ENGINEERING OF CHEMICAL REACTORS

1.1. Identification

University:	Alma Mater Studiorum - Università di Bologna													
School:	School of Engineering													
Course:	Engineering of chemical reactors													
ECTS:	3													
Semester:	*Winter*					X	*Summer*							
Category	*Fundamental course*					X	*Specialisation course*							
Module	*MFI*	X	*MFII*		*MFIII*		*MSI*		*MSII*		*MSIII*			
Teachers:	Giovanni Camera Roda													
Language:	*English*		*Italian*	X	*Swedish*		*Spanish*							

1.2. Learning-outcomes

Design and optimization skills for chemical and catalytic reactors.
Analysis of a chemical reactor.
Identification of the controlling parameters.

1.3. Competencies

Kinetics analysis of the reaction rate.
Scale up.
Choice of the type of reactor and of the operative conditions.
Solution of the balance equations and design of the reactor.
Optimization.
Mathematical model of a reactor.

1.4. Contents

1. Rate of reaction
2. Ideal reactors
3. Kinetics analysis
4. Batch reactor
5. PFR reactors
6. CSTR reactors
8. Analysis of mass density variation in gaseous reactions
9. Conversion, yield and selectivity
9. Effect of the temperature the yield of equilibrium reactions

10. Reactors with a recycle stream
11. Heterogeneous catalytic reactions
12. Photocatalytic reactors
13. Examples of calculations

1.5. Teaching Methodology

- Lecture sessions
- Example of solved problems and software tools.
- Case study.

1.6. Evaluation

- written exams
- oral evaluation

1.7. Bibliography

G.F.Froment e K.B.Bischoff, Chemical *Reactor Analysis and Design*, John Wiley and Sons, New York, 1979.

O.Levenspiel, *Ingegneria delle reazioni chimiche*, Casa editrice ambrosiana, Milano, 1978. (italian translation of the original English version of this book).

K.G.Denbigh e J.C.R.Turner, *Teoria dei reattori chimici, Principi generali,* Etas Libri, Milano, 1978. (italian translation of the original English version of this book).