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|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------|
| <b>Subject code:</b><br>M-001              | <b>Subject name:</b> Mathematics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                        |
| <b>Study cycle:</b> I                      | <b>Year:</b> I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Semester:</b> I                                        | <b>ECTS credits:</b> 6 |
| <b>Status:</b> Mandatory                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Contact hours:</b> 60<br>Lectures: 30<br>Exercises: 30 |                        |
| <b>Assigned professors and assistants:</b> | Lecturers and assistants selected for the field to which the course belongs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                           |                        |
| <b>Prerequisites:</b>                      | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                           |                        |
| <b>Subject objectives:</b>                 | Preparing students for an introduction to mathematics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                           |                        |
| <b>Teaching units:</b>                     | <ol style="list-style-type: none"><li>1. Introduction.</li><li>2. Basic arithmetic operations.</li><li>3. Number sets and their properties.</li><li>4. Proportions.</li><li>5. Coordinate systems (Cartesian, Polar, Cylindrical, and Spherical).</li><li>6. Elementary functions.</li><li>7. Solving systems of linear equations: Gaussian method.</li><li>8. Determinants.</li><li>9. Solving systems of linear equations: Cramer's rule.</li><li>10. Matrices and matrix operations.</li><li>11. Elementary transformations on matrices.</li><li>12. Matrix equations.</li><li>13. Systems of linear equations as a matrix equation.</li><li>14. Least squares method.</li><li>15. Application of the least squares method in solving systems of linear equations.</li></ol> |                                                           |                        |
| <b>Learning outcomes:</b>                  | <b>Knowledge:</b><br>The student acquires knowledge of the fundamentals of mathematics.<br><b>Skills:</b><br>Understanding mathematical concepts.<br><b>Competencies:</b><br>Application of mathematics in geography.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                           |                        |
| <b>Teaching methods:</b>                   | Multimedia presentation. Mathematical software.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |                        |



UNIVERSITY OF SARAJEVO – FACULTY OF SCIENCE  
SUBJECT DESCRIPTION

Form SP2

Page 2 of 2

|                                                                      | <i>Maximum Points</i>                                                                                      |                      | <i>Minimum points</i> |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|
|                                                                      |                                                                                                            |                      |                       |
| <b>Knowledge testing methods with grading structure<sup>1</sup>:</b> | Attendance                                                                                                 |                      |                       |
|                                                                      | Participation on lectures                                                                                  |                      |                       |
|                                                                      | Tests                                                                                                      | 40                   | 22                    |
|                                                                      | Seminar paper                                                                                              |                      |                       |
|                                                                      | Final exam                                                                                                 | 60                   | 33                    |
|                                                                      | TOTAL                                                                                                      | 100                  | 55                    |
|                                                                      | <b>Assessment:</b>                                                                                         |                      |                       |
|                                                                      | <i>Grade</i>                                                                                               | <i>ECTS grade</i>    | <i>Points scale</i>   |
|                                                                      | 10                                                                                                         | (A) excellent        | 95 - 100              |
|                                                                      | 9                                                                                                          | (B) very good        | 85 - 94               |
| <b>Literature<sup>2</sup>:</b>                                       | 8                                                                                                          | (C) good             | 75 - 84               |
|                                                                      | 7                                                                                                          | (D) satisfactory     | 66 - 74               |
|                                                                      | 6                                                                                                          | (E) sufficient       | 55 - 64               |
|                                                                      | 5                                                                                                          | (F, FX) insufficient | 55                    |
|                                                                      | <b>Mandatory:</b>                                                                                          |                      |                       |
|                                                                      | S. Kurepa, Uvod u matematiku, Tehnička knjiga Zagreb, 1984                                                 |                      |                       |
|                                                                      | <b>Recommended:</b>                                                                                        |                      |                       |
|                                                                      | Stephen Boyd, Lieven Vandenberghe, Introduction to applied linear algebra, Cambridge University Press 2018 |                      |                       |

<sup>1</sup> The structure of points and point criteria for each subject is determined by the Council of the organizational unit before the beginning of the academic year in which the subject is taught in accordance with Article 64, paragraph 6 of the Law on Higher Education of Sarajevo Canton

<sup>2</sup> The Senate of the higher education institution as an institution or a council of the organizational unit of the higher education institution as a public institution determines mandatory and recommended textbooks and manuals, as well as other recommended literature on the basis of which exams are prepared by a special act which is required to be published on its website before the beginning of the academic year in accordance with Article 56, paragraph 3 of the Law on Higher Education of the Sarajevo Canton.