



NATIONAL UNIVERSITY OF ENGINEERING COLLEGE OF GEOLOGICAL, MINING AND METALLURGICAL ENGINEERING

METALLURGICAL ENGINEERING PROGRAM

ME320 METALLURGICAL BASICS I

I. GENERAL INFORMATION

CODE	:	ME320 Metallurgical Basics I
SEMESTER	:	6
CREDITS	:	4
HOURS PER WEEK	:	6 (Theory, Practice, Laboratory)
PREREQUISITES	:	ME311 Metallurgic Physics-Chemistry
CONDITION	:	Compulsory
DEPARTMENT	:	Metallurgical Engineering

II. LEARNING UNITS

1. METALLURGIC THERMODYNAMICS

Revision of Maxwell relations. Phase equilibrium in multi-component systems. Solution and mixtures.

2. CONSTRUCTION OF PHASE EQUILIBRIUM DIAGRAMS

Construction of Ellingham diagrams. Construction of Kellogg diagrams (phase-stability). Phase equilibrium. Binary, ternary and multicomponent phase diagrams. Chemical equilibrium in complex heterogeneous systems.

3. SOLUTIONS

Binary regular solutions. Stability criteria. Multicomponent solutions. Diluted solutions. Alternative standard states. Models of ideal and non-ideal solutions.

4. METALLURGICAL KINETICS I

Kinetics of homogeneous reactions. Reaction mechanisms.

5. KINETICS OF HETEROGENEOUS REACTIONS

Classification of two-phases reactions. Adsorption and interface reactions. Gas-solid reactions.

6. APPLICATIONS OF HETEROGENEOUS REACTIONS KINETICS TO METALLURGIC AND ENVIRONMENTAL PROBLEMS

Gas-liquid reactions. Solid-liquid reactions. Heterogeneous catalysis. Empiric and semi-empiric kinetic models

III. PRACTICAL WORK

1. Graphical representations of chemical equilibrium
2. Kellogg diagrams and phase diagrams
3. Chemical kinetics applied to metallurgy
4. Heterogeneous kinetics applied to metallurgy
5. Kinetics laboratory