Course Title	Drawing geometry and engineering graphics (ECTS 8)
Topic/Module Code	CHGMG11208
Semesters Taught	1/2 semesters
Assigned Instructor	Mukhitdinov Abduvali Burkhanovich, associate professor
Language of Instruction	Uzbek
Course Type	Mandatory
Academic Hours (including independent study)	**Total hours - 240.** **Classroom hours - 96.** Lecture hours - 24 Laboratory hours - - Practical hours - 72 **Independent study -144 hours**
ECTS	8
Course Objectives, Tasks, and Learning Outcomes	**Course Objective**: "Drawing Geometry and Engineering Graphics" is to provide students with the knowledge required by the educational standards in accordance with the profile of the direction, to improve and develop thinking skills related to the logical analysis and generalization of spatial constructive-geometric structures, to visualize various three-dimensional objects in space and their relationships, to logically analyze and generalize spatial constructive-geometric structures based on graphic models of space in the form of two-dimensional drawings on the plane, to provide students with the knowledge and skills required by the educational standards, to familiarize students with modern graphic program tools, to perform graphic primitives corresponding to the direction of the specialist, to edit them and create acceptable variants, to thoroughly master the knowledge and skills required by the educational standards, to store the performed graphic information in memory and print it on paper. **Course Tasks:** is to master the methods of creating specific graphic models based on the central and orthogonal projection of space in the field of "Drawing Geometry and Engineering Graphics" and to acquire sufficient knowledge, skills and qualifications to independently solve positional and metric problems related to spatial objects and their relationships using these graphic models. It is to provide students with sufficient knowledge, skills and qualifications necessary for the automation of work on the design of graphic information related to engineering and specialized disciplines, that is, two- and three-dimensional images of geometric objects, as well as the creation of models of technological processes. **Learning outcomes:** ***Professional competencies:*** To have an idea and knowledge of the theories related to the perfect mastery of the science of methods for generating specific graphic models based on central and orthogonal projections of space; To have the skills to independently solve problems related to spatial shapes and their relationships in graphic models; read and create drawings and find solutions to graphical problems based on standards and design documents; Spatial problem solving and geometric analysis and optimization to have skills need; Must have skills in using graphic documents in production and design processes and preparing design and technological documentation. ***Skills:*** Standard implementation of line types and inscriptions when

	constructing geometric shapes can acquire skills; Visualizing spatial shapes and converting three-dimensional objects into two-dimensional images will acquire skills; Can draw sections and cuts in axonometric images and analyze dimensions and technical requirements.
Course Content (Topics)	**I. Main Theoretical Part (Lectures)** **Semester 1** **Topic 1:** Introduction. The discipline of descriptive geometry and the theoretical foundations of drawing. The Monge method. The *epure* (projection drawing) of a point based on its coordinates. **Topic 2:** The straight line. The position of a straight line in space. Straight lines in special positions. **Topic 3:** The plane. Points and straight lines on a plane. Principal lines of a plane. Planes in special positions. **Topic 4:** Methods for transforming projections. The method of changing projection planes. **Topic 5:** Surfaces. Types of surfaces. Polyhedra. Second-order surfaces. Developable surfaces (*torses*). Intersection of surfaces with a plane. **Topic 6:** Intersection of polyhedra. Development of surfaces. Mutual intersection of surfaces and methods for constructing these intersections. **Semester 2** **Topic 7:** Geometric constructions in technical drawings. Drawing parallel lines. Drawing perpendicular lines. **Topic 8:** Perspective and shadows. The apparatus for constructing perspective. Perspective of straight lines, planar shapes, and geometric solids. Methods for constructing perspective. **Topic 9:** Drawing interiors and exteriors. **Topic 10:** Connections (joints). Detachable and permanent connections. Screw threads. Threaded connections. **Topic 11:** Architectural/Construction drawing. Content of construction drawings. Naming and labeling of construction drawings. **Topic 12:** Building sections. Constructing a section and representing a staircase within a section. Vertical dimensions. Building facades. **II. Instructions and Recommendations for Laboratory Classes** Laboratory classes are not provided for in the model curriculum of the subject. **III. Instructions and Recommendations for Practical Classes** The teacher's preparation for a practical session begins with studying the initial documents (curriculum, thematic plan, etc.) and ends with the development of a lesson plan. The teacher should have an idea of the goals and objectives of the practical session, as well as the amount of work that each student must complete. Methodological guidelines are the teacher's main methodological document in preparing and conducting practical classes. The goal of practical training is to understand theory and acquire skills. Its conscious application in educational and professional activities consists in developing the ability to confidently formulate one's own point of view. **Recommended Practical Topics:** **Semester 1** 1. Introduction. Design documentation. Standards. Types of objects and design documents. Preparing a drawing sheet. Formats. 2. Types of lines. Rules for dimensioning. Title blocks and their execution in academic drawings.

	3. Descriptive geometry and the theoretical foundations of drawing construction. The Monge method. Representing a point via its coordinates (epure). 4. The straight line. The position of a straight line in space. 5. Straight lines in special positions. General information. 6. The plane. Points and straight lines on a plane. 7. Principal lines of a plane. Planes in special positions. 8. Perpendicularity between a straight line and a plane, and between two planes. 9. Methods for transforming projections. The method of changing projection planes. 10. The method of rotating projection planes around principal lines. 11. Projection drawing. Projecting an object onto two mutually perpendicular planes. 12. Axonometric projections. Orthogonal (rectangular) axonometric projections. Orthogonal isometric projection. 13. Views. Local (partial) views. System for the arrangement of views. 14. Sections and cuts. Graphic representations of materials in sections and cuts. 15. Creation and interpretation of assembly drawings. Reading assembly drawings. Decomposing assembly drawings into individual part drawings. 16. Surfaces. Types of surfaces. Polyhedra. Second-order surfaces. Developable surfaces (torses). 17. Intersection of surfaces with a plane. True size of a cross-sectional area. 18. Construction of surface developments (unfoldings). General information. Developments of polyhedra. Construction of developments for cylindrical surfaces. **Semester 2** 19. Geometric constructions: dividing a straight line into equal parts; dividing a circle into equal parts. 20. Tangential connections (blending/filleting). Slope and taper. Curves drawn using a French curve (template). 21. Mechanical engineering drawing. Sketches, working drawings, and the requirements for them. 22. Working drawings and the requirements for them. 23. Creating technical drawings (pictorial/freehand-style representations). Drawing 2D (planar) shapes. Drawing 3D geometric solids. 24. The apparatus for constructing perspective. Perspective of a straight line, a 2D shape, and 3D geometric solids. 25. Methods for constructing perspective. The architect’s method. 26. Constructing shadows in perspective. Shadows of geometric solids in perspective. 27. Drawing interiors and exteriors. 28. Joints (connections). Detachable and permanent (non-detachable) joints. Screw threads. Threaded joints. Calculating the dimensions of joint elements. 29. Threaded joints. Drawing screw threads. 30. Fastening components: screws, studs, stud holes, nuts, and washers. Drawing stud-based joints. 31. Construction drawing. Content of construction drawings. Naming and labeling (designation) of construction drawings. 32. Dimensioning in construction drawings. Basic conventional symbols used in construction drawings.

	33. Building floor plan. Types and thickness of walls, placement of doors and windows, conventional symbols. 34. Building section. Constructing a section and representing a staircase within it. Vertical dimensions. Building facade. Conventional symbols. 35. Drawings of building structures. Their types and conventional symbols. 36. Drawings of timber (wooden) structures. Their conventional symbols. **IV. Independent Learning and Independent Work** Independent learning competence serves to support students' independent self-development and increase the effectiveness of professional activities. Students perform independent work on their mobile devices under the guidance of a teacher in a traditional or electronic form. **Independent Study Topics:** **Semester 1** 1. Learning to determine the positions of points–located in general positions within a 3D Cartesian coordinate system (including their placement across various spatial quadrants and octants)–using both 3D diagrams and Monge projections (epures). 2. Learning methods to determine the true lengths of line segments that are in a general position relative to the projection planes. 3. Studying the representation of planes–including projection planes, planes parallel or perpendicular to projection planes (projecting planes), and bisector planes–within 3D diagrams and Monge projections. 4. Learning methods to determine the true shape (true size and form) of triangular planes that are in a general position relative to the projection planes. **Semester 2** 5. Learning to determine the number of principal views for parts. Creating clear representations of parts—producing axonometric projections and learning the rules for applying cross-sections to them. 6. The apparatus for constructing perspective. Perspective of straight lines, planar shapes, and geometric solids. Methods for creating perspective. The architect's method. 7. Threaded connections. Calculating the dimensions of connection elements. Conventional symbols. 8. Architectural and construction drawing. Content of construction drawings. Naming and labeling (designation) of construction drawings.
Guidelines for organizing calculation and graphical work	The primary objectives of completing computational-graphic assignments are: - To enable students to apply their theoretical knowledge in practice and to foster their ability to work independently. - Students are advised to utilize the methodological guidelines developed for these assignments, as well as the specific graphic tasks prepared for independent study, based on the individual assignments provided for the course. Recommended topics for computational-graphic assignments: **Semester 1** Assignment 1. Types of lines. Drawing 1 (Epyur 1). Assignment 2. Drawing 2 (Epyur 2). Assignment 3. Projection drawing. Assignment 4. Drawing 3 (Epyur 3). Polyhedra.

	Semester 2 Assignment 1. Geometric constructions. Tangencies/Connections. Assignment 2. Threaded connections. Assignment 3. Methods for constructing perspective drawings. Assignment 4. Conventional symbols and their types.
Student Assessment	Student assessment is based on mastery of instructional materials (tests, assignments, written and oral work results) during the semester and final examination. Students are evaluated on a 100-point system. Of this total, 50 points are allocated to continuous and midterm assessments (60% for continuous assessment/independent study, and 40% for midterm assessment), while 50 points are allocated to the final exam. Students whose total continuous and midterm assessment score is below 30 points are not admitted to the final exam. A student who scores 30 or more points on the final exam is considered to have passed the course.
Exam requirements	The student must fully master the theoretical and practical concepts of the topic and accurately reflect analysis results. The student must have completed assignments given for independent work, continuous, and midterm assessments. Additionally, within the specified period, the student must obtain the required minimum score across continuous assessment, midterm assessment, independent study, and final examination. Students who have not submitted continuous assessment, midterm assessment, or independent study assignments, or who score fewer than 30 points across these assessment types, will not be admitted to the final exam. Furthermore, a student who misses 25% or more of the allocated classroom hours without a valid excuse will be excluded from the subject, barred from the final exam, and deemed not to have earned the relevant credits for this subject. A student who fails the final exam or scores within the range of "0–29.9" on final evaluations is considered academically indebted.
Recommendation literature	**Core Literature:** **Main literature** 1. A.B.Muxitdinov. “Muhandislik va kompyuter grafikasi” darslik.–Jizzax: JizPI, 2025 yil, 296 b. 2. B.N.Gapparov. “Chizma geometriya va muhandislik grafikasi” o‘quv qo‘llanma.–Jizzax: JizPI, 2023 yil. 3. A.B.Muxitdinov. “Chizma geometriya va muhandislik grafikasi” o‘quv qo‘llanma.–Jizzax: JizPI, 2021 yil, 145 b. 4. F.B.O‘razaliyev. “Muhandislik va kompyuter grafikasi” darslik.–Jizzax: JizPI, 2024 yil. 5. A.N.Valiyev. “Perspektiva” darslik.–T.: Voris, 2012 yil, 325 b. **Supplementary Literature:** 6. Sh.Murodov, L.Xakimov, A.Xolmurzayev, M.Jumayev, A.To‘xtayev. “Chizma geometriya” o‘quv qo‘llanma, Iqtisod–moliya, 2006 yil, 241 b. 7. U.Abdullayev. “Chizma geometriyadan masalalar to‘plami” o‘quv qo‘llanma.–T.: “O‘zbekiston” nashriyoti. 2003 yil, 157 b. 8. A.N.Valiyev. “Perspektiva” o‘quv qo‘llanma.–T.: Voris, 2009 yil, 192 b. **Internet Resources:**

	9. http://ziyonet.uz 10. https://stat.uz 11. www.Autodex.com 12. www.AutoCAD.ru