DISPLAY OF THREE-DIMENSIONAL OBJECTS AND BASES OF DESIGN

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Summary. The paper presents the material for an additional course in the visualization of three-dimensional objects and the basics of design at the Kharkov State University of Food Technology and Trade for students training areas "Food technology and engineering".

Keywords: **visualization, 3D objects, geometric modeling, rendering, design, processing equipment, catering and food production.**

Formulation of the problem. The bachelor`s study program training ways "Food technologies and engineering" currently involves studying graphic disciplines in the course "Engineering and Computer Graphics" in the amount of 135 hours (72 class hours). Despite the strong reduction in hours of classroom discipline - the discipline in 2015 to read for one semester 1st year - we were able to save the main achievements of the past years. Necessarily remain 3D modeling of technological equipment catering and food production in AutoCAD (creation of simplified geometric models and updating a database of process equipment models), forming a 3D model of the food industry in AutoCAD Architecture, the implementation of a course project on discipline "Engineering and Computer Graphics".

Analysis of recent research and publications. As previously covered [1, 2] skills obtained in the course of studying the discipline "Engineering and Computer Graphics", used in the inter-chair disciplines at the undergraduate, such as the "Modelling of technological lines of the industry", "Design of power companies with the basics CAD" in the course and diploma designing.

Formulation of article purposes. To determine the actuality and feasibility of introducing into the learning process an additional course in the visualization of three-dimensional objects and design basics for students training areas "Food technologies and engineering".

Main part. According to the OKH industry standard of Higher Education MES in "Food Technologies" engineer must be able to carry out "... the project activities related to the construction, hardware and graphic design jobs, industrial units and production lines and the development of integrated projects of new construction, reconstruction and technological re-equipment of enterprises of food industry of different capacities". The European experience shows that the most urgent task is the creation of low productivity enterprises, organizations mechanized lines for the production of import-substituting products with a view to

further upgrading (both due to the replacement of a single equipment, and their complex).

Modern design involves the use of various computer tools and methods for creating, modifying and presenting the project to the customer. 3D-model - an integral component of the quality of presentations and technical documentation, and - the basis for the creation of a prototype product for volume rendering of objects and space.

With the basic tools 3D render of computer models in AutoCAD students are introduced within the allotted class hours, but the tremendous opportunity of creating a truly realistic images remain unexplored.

Every year in the preparation of reports on the ongoing conference of young scientists and students separate sections studied so interesting topics such as 3D visualization. The interest of the students considered the topic prompted us to organize a special course "Visualization of 3D objects and design basis", which has been tested for two years as a discipline at the option of students training areas "Food technologies and engineering." The main topics of the discipline - methods of 3D visualization created by the geometric model: the object texturing of the sun location and other light sources, the observation point, the display settings to create a two-dimensional raster image based on built 3D-model - volume rendering. Figure 1 shows a model of a mixer before (a) and after (b) rendering.
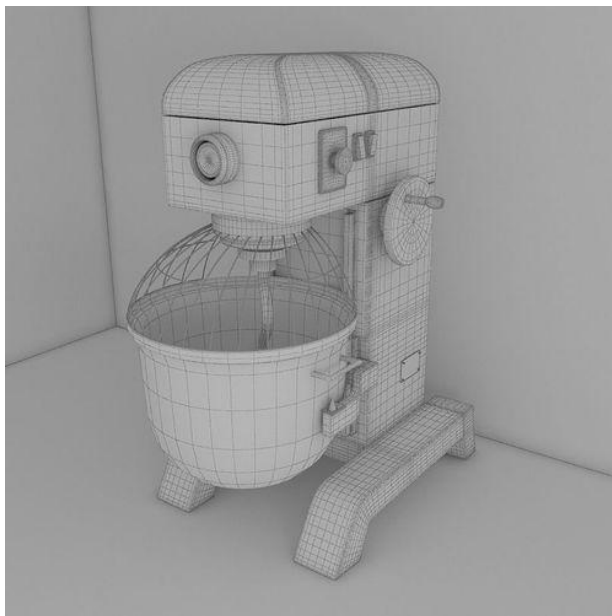
a)   *b)*

Fig. 1. The rendering of mixer model

The course also discusses such AutoCAD tools like "camera" and "Animation move along the path.A separate issue concerns modern technologies of additive manufacturing - 3D printing, including those prepared by the lecture "Three-dimensional printing in the food industry."

The second part is devoted to a special course on the basics of design, because the representation of the power of the enterprise project, of course, can not do without product design and interior design.

Interior design of a cafe or restaurant - is, first of all, exclusive, style, quality, a feeling of coziness and comfort of staying in it.

Fully engage in interior design as part of the curriculum disciplines-engineering students are not able to, but the interior design elements of catering, including in the implementation of a course project, can be used. Figure 2 shows a fragment of the work performed in the course project. Image obtained using the 3D visualization.

Fig. 2. The rendering of the model of café

Conclusions. According to the curriculum, which come into force from the 2016/17 school year, the new name of the areas of training sounds like "Food technology and technology management in the restaurant business." Therefore, we believe it is relevant and appropriate to the inclusion of such training courses that would prepare the engineer food technologist as a businessman and organizer of production, restaurateur, owns including the most modern methods of presentation model of company.

Literature:

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