Topic 1.1. Lecture 1. Projecting the point and line.

At the time of this chapter discusses issues listed later in thesis form.

The object and purpose of the course "Engineering and Computer Graphics". Relationship with other academic disciplines that are being studied. The spatial geometric model and integrated drawing point. Direct and inverse problems of projection points. Construction of the third projections of the two given. The spatial geometric model and integrated drawing a straight line. Direct level and projecting straight, their basic properties. The main provisions of the method of replacing the projection planes. Determining the actual size of the line segment by replacing the generic projection planes.

Topic 1.2. Lecture 2. Projecting plane and a circle.

At the time of this chapter discusses issues listed later in thesis form.

Comprehensive drawing and geometric determinants plane. Affiliation direct and point the plane. The level lines in the plane of general position. Plane Public and Private provision. Projecting the plane, and the level of their basic properties. Traces of the projection plane. Convert generic planes - in projecting the plane, projecting plane - in the plane level. Projecting circle belonging to the projecting plane. Graphical ellipse on its axis via intermediate points. The projections of the circle, a plane belonging to a common position.

Topic 1.3. Lecture 3. Projecting curves and surfaces.

This lecture addresses the issues listed later in thesis form.

Classification curves and their properties. Kinematic forming lines and surfaces. Basic ways of defining curved surfaces, principles of construction on the complex figure. Building projections point on the surface: the general principles and their use for cylindrical, conical and spherical surfaces. Marking surfaces, their determinants. Surfaces ruled that unfold (cylindrical, conical, torus) ruled, no oblique plane) surface of revolution. Advantages and disadvantages of the definition of surfaces in graphical and analytical form, the definition of parametric curves and surfaces.

Topic 1.4. Lecture 4. Axonometric projection.

This lecture addresses the issues listed later in thesis form.

Basic theoretical information. A perspective view of a point. Theoretical and reduced coefficients of projections distortions. Rectangular isometric and diameters. Features oblique frontal and horizontal isometric front diameters. Axonometric projection circles parallel to the main plane of projection in a rectangular isometric view and diameters, replacing them by ovals. Hatching incisions in axonometric projections. An algorithm for constructing a perspective view of machine parts. Relationship axonometric and orthogonal projections. Five standard types of perspective.

Topic 1.5. Lecture 5. The cut surface of the plane.

At the time of this chapter discusses issues listed later in thesis form.

General principles and algorithm of construction of the section line of arbitrary surfaces planes: the definition of the characteristic points of the section line - support, intermediate, contour; determining the visible part of the section line, and life-size figures of the section. Constructing the section line of the projecting face plane surface

and a cylindrical surface, conical surface of the sphere. Principles of construction of section lines of surfaces of general position of the plane of general position on complex drawings. The concept of scanning surface. The method of constructing scans surfaces. A geodesic line. Methods of construction of geodesic lines. Examples.

Topic 1.6. Lecture 6. Mutual crossing curved surfaces with multi-faceted.

This lecture addresses the issues listed later in thesis form.

General information and theoretical positions. The basic principles and the algorithm for constructing the line of intersection of the two surfaces, of which at least one is a multi-faceted surface. Examples of intersection parallel to the cylindrical surface or conical surface, a pyramidal or prismatic surface. Execution drawings. Principle and algorithm of construction of the line of intersection of three surfaces, of which at least one multi-faceted. Examples of geometric constructions crossing cylindrical and conical surface of the prism and a pyramid with the implementation of the necessary cuts and applying the right size. Summary of lectures on the topic of educational material.

Topic 1.7. Lecture 7. The intersection of surfaces.

This lecture addresses the issues listed later in thesis form.

The basic theoretical positions and information on the intersection of curved surfaces. General principles and algorithm of construction of the line of intersection of two curved surfaces: the definition of the line of intersection of the type, shape and number of section lines; choice of the type and quantity of surface-intermediaries; build support, intermediate and contour points; determining the visible part of the line of intersection. The use of spherical surfaces intermediary theorem on the intersection of two surfaces of revolution with common axis, examples, analysis. Special cases of intersection of the second order. Summary of lectures in educational material.

Topic 2.2. Lecture 8. Projection drawings.

This lecture addresses the issues listed later in thesis form.

The basic theoretical positions and information on the projection drawing. Determination of the shape of figures for its projections. Kinds (selection), cuts (simple, complex), remote elements of the examples of image models of technical forms. Contingencies and simplicity when performing image. Analysis of the shape of the model, dividing it into simple geometric shapes. Construction of a third projection, and a perspective view of the subject of two given projections. Graphical symbol of construction materials products. Summary of lectures on the subject material.

Topic 2.3. Lecture 9. Implementation size. Reading size in the drawings. Reading images technical forms.

This lecture addresses the issues listed later in thesis form.

The basic theoretical positions and information about the use of the size of the drawings. Remote and dimension lines, arrows, dimension numbers. Linear and angular dimensions. Performing size considering design and technological databases. These examples and their analysis. Types of sizes. Reading dimensions in the drawings and images technical forms. Understanding dimensioning machine parts for various purposes. Details of the type of nut, the shaft housing. Reduction and analysis of specific examples. Summary of lectures on the topic of educational material.

Topic 2.4. Lecture 10. Sketches and drawings.

This lecture addresses the issues listed later in thesis form.

The basic theoretical principles and details of sketches and working drawings, their purpose and scope. Basic requirements for the sketches and working drawings of parts. Selection of the main view, the determination of the number of images. Guidance relevant examples and analysis. Dimensions shape and position taking into account technological bases. Surface roughness: basic parameters, rules for the implementation of signs and parameters in the drawings. Identification of the substance details. Features of construction sketches and working drawings of specific types of machine parts. Summary of lectures on the subject material.

Topic 2.5. Lecture 11. The threads and their classification.

This lecture addresses the issues listed later in thesis form.

General theoretical positions and information on the application thread in modern technology. Thread: Classification (external, internal, metric, trapezoidal, resistant, tubular, rectangular, conical and cylindrical, right and left), the parameters (outer, middle and inner diameters, step and move the thread profile angle, length, thread runout) Images and symbols in the drawings the threaded connections. Filing and analysis of relevant examples. The use of reference materials. Body parts with thread. Sketching and working drawings threaded parts. Summary of lectures on the subject material.

Topic 2.6. Lecture 12. Execution of drawings of typical parts.

This lecture addresses the issues listed later in thesis form.

General theoretical positions and information on the construction drawings of typical parts of machine facilities. Performing a sketch of the working drawings and details of "Shaft." Concrete examples and their analysis. Typical elements of design and technological details. Slot and spline connection. Sketching and drawing the working parts such as "cover" and "housing." Bringing the case studies and their analysis. Typical elements of design and technological details. Machine-building classifiers details area of their effective application. Summary of lectures on the subject material.

Topic 2.7. Lecture 13. Assembly drawings. Specifications.

This lecture addresses the issues listed later in thesis form.

General theoretical positions and information on the use of assembly units in mechanical engineering. Assembly drawing. Requirements to assembly drawings. Features images of typical elements of assembly units. Contingencies and simplification in assembly drawings. Specification. A typical sequence of assembly drawings. Examples of assembly drawings engineering products, their analysis. Drawings of the general form, purpose and application. Reading and drawings detailing the general form. Dimensional drawings. Assembly drawings. Summary of lectures on the subject material.

Topic 2.8. Lecture 14. Plug and unplug connectors.

This lecture addresses the issues listed later in thesis form.

General theoretical positions and information on the purpose and use of the compounds in mechanical engineering. Split and permanent connections. Mobile fittings. Fixed threaded connections. Standard threaded fasteners (screws, nuts, bolts, screws). Images and symbols detachable connections in the drawings. Examples of specific threaded connections and analysis. Permanent connections (welded, soldered and glued, riveted). Classification of welded joints (in a manner of mutual arrangement of parts to be welded at the edges of the form of training, the nature of performance). Images and designation of permanent joints in the drawings. Summary of lectures on the subject material.

Topic 3.1. Lecture 15. Modern approaches to the solution of engineering and graphics applications.

This lecture addresses the issues listed later in thesis form.

General theoretical information about automated geometric modeling of engineering products. Systems of automated design drawings as components of advanced integrated CAD / CAM / CAE computer system. Basic techniques, methods, techniques and algorithms of computer drawing. Creating and editing geometric primitives. Dimensions (linear and angular). Using text. Operating and assembly drawings. Concrete examples of the automated construction drawings and their analysis. Summary of lectures on the subject material.

Topic 3.2. Lecture 16. Computer parametric geometric modeling.

This lecture addresses the issues listed later in thesis form.

General theoretical knowledge of parametric geometric modeling. The definition of parametric geometric modeling, its main advantages and disadvantages. A typical sequence of parametric computer-aided geometric modeling in two and three dimensions. Examples of practical application of parametric shaping of parts and assembly units, conducting their analysis. Prospects for further development of parametric geometric modeling in modern CAD / CAM / CAE computer information systems. Summary of lectures on the topic of educational material.

Topic 3.3. Lecture 17. Solid computer geometric modeling.

This lecture addresses the issues listed later in thesis form.

General theoretical knowledge of geometric modeling in three dimensions. Review and critical analysis of the main features of modern automated systems for three-dimensional modeling. C-REP and REP-in methods for determining the three-dimensional geometric objects. Their main advantages and disadvantages. Prospects for further development. Structural-parametric modeling of products and processes in engineering. Geometric computer models as an objective basis for generalizing to conduct a comprehensive optimization of industrial products. Summary of lectures on the topic of educational material.

Topic 3.4. Lecture 18. Survey.