

SYLLABUS

1. Course title:

DRILLING AND BLASTING TECHNOLOGY

2. Code:

LRUDTBM

3. Cycle of study:

1

4. ECTS credits:

5

5. Type of course:

Mandatory

6. Prerequisites:

No

7. Class restrictions:

No

8. Duration / semester(s):

1

3

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)
9.1. Lectures	3			Classes: 56,25
9.2. Seminars	1			Individual work: 69,17
9.3. Laboratory / Practice classes	1			In total: 125,4

10. Faculty:

Mining, Geology and Civil Engineering

11. Department/study program:

Mining Engineering

12. Lecturer:

PhD Samir Nurić Full Professor

13. Course aims:

- Familiarize students with basic knowledge in the field of drilling and blasting technology in mining.
- Present the latest insights into the basic principles of drilling equipment operation in the exploitation of mineral raw materials.

- Introduce the methodology for defining drilling and blasting parameters and prepare students for creating project documentation in this field, as well as present the principles and techniques of blasting execution, including the calculation of their parameters.
- Prepare students for engineering calculations and analysis of work during drilling and blasting operations.
- Enhance their intellectual skills in the application of acquired knowledge to solve various engineering problems.
- Improve their communication skills in both written and verbal forms, as well as skills related to individual and team/group work.
- Improve students' skills related to continuous work throughout the year and foster open communication between professor and students, thereby enhancing the teaching process.

14. Learning outcomes:

At the end of the semester/course, successful students, who have continuously completed their obligations throughout the entire teaching period, will be able to:

- Use available (written/electronic) literature related to solving various problems in this course,
- Select and adapt drilling and blasting equipment according to the characteristics of the working environment and the planned production capacities of the mine,
- Solve problems of varying complexity, both individually and in teams, and present solutions in written or verbal form,
- Understand the significance of this course in solving various problems in mining engineering practice,
- Pass the final exam in the first exam periods at the end of the semester.

15. Course content:

Course Presentation: Syllabus for Drilling and Blasting Technology (Literature, Course Content, Course Objectives, etc.). Basic Physical and Mechanical Characteristics of the Working Environment. Drilling of Mine Boreholes. Methods of Drilling. Theoretical Foundations of Rock Destruction during Rotary and Impact-Rotary Drilling. Rotary Drilling Machines in Underground Exploitation. Impact Drilling. Theoretical Foundations of Drill Hammers and Rock Destruction Principles in Impact Drilling. Drilling Speed and Factors Influencing Drilling Speed. Overview of impact drilling machines used specifically for underground mining operations. Work Organization in the Construction of Mining Structures. Loading and Transport Machines for Underground Exploitation. Blasting Work in Underground and Surface Exploitation. Explosion and Explosive Materials. Types of Explosives. Ignition of Mines. The ignition process for mines and the devices used for initiating explosions. Explosive Initiation Methods. Examination of different methods for igniting explosives, including electric ignition and slow-burning detonating cord. Explosion Mechanism. Understanding the basic principles of how explosions work, and their effect on the surrounding environment. Detonation Theory. Theoretical study of detonation processes and the effects of explosions on rock and working environments. Seismic Effects of Explosions. Mine and Blasting Elements in Rock. Selection of Explosives. Methods for calculating the correct amount of explosives needed when working in confined or restricted spaces. Explosive Quantity Calculation for Underground Chamber Construction with One Free Surface. Methods for calculating the specific consumption of explosives based on the type of rock and the characteristics of the blast. Blasting Schemes. Types of Blasting. Contouring Blasting.

16. Learning methods:

In order to efficiently conduct the course and achieve the expected course goals and student competencies by the end of the semester, different teaching methods will be used during the course:

- Lectures,
- Laboratory (field) exercises,
- Project (programming) task, and
- Consultations.

Throughout the entire semester, students are required to attend lectures and laboratory-field exercises as defined by the Regulations or Statute of the University of Tuzla. The right to receive the course signature is defined by the applicable Regulations or Statute of the University of Tuzla. The instructor will monitor student attendance throughout the semester using a specially created form. The percentage of hours that must be attended in lectures is also defined by the applicable Regulations or Statute of the University of Tuzla.

17. Assessment methods:

The methods of evaluating students include the following criteria:

1. Attendance and activity in lectures, auditorium, and laboratory exercises
2. Test
3. Final oral/written exam

Based on the aforementioned facts, at the end of the course, the instructor will form the final grade by scoring individual activities.

18. Assessment components:

The total number of points is obtained by summing the maximum possible points from all activities during the semester: attendance and activity in classes, written/oral exam. The scoring is as follows:

- Attendance in classes: 5 points
- Activity in classes: 5 points

- Test: 40 points
- Pre-exam obligations: 50 points
- Final exam: 50 points

Total: 100 points

The final success of the student, after all the planned knowledge verification forms, is evaluated and graded according to a system comparable to the ECTS grading scale as follows:

- a) 10 (A) - Excellent performance, no mistakes or with minor mistakes, 95-100 points;
- b) 9 (B) - Above average, with a few mistakes, 85-94 points;
- c) 8 (C) - Average, with noticeable mistakes, 75-84 points;
- d) 7 (D) - Generally good, but with significant shortcomings, 65-74 points;
- e) 6 (E) - Meets the minimum criteria, 54-64 points;
- f) 5 (F, FX) - Does not meet the minimum criteria, less than 54 points.

19. Mandatory reading list:

1. B. V. Gokhale, Rotary Drilling and Blasting in Large Surface Mines, Taylor & Francis Group, London, UK, 2011.
2. L. Kričak, Seizmika miniranja, Rudarsko-geološki fakultet -RGF, Beograd, 2006.
3. S. Trajković, Š. Slimak, S. Lutovac, Tehnika miniranja i potresi, RGF, Beograd, 2005.
4. W. Hustrulid, Blasting principles for open pit mining 1 General design concepts, CRC press, Taylor&Francis, 1999.
5. Orica Explosives, Safe and Efficient Blasting in Open Cut Mines, Orica Australia Pty Ltd A.C.N., 2008.
6. Blasthole drilling in open pit mining, 2nd edition, Atlas Copco, 2011.
7. Z. Ibrišimović, K.Gutić, N.Vidanović, Izgradnja podzemnih rudarskih prostorija i rušenje radne sredine bez upotrebe eksploziva, Knjiga I, Tuzla 2012.
8. Z. Ibrišimović, Izgradnja rudarskih objekata, Knjiga II Rušenje radne sredine s eksplozivom, 1996.
9. B. Tomić, A. Sušić, Bušotinska eksplozija mineralnih sirovina - Izgradnja bušotina, Tuzla, 2007.
10. D. Matanović, Tehnika izrade bušotina - Priručnik sa primjerima, Zagreb 2007.

20. Additional reading list:

21. Web sources:

22. Applicable from the academic year:

2025/26

23. Adopted in the Faculty/Academy session: