Mathematics III - Analytic geometry

Department: Mathematics	**Key of the matter:** 810/817
Requirements: Have passed mathematics II of High School Mathematics	**Year:** Second
Weekly load: 5	**Date of elaboration** April 2017

Topics

Unit I

1.1.   What is analytical geometry?
1.2.   Rectangular coordinate system.
1.2.1. Points on the plane.
1.2.2. Distance between two points.
1.2.3. Division of a segment in a given ratio.
1.2.4. Mid point.
1.2.5. Perimeters and areas.
1.3.   Straight
1.3.1. Concept of slope.
1.3.2. Graphic interpretation of the slope.
1.3.3. Obtaining the known slope two points of the line.
1.3.4. Obtaining the slope, known the coordinates to the origin.
1.3.5. Angles formed between two lines.
1.3.6. Conditions of parallelism and perpendicularity.
1.3.7. Equation of the line.
1.3.7.1. Known a point and the slope.
1.3.7.2. Two points known.
1.3.7.3. Common, standard or canonical form.
1.3.7.4. Determinant form.
1.3.7.5. Symmetrical shape.
1.3.7.6. General form
1.3.7.7. Normal or Hesse form.
1.3.8. Intersection between straight lines.

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1.3.9. Transformations between the different forms of the equation of the line.

1.3.10.   Points of intersection between two lines.

1.3.11.   Distance between two lines.

1.3.12.   Distance from the origin to a line.

1.3.13.   Distance from a point to a line.

1.3.14.   Distance between two parallel lines.

Unit II

3.1.   Conic sections

3.1.1. Parable

3.1.1.1. Equations of the parabola: whose vertex is at the origin and at the vertex (h, k).

3.1.1.2. Elements of the parabola: vertex, focus, directrix, parameter and straight side.

3.1.1.3. Equation in its ordinary and general form.

3.1.2. Circumference

3.1.2.1. Equations of the circumference: with center at the origin and in (h, k).

3.1.2.2. Equation in its ordinary, canonical and general form.

3.1.2.3. Calculation of the parameters of the circumference given its equation in general and standard form.

3.1.2.4. Elements of the circumference.

3.1.2.5. Problems involving straight and circumference.

3.1.3. Ellipse

3.1.3.1. Equations of the ellipse: whose center is at the origin and in (h, k).

3.1.3.2. Elements of the ellipse: center, vertices, foci, major axis, minor axis, total distance, straight side and eccentricity.

3.1.3.3. Equation in its ordinary, canonical and general form.

3.1.3.4. Calculation of the parameters of the ellipse given its equation in general form.

3.1.4. Hyperbola

3.1.4.1. Equations of the hyperbola: with center at the origin or in (h, k).

3.1.4.2. Equation in its common or canonical form.

3.1.4.3. Elements of the hyperbola: center, vertices, foci, major and minor axis, focal distance, straight side and eccentricity.

3.1.4.4. Calculation of the parameters of the hyperbola given its equation in general form.