

IWS 1. Understanding mineral processing technology and its applications

Objective:

This assignment aims to provide students with a comprehensive understanding of mineral processing technology, its methods, equipment, and applications in various industries. By the end of the assignment, students should be able to describe different mineral processing techniques, their purposes, and the equipment used.

Instructions:

1. Introduction

- Provide a brief overview of what mineral processing technology is.
- Explain the importance of mineral processing in the mining industry.
- Discuss the role of mineral processing in sustainability and environmental conservation.

2. Core concepts

- **Comminution:**
Define comminution and explain the difference between crushing and grinding. Provide examples of equipment used in each process.

- **Separation techniques:**

Describe the following separation techniques:

- **Gravity separation**
- **Magnetic separation**
- **Flotation**
- **Leaching**

Explain how each technique works and the types of minerals typically processed with these methods.

- **Concentration and Refinement:**

Discuss how ores are concentrated and refined after separation, focusing on specific processes like smelting and electro-refining.

3. Case studies

- Research and present a case study on a real-world application of mineral processing technology in one of the following industries:
 - Gold mining
 - Copper mining
 - Iron ore processing

- Rare earth element extraction
 - Describe the specific mineral processing techniques used and their outcomes in the chosen case study.
4. **Equipment and machinery**
- List and describe five key pieces of machinery or equipment used in mineral processing (e.g., ball mills, jaw crushers, flotation cells).
 - Provide images or diagrams of the equipment and explain their function in the mineral processing cycle.
5. **Challenges and future directions**
- Discuss the challenges faced in mineral processing technology, such as energy consumption, waste management, and environmental impacts.
 - Explore potential future trends and innovations in the field, such as the use of artificial intelligence, automation, and more sustainable practices.
6. **Conclusion**
- Summarize the key points covered in the assignment.
 - Reflect on the importance of mineral processing technology in the modern world.

Format:

- Word count: 2000-2500 words
- Font: Times New Roman, 12 pt
- Line spacing: 1.5
- Include references and citations.

Submission date:

16.09.2024 (3rd week)

Assessment criteria:

- Content accuracy and depth: 40%
- Clarity and organization: 20%
- Case study analysis: 20%
- Creativity and innovation: 10%
- Proper referencing: 10%