COURSE CODE   MATH 124
COURSE TITLE   Geometry
COURSE TYPE   Area Core
LECTURER(S)   Assist. Prof. Dr. Müge Saadetoglu  (Office AS243, Ext. 1030)
ASSISTANT   Tamanna Marzieh Keleshteri          (Office AS 249, Ext. 2197)
EMU CREDITS   (3, 1, 0) 3
ECTS CREDITS
PREREQUISITES   None
COREQUISITES   None
WEB LINK   http://brahms.emu.edu.tr/msaadetoglu
TIME TABLE   Gr 01 : Tuesday 08:30 -10:20 in CL 105, Wednesday 10:30 -12:20, in AS G04
OFFICE HOUR   to be announced later.
AIMS & OBJECTIVES   To revisit those parts of elementary geometry that can be approached making use of algebraic ideas such as constructions by straightedge and compass alone and transformations: part of geometry that links the subject with other branches of mathematics, such as extension field theory and group theory. To introduce the basics of inversive, projective and non- Euclidean geometry.
CATALOGUE DESCRIPTION   Constructions using the straightedge and compass alone. Remarkable points and lines connected with a triangle: Ceva’s theorem, the incircles and excircles, the orthic triangle, the Euler line. Some properties of circles: the radical axis of two circles, the Simson line, first Ptolemy’s theorem. Collinearity and concurrence: cyclic quadrangles, Menelaus’s theorem, Pappus’s theorem, Desargues’s theorem, Pascal’s theorem. Transformations: translations, rotations, half-turn, reflections, dilatation. Inversive Geometry: Separation, Cross ratio, Inversion, the second Ptolemy theorem. Elements of projective geometry: Reciprocation, Conics, Projective plane.
GRADING CRITERIA   MT1 - %30, MT2 - %30, Final - %40
METHOD OF ASSESSMENT   85–100 (A); 80–84 (A-); 75–79 (B+); 70–74 (B); 66–69 (B-);
                        63–65 (C+); 60–62 (C); 57–59 (C-); 54–56 (D+); 50–53 (D);
                        45–49 (D- /FAIL); 0-44 (F/FAIL).
TEACHING METHOD   Lectures and assignments.
RELATION TO OTHER COURSES   Geometry is closely connected to other branches of pure mathematics such as Linear algebra and abstract algebra.
GENERAL LEARNING OUTCOMES

On successful completion of this course, all students will have developed **knowledge** and **understanding** of:
- Constructions by using the straightedge and compass alone.
- Remarkable points and lines connected with a triangle.
- Remarkable collinearity and concurrence theorems.
- Transformations.
- Elements of inversive geometry
- Elements of projective geometry.
- Elements of non-Euclidean geometry.

On successful completion of this course, all students will have developed **their skills** in:
- Constructing elementary geometric objects by using the straightedge and compass alone
- Manipulating basic collinearity and concurrence theorems.
- Manipulating the basic geometric transformation to solve problems of elementary geometry.
- Manipulating inversion and its direct consequences, such as Ptolemy's theorems, to solve problems of elementary geometry.
- Recognize models of projective and non-Euclidean geometry.

On successful completion of this course, all students will have developed their appreciation of and respect for **values and attitudes** regarding the issues of:
- Mathematical thinking
- Critical thinking
- Communication with other peoples.

COURSE OUTLINE

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<tr>
<th>Week 1</th>
<th>First meeting with the students; Informing the students.</th>
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<tr>
<td>Week 2-3</td>
<td>Constructions using the straightedge and compass alone, Review on Circles</td>
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<td>Week 4 Mar. 5-9</td>
<td>The extended Law of Sines, Ceva’s theorem, points of interests</td>
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<td>Week 5 Mar. 12-16</td>
<td>The incircle and excircles, The orthic triangle, the median triangle and the Euler line</td>
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<td>Week 6 Mar. 19-23</td>
<td>The power of a point with respect to a circle, The radical axis.</td>
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<td>Week 7 Mar. 26-30</td>
<td>The Simson line, Ptolemy’s theorem. Quadrangles, cyclic quadrangles.</td>
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<td>Week 8-9 Apr. 4-14</td>
<td>MIDTERM Examinations</td>
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<td>Week 10 Apr. 16-20</td>
<td>Menelaus’s Theorem, Pappus’s Theorem</td>
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<td>Week 11 Apr. 24-27</td>
<td>Desargues’s theorem, Pascal’s theorem,</td>
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<td>Week 12 May, 1-4</td>
<td>Translations, rotation</td>
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<td>Week 13 May, 7-11</td>
<td>Spiral similarity, separation, cross ratio.</td>
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<td>Week 14 May, 14-18</td>
<td>Inversion, inversive plane.</td>
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<td>Week 15 May, 21-24</td>
<td>Orthogonality, reciprocation.</td>
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<td>Week 16 onwards</td>
<td>Final Exams</td>
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<td>May 28- June 12</td>
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ACADEMIC HONESTY

Copying from others or providing answers or information (written or oral) to others is cheating. Copying from another student’s paper or from another text without written acknowledgement is plagiarism. According to University’s bylaws cheating and plagiarism are serious offences resulting in a failure from exam or project and disciplinary action (which includes an official warning or/and suspension from the university for up to one semester).

IMPORTANT NOTES

- Attendance is compulsory. Any student who has poor attendance and/or misses and examination without providing valid excuse will be given NG grade.
- Students missing an examination should provide a valid excuse within three days following the examination they missed. One make-up examination will be given at the end of the semester after the final examination period. No make-up will be given for missed quizzes.