<table>
<tr><td>COURSE NAME</td><td colspan="5">Introduction to Number Theory</td></tr>
<tr><td>Code</td><td>PMM102</td><td>Year of study</td><td colspan="3">1st or 2rd year of undergraduate study</td></tr>
<tr><td>Course teacher</td><td>Borka Jadrijević</td><td>Credits (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td></tr>
<tr><td>30</td><td></td><td>30</td></tr>
<tr><td>Status of the course</td><td>compulsory and elective course</td><td>Percentage of application of e-learning</td><td colspan="3">30%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Students will acquire basic knowledge in elementary number theory and the ability to apply that knowledge in solving various problems related to these topics. The course is a good background for understanding and learning more advanced courses in this area.</td></tr>
<tr><td>Prerequisites</td><td colspan="5">None</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">Upon successful completion of the course, the student is able to:

- define and interpret the fundamental concepts of divisibility and apply them to solve a variety of problems;
- formulate and prove basic results of modular arithmetic;
- perform calculations using modular arithmetic;
- solve congruences and system of congruences of various types;
- prove basic results about quadratic residues and use the Quadratic Reciprocity Law to calculate the Legendre symbols;
- describe important multiplicative functions in number theory;
- formulate basic concepts of binary quadratic forms;
- describe and use formulas for generating the Pythagorean triples;
- define continued fraction expansion, compute continued fraction expansion for rationals and quadratic irrationals and apply it to solving the Pell equation.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. Divisibility. Greatest common divisor. Euclidean algorithm. Linear Diophantine equations. Primes. Unique factorization. (3 hours)

2. Congruences. Linear congruences. Chinese remainder theorem. Euler's theorem. Wilson's theorem. Hensel's lemma. Primitive roots and indices. (9 hours)

3. Quadratic residues. Legendre symbol. Quadratic reciprocity law. Jacobi symbol. (4 hours)

4. Quadratic forms. Equivalence and reduction of binary quadratic forms. Sums of two and four squares. (3 hours)

5. Arithmetic functions. Number and sum of positive divisors functions. Euler and Möbius functions, Distribution of primes. Asymptotic estimates for arithmetic functions. (4 hours)

6. Diophantine approximation and Diophantine equations. Dirichlet's theorem. Continued fractions. Diophantine approximation. Pell equation. Pythagorean triples. (7 hours)</td></tr>
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Format of instruction	Lectures, tutorial sessions
Student responsibilities	Attendance of lectures and tutorial sessions is obligatory.
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance (1 ECTS) Written exam (1,5 ECTS) Oral exam (2,5 ECTS)
Grading and evaluating student work in class and at the final exam	The exam is taken in written and oral form. The passing grade of the written exam is a requirement for the oral exam. Both parts of the exam are equally weighted in the final grade. There are two partial written exams during the semester. Passing both partial written exams allows students to take the oral exam. In case of failure of the partial exams or the oral exam, the student must retake the written exam before taking the oral exam again.
Required literature (available in the library and via other media)	A.Dujella, *Uvod u teoriju brojeva*, skripta PMF-MO, Zagreb http://web.math.hr/~duje/utb.html; I. Niven,H. S. Zuckerman, H. L. Montgomery, *An Introduction to the Theory Numbers*, Wiley, New York, 1991; K. H. Rosen, *Elementary Number Theory and Its Applications*, Addison-Wesley, Reading, 1993.; M. Bombardelli, A. Dujella, S.Slijepčević, *Matematička natjecanja učenika srednjih škola*, HMD, Element, Zagreb, 1996;
Optional literature (at the time of submission of study programme proposal)	H. A. Baker: *A Concise Introduction to the Theory of Numbers*, Cambridge University Press, Cambridge, 1994. E. Rose, *A Course in Number Theory*, Oxford University Press, Oxford, 1995;
Quality assurance methods that ensure the acquisition of exit competences	Statistics of test results and anonymous student evaluations at the end of the semester according to the regulations of the University of Split.
Other (as the proposer wishes to add)	