26423 - Mineral and Energy Resources

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	296 - Degree in Geology
ECTS	7.0
Course	3
Period	Second semester
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

This course covers the processes that control the formation of ore deposits, energy and geothermal resources. Resource forming processes are examined in the framework of the tectonic, petrogenetic and geochemical evolution of the Earth's crust on local, regional and global geological scales. Thus, the course draws upon igneous, metamorphic and sedimentary processes, mineralogy, geochemistry and structural geology. To sum op, the course is designed to allow students to recognize exploration and targeting model for mineral and energy resources.

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

Assessment details

Exam (50%)

An exam is set at the end of the course to ensure summative knowledge of the course material.

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Practicals (30%)

Practicals will cover aspects of hand sample mineral and rock identification, drill core logging and appraisal of alteration styles associated with mineralisation. Worksheets are required to be handed in at the end of each practical, and/or combined with short take home assignments.

Field work (20%)

The practical course will also involve a field practical to a several mine sites in some Spanish mining district.

5.Activities and resources

5.1.General methodological presentation

More and more geologists are expressing opinions about our mineral and energy supplies and doing so, we incur and obligation to understand the factors that control their genesis. That is what this course is about. Consequently, students are expected to demonstrate a thorough understanding of the theory, principles and practice of various fields of Geology.

This is the reason why, lectures will be complemented with practical sessions and a 5-days field trip. Students should be able to work independently and in teams in fieldwork and to demonstrate basic research-, creative problem-solving- and critical thinking-skills. At this level they should show well-developed communication skills and be able to structure logical arguments in both verbal and written forms in seminars and reports. Knowledge and skills will be assessed by means of written theory and practical assignments, field reports, and examinations.

The University places a high priority on approaches to learning and teaching that enhance the student experience. Feedback is sought from students in a variety of ways including on-going engagement with staff, and the use of online discussion boards. Presentations as well lecture notes will be available at: https://moodle2.unizar.es/add/

5.2.Learning activities

Activity 1: Lectures: 30 hours

Activity 2: Practical Sessions: 24 hours

Activity 3: 4-day Field Trip

5.3.Program

Introduction to Mineral Deposits.

Spanish mining law.

Mineral Resources.

- Morphology, textures.
- Ore-forming processes.

- Hydrothermal alteration.
- Ore Deposit Models.
- Use of mineral resources.

Energy Resources.

- Fuels
- Nuclear energy
- Geothermal resources.

Exploration and Evaluation of resources.

Environmental impacts

Practical sessions

Practical work emphasises the mesoscopic and microscopic recognition of ore minerals and textures in hand sample, drill core and polished sections. Drill core logging and mining software.

Field Trip

This course includes 5-day field trip to one of the major mining district of Spain.

5.4.Planning and scheduling

This course will be delivered by the following means:

3 x 1-hour lectures per week

1 x 2-hour practical per week

Timetables are available on https://ciencias.unizar.es/consultar-horarios

Additional Timetable Information

Lectures:

Monday and Thursday 10:50-10:50 (C-2)

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Wednesday 11:00-11:50 (C-2)

Practical (students are required to sign onto 1 practical session only):

P1 Monday 15-17 (C-3-18)

P2 Monday 17-19 (C-3-18)

P3 Monday 19-21 (C-3-18)

5.5.Bibliography and recomended resources

BB	Bustillo Revuelta, M. Recursos minerales: tipología, prospección, evaluación, explotación, mineralurgia, impacto ambiental. 2ª ed. 2000
BB	Craig, J.R. Ore microscopy and ore petrography John Wiley and Sons. Nueva York. 1994
BB	Craig, James R.. Recursos de la Tierra : Origen, uso e impacto ambiental / James R. Craig, David J. Vaughan, Brian J. Skinner ; coordinación, revisión y adaptación Benjamín Calvo Pérez, Dolores García del Amo . - 3ª ed. Madrid : Pearson, 2007
BB	Craig, James Roland. Ore microscopy and ore petrography / James R. Craig, David J. Vaughan New York [etc.] : Wiley, cop. 1981
BB	Evans, A.M. . An introduction to Economic Geology and its environmental impact. Blackwell Science. 1997
BB	Ixer, R.A. . Atlas of opaque and ore minerals in their associations. Open University Press, Milton Keynes. 1990
BB	Jones, Meurig P.. Applied Mineralogy : a quantitative approach / Meuring P. Jones. London : Graham and Trotman, 1987.

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BB	Kazhdán, A. B. . Prospección de yacimientos minerales . Mir. Moscú. 1982
BB	Kesler, Stephen E.. Mineral resources, economics and the environment / Stephen E. Kesler New York [etc.] : Macmillan College Publishing Company, Inc. [etc.], cop. 1994
BB	Manning, D.A.C.. Introduction to industrial minerals / D.A.C. Manning. . - 1st ed. London [etc.] : Chapman & Hall, 1995.
BB	Mineralogía aplicada / editor, Emilio Galán Huertos ; Manuel Regueiro González-Barros... [et al.] Madrid : Síntesis, D.L. 2003
BB	Orche García, Enrique. Manual de evaluación de yacimientos minerales / Enrique Orche García Madrid : Carlos López Jimeno, 1999
BB	Petruk, William. Applied mineralogy in the mining industry / William Petruk . - [1st ed.] Amsterdam [etc.] : Elsevier, 2000
BB	Robb, Laurence.. Introduction to ore-forming processes / Laurence Robb. Malden (Massachusetts) : Blackell Publishing , 2005.
BB	Vázquez Guzmán, F.. Geología económica de los recursos minerales. Fundación Gómez Pardo. Madrid. 1996
BB	Yacimientos minerales : técnicas de estudio, tipos, evolución metalogénica, exploración / [dirigido por] R. Lunar & R. Oyarzun Madrid : Centro de Estudios Ramón Areces, D.L. 1991

LISTADO DE URLs:

ACID ROCK DRAINAGE -

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[http://technology.infomine.com/enviromine/ard/home.htm]

Recursos Mineros -
[http://www.recmin.com/]

Universität Würzburg. Mineralogische
Museum (enlaces a otras instituciones) -
[http://www.mineralogisches-museum.uni-wuerzburg.de/links_und_kooperationen/

Virtual Atlas of Opaque and Ore Minerals
in their Associations -
[http://www.smenet.org/opaque-ore/]