TOPIC 3. Elements of vector algebra and analytic geometry
ТЕМА 3. Елементи векторної алгебри та аналітичної геометрії

1. The definition of a vector.
2. The definition of a point.
3. Linear operations with vectors in coordinates.
4. Coordinates of the point of division of a segment.
5. Coordinates of the vector which is given by two points.
6. A scalar product.
7. Properties of a scalar product of two vectors.
8. Expression of a scalar product through coordinates.
9. A cross product of two vectors.
10. Properties of a cross product.
11. Expression of a cross product through coordinates.
12. A mixed product of three vectors, its properties.
13. Expression of a mixed product through coordinates of vectors-factors.
14. The definition of linear space.
15. The basis of linear space.
16. The notion of subspace.
17. The notion of linear vector space.
18. The rank of the finite systems of vectors, the rules of calculation.
19. The definition of the eigenvalue of a matrix.
20. The definition of the eigenvector of a matrix.
21. A characteristic equation.
22. The notion of a quadratic form.
23. The conditions of determinacy of quadratic forms.
24. The matrix of a quadratic form.
25. A canonical form.
26. Reducing quadratic forms to a canonical form.
27. A general equation of the second-order curve.
28. Reducing the second-order curve to a canonical form.
29. A parabola.
30. An ellipse.
31. A hyperbola.