



**The University of Jordan**  
**School of Engineering**  
**Chemical Engineering Department**

CHE 0905455 Extractive Metallurgy  
Second Semester /

**Course Catalogue**

**3 Credit hours.** Scope of extractive metallurgy. Ores and mineral: natural resources in Jordan, beneficiation and products. Application of thermodynamics and reaction kinetics in metal extraction. Hydrometallurgical processes. Industrial applications in production of common ferrous and nonferrous metals, including the iron blast furnace, theory and practice and modern iron-ores direct reduction technologies. Hydro- and electrometallurgy. Applications from the production of copper, aluminium, manganese, magnesium and uranium industries.

**Instructor**

Instructor	<b>Dr. Yousef Mubarak</b> E-mail: <a href="mailto:ymubarak@ju.edu.jo">ymubarak@ju.edu.jo</a>	Office: CHE 3 <sup>rd</sup> Floor Office 315 Tel: 22891 Web: <a href="http://eacademic.ju.edu.jo/ymubarak/default.aspx">http://eacademic.ju.edu.jo/ymubarak/default.aspx</a>
------------	---	---

**Prerequisites**

<b>Prerequisites by topic</b>	Process Heat Transfer, Unit Operation of Particulate Solid
<b>Prerequisites by course</b>	0905343,0915351

**Text book**

<b>Title</b>	Handouts will be given to the students
--------------	--

**References**

<b>Books</b>	<ol style="list-style-type: none"><li>1. Principles of Extractive Metallurgy, Terkel Rosenqvist, McGraw-Hill Book Company.</li><li>2. Principles of Extractive Metallurgy, H. S. Ray and A. Ghosh, WEL Publishing.</li><li>3. Extractive Metallurgy of Copper, W.G. Davenport, A.K. Biswas, PERGAMON publishing company.</li><li>4. Handbook of Extractive Metallurgy: Fathi Habashi; Wiley-VCH</li></ol>
--------------	---

**Objectives**

1. Knowledge of various techniques, unit process and operations used in metal extraction and refining.
2. To apply the fundamental knowledge for design of a reactor and process flow sheets.
3. To develop computational and mathematical abilities to be applied for process design and control.
4. To be able to select the correct process routes, reactors and be able to optimize and control them.
5. To develop the leaders for coming future who are able to bring new and economic technologies for metal extraction.

### **Topics Covered:**

1	Scope of extractive metallurgy.
2	Introduction to Metal Extraction
3	Ores and Minerals; Natural resources in Jordan
4	Hydrometallurgical processes
5	Extraction of Iron and Steel Making
6	Extraction and Purification of Copper
7	Extraction of Aluminum and Sodium
8	Extraction of Lead, Zinc, Titanium and Chromium
9	Economic and Environmental Issues and Recycling

### **Course Assessment:**

A project will be given to each group of students in one of the metal extraction subjects.

### **Attendance Policy:**

It is expected that students will attend every lecture/discussion class. Students are responsible for the material covered in class, even if they are absent. Excessive unexcused absences may result in a lower grade, or even course failure. Please display proper decorum during class, examples of poor decorum: sleeping, using your mobile, arriving late to class, talking to neighbor, leaving during class.

### **Makeup Policy:**

Exams will be made up only in the case of an excused emergency. Normally make up exams are much more difficult compared to the on time exams.

<b>Evaluation</b>		
<b>Assessment Tool</b>	<b>Expected Due Date</b>	<b>Weight</b>
Project	Will be announced	10 %
First Exam	Thursday 10-3-2016	20 %
Second Exam	Thursday 21-4-2016	20%
Final Exam	According to the University final examination schedule	50 %

Students are strongly encouraged to be active in class. Feel free to ask questions if you do not understand something, express your opinion and say what is on your mind, learn the material in class. I am always open to helpful comments that will improve the course content, also if you are having a problem with the course, don't hesitate to communicate with me via telephone, email, or during office hours as soon as possible so that it can be resolved quickly.