程介绍 About Course

Theories for Chemical Reactors

This course is mostly established for foreign MS students and it will be taught in English. It is also applicable to those Chinese MS students who are eager to improve their international perspective, fundamental knowledge in chemical reactor design and communication skills in English. The objectives of this course are to help students understand the fundamental theories and knowledge of the key processes of chemical industry, i.e., chemical reaction and reactors, and to train skills for analyzing, calculating and solving practical problems of chemical reaction processes in the production process.

Outlines:

10. Plug convection model, axial dispersion model and tanks-in-series model (6 hours)
11. Laminar flow (2 hours)
12. Gas-solid catalytic reactions (3 hours)

● 课程大纲 Syllabus

Dr/Prof.

: The objectives of this course are to help students understand the fundamental
d knowledge of the key processes of chemical industry, i.e., chemical reaction and
d to train skills for analyzing, calculating and solving practical problems of chemical
cesses in the production process.

D. Levenspiel, 《Chemical Reaction Engineering》 3rd Edition, John Wiley & Sons,

: G. F. Froment and K. B. Bischoff, 《Chemical Reactor Analysis and Design》 2nd
n Wiley & Sons, Inc. 1990

llabus:

ction (2 hour)

sks, contents and research methods of chemical reaction engineering; the concept of
reaction rate.

es of homogeneous reaction (3 hours)

ption of reaction rate equation, molecularity and order of reaction.

etation of batch reactor data (8 hours)

tegral method and differential method for determining reaction kinetics equation;
tion, temperature, pressure and reaction rate; the search for a rate equation.

omogeneous reactors (2 hours)

ots of batch, plug flow and mixed flow reactors, and establishment of their reaction
tions.

for single reactions (6 hours)

risons between plug flow and mixed flow reactors; plug flow and mixed flow reactors
and/or in parallel; Kinetic characteristics of recycle reactor and autocatalytic reactions.

l reactions (2 hours)

characteristics of parallel reactions and applicable reactor types; Definition of
y and calculation of product distribution.

es of multiple reactions and reactor design (2 hours)

characteristics and calculation of product distribution for series-parallel reactions.

of temperature on reactions (3 hours)

nt operating modes of non-isothermal reactors; significance and calculation of
reaction operation lines; temperature stability of reactors.

deal flow (5 hours)

ion of backmixing and its influence on process; density functions and distribution
for residence time distribution, and their physical significance and calculation;

Instructor: Liqiang Wu

Description

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reactors, an
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Textbook: C
Inc. 1998

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21. None-i
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functions

calculation of mean residence time and variance; residence time distribution function and numerical characteristics of ideal reactor.

22. Pure convection model, axial dispersion model and tanks-in-series model (8 hours)

    Definitions of these models; the physical significance of the parameters; and calculation of the conversion rates of reactors through these models.

23. Laminar flow (2 hours)

    The mixing properties of laminar flow; its non-ideality, description and detection.

24. Gas-solid catalytic reactions (5 hours)

Grading: Project 20%; Homework 30%; Final exam 50%.

- 教案 **Teaching Plan**
- 视频 **Video**