Annotation

"Machine shops design" course refers to professional circle of disciplines and is intended for training students majoring in the specialty 150700 «Mechanical engineering» and pursuing the bachelor degree. The course is focused on methodology of designing machining and machine-assembling shops for modern engineering factories. It is aimed at students who wish to make their career in the field of production and enterprise management.

The course is studied in the 8th term and contains 22 hours of lectures, 22 hours of laboratory works, 44 hours of self-study which includes individual hometasks for designing a shop division with high economic self-sufficiency.

Final examination – credit test (3 credits).

The course is preceded by such disciplines as "Construction materials engineering", "Metrology, standardization and certification", "Theory of mechanical engineering technology", "Material cutting and cutting tool", "Technology of Mechanical Engineering". Moreover, the last course is also continued in the same eighth term as the discipline "Machine shops design".

As a result of studying the discipline "Machine shops design" a student should:

know:

- Basic principles of organizing production departments and shops;
- Techniques of choosing shop structure and organizational forms of its basic divisions;
- The content of technical, organizational, economic and social problems solved at designing;
- Main principles of designing shops;
- Structure and functions of all services of the auxiliary system;
- Sequence of developing a technical design assignment.

be able to:

- Calculate labour input of annual processing of all products in the shop depending on manufacture seriality;
- Calculate the batch size;
- Arrange the shop depending on manufacture seriality;
- Calculate the required quantity of equipment, floor space of the shop and its divisions;
- Carry out a rational layout of the equipment in the shop when building a new premise and reconstructing the old one;
- Calculate the required floor space and carry out a layout of the auxiliary services of the shop and factory;

- Choose a type of the building and its arrangement depending on the requirements for the accuracy of live parts, technical characteristics of assembled mechanisms and manufacture seriality;
- Choose cutting tools, tip grades, optimum geometrical parameters and cutting mode;
- Develop tasks for building, sanitary and power sections;
- Develop a general plan of the factory;
- Make a feasibility report of the project.

master:

- Calculation of the required quantity of equipment, floor space of the shop and its divisions;
- Performance of a rational layout of the equipment in the shop when building a new premise and reconstructing the old one;
- Auxiliary system design.

Course content

Main principles of organizing manufacturing divisions. A methodology of choosing a shop structure and organizational forms of its basic divisions. Defining the structure and quantity of the basic production machinery for each division. Requirements of environment protection and waste recycling. General requirements for a layout of divisions and shops. Feasibility reports on designing and building or reconstructing manufacture.

Sequence of design and building. Use of computer-aided design (CAD) systems for designing divisions and shops. Criteria of choosing an optimum variant of the project. Main design principles.

Basic directions of choosing the structure of the production machinery for flow-line and non-line production. Defining the structure of basic (technological) equipment. Calculation of total labour input of the annual program. Calculation of machine tools quantity and floor space. Workplace organization. A layout of the basic (technological) equipment at manufacturing divisions.

Design of auxiliary system (storehouse, transport, tool management, repair and maintenance, quality inspection, labour safety service, management and production planning services).

Types and arrangements of buildings for mechanical assembly production. Developing tasks of building, sanitary and power engineering sections. The general layout of a factory (enterprise). A project feasibility study.