SYLLABUS

1. Course title:

PROGRAMMING WITH NUMERICAL METHODS

2. Code:

LRUDPRNM

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   5

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)	
9.1. Lectures	3			Classes:	45,00
9.2. Seminars	0			Individual work:	83,25
9.3. Laboratory / Practice classes	1			In total:	128,25

10. Faculty:

Mining, Geology and Civil Engineering

11. Department/study program:

Mining Engineering

12. Lecturer:

PhD Adila Nurić Full Professor

13. Course aims:

• Introduce students to the basic knowledge in the fields of computing, programming, and numerical methods,
• Improve their knowledge in the areas of programming and numerical methods,
• Train students to apply procedural programming languages and numerical methods in engineering calculations and

analyses,
• **Improve their intellectual skills in applying acquired knowledge to solve various engineering problems,**
• **Improve their communication skills in both written and verbal forms,**
• **Improve their skills related to individual and team/group work,**
• **Enhance students' skills in continuous work throughout the year,**
• **Prepare students for teamwork and open communication with professors, thus improving the teaching process and the absorption of new knowledge.**

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 of this course,
• Develop simple or complex programs in Python (open source), C++/Fortran related to engineering data processing,
• Solve problems of various complexities, individually and in teams, and present them in written or verbal form,
• Understand the significance of this course in solving various problems in engineering practice,
• Pass the final exam in the first exam sessions at the end of the semester.

15. Course content:

Syllabus Presentation: Programming with Numerical Methods. Application of Informatics in Engineering. Types of Programming Languages. Algorithms and Codes. Open Source Programming Language Python. Coding with Python for Linear Programming Structures. Coding with Python for Branching Programming Structures. Coding with C++/FORTRAN Programming Language for Linear Programming Structures. Coding with C++/FORTRAN Programming Language for Branching Programming Structures. Development of Applications in Mining Using Programming Languages. Numerical Methods. Interpolation. Approximation. Iteration. Solving Systems of Equations. Solving Differential Equations.

16. Learning methods:

In order to efficiently conduct the classes and achieve the expected course objectives and competencies for students at the end of the semester, various teaching methods are used:
• Lectures
• Laboratory Exercises
Lectures and Laboratory Exercises: Students are required to attend lectures and laboratory exercises throughout the semester as defined by the University of Tuzla Regulations. The conditions for obtaining a signature for the course are also defined by the University of Tuzla Regulations. The professor will track student attendance using a specially created form throughout the semester. The percentage of hours that must be attended for both lectures and exercises is also defined by the University of Tuzla Regulations.

17. Assessment methods:

Methods of evaluating students include the following criteria:
1. Attendance and activity in lectures and exercises
2. Tests
3. Final exam - tasks
To assess the knowledge acquired in the course, the following methods are used:
• Written methods
• Oral methods
Written methods include written assessments through tests after certain areas of the curriculum.

18. Assessment components:

Grading and Evaluation:
• **Attendance in lectures: 5 points**
• **Attendance in exercises: 5 points**
• **Activity in lectures and exercises: 10 points**
• **Test tasks: 50 points**
Total up to 70 points
• **Final exam - tasks up to 30 points**
TOTAL: 100 points
The final success of the student, after all the prescribed forms of knowledge assessment, is graded using a system comparable to the ECTS grading scale as follows:
a) 10 (A) - Exceptional success with no errors or with minor errors, worth 95-100 points;
b) 9 (B) - Above average, with some errors, worth 85-94 points;
c) 8 (C) - Average, with noticeable errors, worth 75-84 points;
d) 7 (D) - Generally good, but with significant deficiencies, worth 65-74 points;
e) 6 (E) - Meets the minimum criteria, worth 54-64 points;
f) 5 (F, FX) - Does not meet the minimum criteria, worth less than 54 points.

19. Mandatory reading list:

1. M. Avdić, A. Nurić, Programiranje i primjena u inženjerstvu, COPYGRAF Tuzla, 2008
2. W.E. Mayo, M. Cwiakala, Programming with fortran 90, The McGraw Hill Companies, 1996
3. A. Nurić, S. Nurić, Programiranje i statistika u inženjerstvu, Univerzitet u Tuzli, 2015
4. Z. Hercigonja, Programiranje u Pythonu, 2017
5. M. Hruška, Osnove programiranja (Python), Sveučilište u Zagrebu, 2018
6. R.V.Kruc, Kratki uvod u Python, Sveučilište u Zagrebu, 2018
7. D.Urošević, Algoritmi u programskom jeziku C, Mikroknjiga Beograd, 1996
8. N. Prljača, Programiranje u C programskom jeziku, Univerzitet u Tuzli, 1999
9. R. Jakopec, C++ programiranje za apsolutne početnike, Varaždin
10. D. Tošić, Uvod u numeričku analizu, Naučna knjiga Beograd, 1982
11. S. Vujić, A. Ivić, Matematičke metode u rudarstvu i geologiji, Univerzitet u Beogradu, 1990
B. Carnahan et. al., Applied numerical methods, JW, USA, 1969

20. Additional reading list:

21. Web sources:

1. A. Nurić, Razvoj algoritma i kreiranje programa, OER, www.edx.baektel.eu
2. http://download.tutoriali.org/Tutorials/C/C++_za_apsolutne_pocetnike.pdf
3. http://www.angelfire.com/art2/ebooks/teachyourselfcplusplusin21days.pdf
4. https://www.znanje.org/knjige/computer/cpp/n/cpp01.htm
5. http://elibrary.matf.bg.ac.rs/bitstream/handle/123456789/2936/numet_knjiga.pdf?sequence=1
6. https://web.math.pmf.unizg.hr/~rogina/2001096/num_anal.pdf
7. https://web.math.pmf.unizg.hr/~drmac/NumAnaliza1.html
8. https://web.math.pmf.unizg.hr/~drmac/dNumAnaliza2.html

22. Applicable from the academic year:

2025/26.

23. Adopted in the Faculty/Academy session: