

330603 - MSES - Modeling and Simulation of Underground Excavations

Coordinating unit: 330 - EPSEM - Manresa School of Engineering
 Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering
 Academic year: 2019
 Degree: MASTER'S DEGREE IN MINING ENGINEERING (Syllabus 2013). (Teaching unit Compulsory)
 ECTS credits: 5 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: Parcerisa Duocastella, David

Degree competences to which the subject contributes

Specific:

1. (ENG) Coneixement adequat d'aspectes científics i tecnològics de geotècnia.
2. (ENG) Capacitat per a la realització d'estudis de gestió del territori i espais subterranis, incloent la construcció de túnels i altres infraestructures subterrànies.

Learning objectives of the subject

Study load

| | | | |
|---------------------------|---------------------|-----|--------|
| Total learning time: 125h | Hours large group: | 0h | 0.00% |
| | Hours medium group: | 45h | 36.00% |
| | Hours small group: | 0h | 0.00% |
| | Guided activities: | 0h | 0.00% |
| | Self study: | 80h | 64.00% |

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Content

| | |
|---|--|
| <p>title english</p> | <p>Learning time: 5h Theory classes: 2h Self study : 3h</p> |
| <p>Description: content english</p> | |
| <p>title english</p> | <p>Learning time: 26h Theory classes: 6h Laboratory classes: 5h Self study : 15h</p> |
| <p>Description: content english</p> | |
| <p>title english</p> | <p>Learning time: 19h Theory classes: 4h Laboratory classes: 3h Self study : 12h</p> |
| <p>Description: content english</p> | |
| <p>title english</p> | <p>Learning time: 29h Theory classes: 6h Laboratory classes: 3h Self study : 20h</p> |
| <p>Description: content english</p> | |
| <p>title english</p> | <p>Learning time: 22h Theory classes: 4h Laboratory classes: 3h Self study : 15h</p> |
| <p>Description: content english</p> | |

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|---------------------------------|--|
| title english | Learning time: 24h Theory classes: 6h Laboratory classes: 3h Self study : 15h |
| Description: content english | |

Planning of activities

| | |
|--------------|--|
| name english | Hours: 11h Laboratory classes: 5h Self study: 6h |
| name english | Hours: 10h Self study: 4h Laboratory classes: 6h |
| name english | Hours: 6h Laboratory classes: 1h Self study: 5h |
| name english | Hours: 5h Laboratory classes: 2h Self study: 3h |
| name english | Hours: 15h Practical classes: 3h Self study: 12h |

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Bibliography

Basic:

- Chapman, D. N.; Metje, N.; Stärk, A. Introduction to tunnel construction. London: Spon Press, 2010. ISBN 9780415468428.
- Gonzalez de Vallejo, L. I., dir. Manual de campo para la descripción y caracterización de macizos rocosos en afloramientos. Madrid: Instituto Tecnológico Geominero de España, 2007. ISBN 8478407081.
- Gonzalez de Vallejo, L. I., i altres. Ingeniería geológica. Madrid: Prentice Hall, 2002. ISBN 8420531049.
- Hoek, E. "Big tunnels in bad rock". Journal of geotechnical and geoenvironmental engineering [on line]. September 2001, vol. 127, no. 9, p. 726-740 [Consultation: 23/01/2018]. Available on: <<https://www.rocscience.com/assets/resources/learning/hoek/2000-Big-Tunnels-in-Bad-Rock.pdf>>.
- Hoek, E.; Brown, E. T. Excavaciones subterráneas en roca. México: McGraw-Hill, 1985. ISBN 9684516975.
- López Jimeno, C., ed. Manual de túneles y obras subterráneas. Madrid: E.T.S.I. Minas. Universidad Politécnica de Madrid, 2011. ISBN 9788496140370.
- González de Vallejo, Luis I., et al. Ingeniería geológica [on line]. Madrid: Pearson Educación, 2002 [Consultation: 14/09/2018]. Available on: <https://discovery.upc.edu/iii/encore/record/C__Rb1510174?lang=cat>. ISBN 9788483228234.

Complementary:

- De Rienzo, F.; Oreste, P.; Pelizza, S. "Subsurface geological-geotechnical modelling to sustain underground civil planning". Engineering geology [on line]. 1 February 2008, vol. 96, no. 3-4, p. 187-204 [Consultation: 23/01/2018]. Available on: <<https://doi.org/10.1016/j.enggeo.2007.11.002>>.
- Gens, A.; Ledesma, A.; Alonso, E. E. "Estimation of parameters in geotechnical backanalysis - II. Application to a tunnel excavation problem". Computers and geotechnics [on line]. 1996, vol. 18, no. 1, p. 29-46 [Consultation: 23/01/2018]. Available on: <<http://hdl.handle.net/2117/2209>>.
- Ledesma, A.; Gens, A.; Alonso, E. E. "Estimation of parameters in geotechnical backanalysis - I. Maximum likelihood approach". Computers and geotechnics [on line]. 1996, vol. 18, no. 1, p. 1-27 [Consultation: 23/01/2018]. Available on: <<http://hdl.handle.net/2117/2208>>.
- Obradors, J. Importància de la determinació dels paràmetres hidràulics del terreny a l'excavació de les estacions del metro a la Zona Franca de Barcelona [on line]. Barcelona: Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Enginyers de Camins, Canals i Ports de Barcelona, 2006 [Consultation: 23/01/2018]. Available on: <<http://hdl.handle.net/2099.1/3294>>.
- Palmstrom, A. "Measurements of and correlations between block size and rock quality designation (RQD)". Tunnelling and underground space technology [on line]. 4 July 2005, vol. 20, no. 4, p. 362-377 [Consultation: 23/01/2018]. Available on: <<https://doi.org/10.1016/j.tust.2005.01.005>>.
- Sánchez, M. A., i altres. "Geological risk assessment of the area surrounding Altamira Cave: A proposed Natural Risk Index and Safety Factor for protection of prehistoric caves". Engineering geology [on line]. 2 November 2007, vol. 94, no. 3-4, p. 180-200 [Consultation: 23/01/2018]. Available on: <<https://doi.org/10.1016/j.enggeo.2007.08.004>>.
- Sivakumar, C., i altres. "Real time microseismic monitoring to study geomechanics of underground structures". Geomechanics in the emerging social and technological age: proceedings of the 12th Conference of International Association for Computer Methods and Advances in Geomechanics, IACMAG [on line]. Goa, India: Indian Institute of Technology. Geotechnical Engineering Division, 2008. p. 1972-1979 [Consultation: 23/01/2018]. Available on: <<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.384.1650&rep=rep1&type=pdf>>.
- Swanson, P. "Feasibility of using laser-based vibration measurements to detect roof fall hazards in underground mines". Tomasini, E. P., ed. Fifth International Conference on Vibration Measurements by Laser Techniques: advances and applications [on line]. Bellingham: SPIE, 2002. p. 541-552 [Consultation: 29/01/2018]. Available on: <<https://www.cdc.gov/niosh/mining/userfiles/works/pdfs/foulb.pdf>>.
- Tubau, I. Estudio hidrogeológico y propuesta de proceso constructivo para la excavación de un túnel entre pantallas en el Delta del Llobregat [on line]. Barcelona: Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Enginyers de Camins, Canals i Ports de Barcelona, 2004 [Consultation: 29/01/2018]. Available on: <<http://hdl.handle.net/2099.1/3419>>.

Others resources: