

Lecture 1 : Euclid's axioms and ruler and compass construction

1. THIS COURSE

1.1. **Weightages.** The weightages for different evaluations are as follows. The mid-sem and the end-sem weightages are set equal to follow the latest guidelines.

Assignments (total 4)	(Average) 10
Quizzes (total 2)	$20 + 20 = 40$
Mid-sem	25
End-sem	25

Mondays and Tuesdays will be classes, Thursdays will be tutorials.

1.2. **Euclid's axioms.** What are the Euclid's axioms?

Notions of points, lines, etc. Are the well defined. Suppose we assume that if we are given a point and a line, we can say if the point lies on the line or not. Then the Euclid's postulates are:

- (1) Given two points, one can draw a line through them.
- (2) One can extend a line segment to a full line.
- (3) Given a distance d and a point (center), one can draw a circle of radius d .
- (4) All right angles are equal to one another.
- (5) (Parallel Axiom) That, if a straight line, falling on two straight lines make the interior angles on the same side less than two right angles, the two straight lines, if produced indefinitely, meet on that side on which the angles are less than the two right angles.

1.3. **Discussions.**

1.3.1. What theorems do you recall? Can you prove them? Looking for:

1.3.2. Sum of interior angles of a triangle is 180° .

1.3.3. While proving this theorem how are we using the Parallel Axiom?

1.3.4. Pythagoras' theorem.

1.3.5. Converse of Pythagoras' theorem

1.3.6. What is the sum of exterior angles of a pentagon?

1.3.7. How do you construct an equilateral triangle?

1.3.8. How do you construct a square?

1.3.9. Given a circle C and a point A , outside the circle, can you construct a line passing through A , which is tangent to the circle?

1.3.10. Given a line segment, divide it into three equal parts.

1.3.11.SAS