



Birzeit Univeristy

Mathematics Department

Second Semester 2022/2023

**MATH 339 – EUCLIDEAN AND NON-EUCLIDEAN GEOMETRY**

**Course Outline**

### Classes / Instructors / Office Hours:

- **Classes:** Check Ritaj.
- **Instructor:** Dr. Hani Kabajah
- **Office Hours:** Check Ritaj.

### Textbooks:

- M. J. Greenberg, **Euclidean and Non-Euclidean Geometries: Development and History**, 4th edition, W. H. Freeman and Company, 2008.
- D. A. Brannan, M. F. Esplen, and J. J. Gray, **Geometry**, Cambridge University Press, 1999.
- D. C. Kay, **College Geometry: A Discovery Approach**, 2nd edition, Addison Wesley Longman, 2001.

### Grading Policy:

|                                     |             |
|-------------------------------------|-------------|
| • <b>Assignments and/or Quizzes</b> | <b>15 %</b> |
| • <b>Midterm Exam</b>               | <b>35 %</b> |
| • <b>Final Exam</b>                 | <b>50 %</b> |

### Dates / Topics of Exams:

- **The dates and the topics of the exams will be announced when the reservation system is open. Check Ritaj continuously!**

### Notes:

- **You must attend all lectures.**
- **You need a scientific calculator for the lectures and the exams.**
- **You need Geometric Tools for the lectures and the exams.**
- **You are highly encouraged to take notes during the lecture.**
- **Further notes, material, and information will be posted using Ritaj Course Board. Check Ritaj continuously!**

**In the following you can find:**

- The lectures planned for each topic, where 1 lecture stands for 75 minutes
- **Textbook Exercises (at the end of each chapter) are very useful for practice.**
- **The best way of studying is to solve the questions after each section.**

**Topics:**

| <b>Lecture</b> | <b>Chapter</b> | <b>Title</b>   | <b>Textbook</b>  |
|----------------|----------------|--|------------------|
| <b>1 – 3</b>   | <b>1</b>       | <b>Euclid’s Geometry</b>                             | <b>Greenberg</b> |
| <b>4 – 7</b>   | <b>2</b>       | <b>Logic and Incidence Geometry</b>                  | <b>Greenberg</b> |
| <b>8 – 11</b>  | <b>3</b>       | <b>Hilbert’s Axioms</b>                              | <b>Greenberg</b> |
| <b>12 – 15</b> | <b>4</b>       | <b>Neutral Geometry</b>                              | <b>Greenberg</b> |
| <b>16</b>      | <b>5</b>       | <b>History of the Parallel Postulate</b>             | <b>Greenberg</b> |
| <b>17 – 19</b> | <b>6</b>       | <b>The Discovery of Non-Euclidean Geometry</b>       | <b>Greenberg</b> |
| <b>20</b>      | <b>7</b>       | <b>Independence of the Parallel Postulate</b>        | <b>Greenberg</b> |
| <b>21 – 24</b> | <b>2</b>       | <b>Affine Geometry</b>                               | <b>Brannan</b>   |
| <b>21 – 24</b> | <b>5</b>       | <b>Transformations in Geometry</b>                   | <b>Kay</b>       |
| <b>25</b>      | <b>4</b>       | <b>Euclidean Geometry</b>                            | <b>Kay</b>       |
| <b>25</b>      | <b>7</b>       | <b>An Introduction to Three-Dimensional Geometry</b> | <b>Kay</b>       |
| <b>26</b>      | <b>10</b>      | <b>Further Results in Real Hyperbolic Geometry</b>   | <b>Greenberg</b> |