



## Course Information

<b>Course Code</b>	2360476
<b>Course Section</b>	1
<b>Course Title</b>	ALGEBRAIC CURVES
<b>Course Credit</b>	3
<b>Course ECTS</b>	6.0
<b>Course Catalog Description</b>	Affine and projective plane curves, local properties of plane curves, multiple points, intersection numbers, Bezout's theorem, Noether's fundamental theorem. Applications to some enumerative geometry problems. Prerequisite: 2360 367 and 2360 353.
<b>Prerequisites</b>	Students must complete one of the following sets to take this course.

Set	Prerequisites
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1	2360353, 2360367
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<b>Schedule</b>	Tuesday , 10:40 - 12:30, M105 Thursday , 12:40 - 13:30, M105
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## Instructor Information

<b>Name/Title</b>	Assoc.Prof.Dr. TOLGA KARAYAYLA
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<b>Office Hours</b>	To be announced

## Course Objectives

This course is a first introduction to algebraic geometry, through the classical and important topic of algebraic curves. The topic of algebraic curves is central in the development of modern day mathematics and also has many applications. It is expected that students will be able to see the harmonious appearance of several concepts that they learned about in previous courses and appreciate the unity of the subject.

## Course Learning Outcomes

By the end of this course, a student will:

- make use of the correspondence between algebraic varieties over an algebraically closed field  $k$  and finitely generated commutative  $k$ -algebras without nilpotents,
- determine basic properties of a given algebraic curve, compute its projective closure, degree, genus, singular and regular points,
- use Bezout's theorem in order to prove various results including those about linear systems,
- understand and use the group law on an elliptic curve,
- resolve singularities using blow-ups,
- make computations and carry out proofs using the Riemann-Roch theorem.

## Instructional Methods

Lectures and class discussion, optional homework assignments. For the suggested exercise problems and optional homework assignments, we may organize additional sessions to discuss their solutions interactively.

## Course Textbook(s)

Complex Algebraic Curves, Kirwan, F. (Cambridge University Press, 1992)

(available as an eBook at METU Library)



## Supplementary Readings / Resources / E-Resources

### Readings

There are many introductions to the theory of algebraic curves:

- "Algebraic Curves", Fulton, W.
- "Introduction to Plane Algebraic Curves", Kunz, E.
- "Algebraic Curves and Riemann Surfaces", Miranda, R.
- "Plane Algebraic Curves", Gathmann, A.
- "A Scrapbook of Complex Curve Theory", Clemens, C. H.

## Assessment of Student Learning

Assessment	Dates or deadlines
Midterm 1	April 18 (may change) Week 7 or 8
Midterm 2	May 17 (may change) Week 11 or 12
Final	
Oral Exam	
(If the exams cannot be conducted as face to face in-class exams, an oral exam will be conducted at the end of the finals)	
Homework (Bonus)	
The instructor may assign homework problems. These will be optional for students and will count as bonus points for the grading of the course.	

## Course Grading

Deliverable	Grade Points
Midterm 1	30
Midterm 2	30
Final	40
Homework (Bonus) - One or two sets of optional homework assignments may be given. Each set is worth 10 bonus points.	20
Oral Exam (In the case that face to face in-class exams cannot be conducted, there will be an oral exam after the final exam)	60
<b>Total</b>	<b>180</b>

## Course Policies



### *Class Attendance*

Attendance to lectures is strongly recommended.

### *Class Participation*

Participation during the lectures is encouraged. Besides the lectures, there will be discussion sessions for the suggested exercise problems and optional homework assignments. Students are expected to work on these questions before the discussion session and attend the session to discuss the solutions.

### *Late Submission of Assignments*

One or two sets of homework problems may be assigned. No late submission will be accepted.

### *Make up for Exams and Assignments*

In order to be eligible to take a make-up examination for a missed examination, a student should have a documented or verifiable, and officially acceptable excuse. A student cannot take make-up examinations for two or more missed exams. The make-up examination for all exams will be after the final exam, and will include all topics. There will be no make-up for the homework assignments.

### *Other*

The lectures until April will be online via zoom broadcasted from the classroom M105. It is expected that the education will continue with hybrid methods starting with April. As a result, the exams are planned to be face to face in-class exams. If by an order from the university or YÖK the exams cannot be conducted in class, then there will be an oral exam after the final exam.

If the exams will have to be online exams, then they will be classical exams conducted over zoom with assistants proctoring the exam via the webcams.

## Information for Students with Disabilities

Students who experience difficulties due to their disabilities and wish to obtain academic adjustments and/or auxiliary aids must contact ODTU Disability Support Office and/or course instructor and the advisor of students with disabilities at academic departments (for the list: <http://engelsiz.metu.edu.tr/en/advisor-students-disabilities>) as soon as possible. For detailed information, please visit the website of Disability Support Office: <https://engelsiz.metu.edu.tr/en/>

## Academic Honesty

The METU Honour Code is as follows: *"Every member of METU community adopts the following honour code as one of the core principles of academic life and strives to develop an academic environment where continuous adherence to this code is promoted. The members of the METU community are reliable, responsible and honourable people who embrace only the success and recognition they deserve, and act with integrity in their use, evaluation and presentation of facts, data and documents."*