



VOCATIONAL AND TECHNICAL ANATOLIAN HIGH SCHOOL
ANATOLIAN VOCATIONAL AND ANATOLIAN TECHNICAL PROGRAM

MINING TECHNOLOGY FIELD

The Curriculum Framework

Ankara, 2021

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INTRODUCTION

The rapid changes in science and technology, the changing needs of the individual and society, innovations and improvements in learning teaching theories and approaches have also directly affected the roles expected from individuals. This change describes an individual with qualifications like generating information; being able to use it functionally in life, problem solving, critical thinking, entrepreneurial, decisive, having communication skills, being able to empathize, contributing to the society and culture. Acquiring a profession is prioritized in the expectations of individuals and societies from education. Vocational education, within the integrity of the National Education System, comprises planning, researching, improving and organizing all vocational and technical education services together with agriculture, industry and service sectors and activities of coordinated administration, supervision and teaching. The objective of these educational activities carried out within the scope of a certain plan and schedule included in the applications of Vocational and Technical Education is to raise qualified intermediate member power which is needed at all stages of production and to raise competent individuals that will ensure continuity of the society. While curriculums that will serve to raise individuals having this texture of qualification are prepared, a structure that pays regard to individual differences, aims for the value and skill acquisition and turns out to be comprehensible has been adopted rather than a structure that merely conveys information. In line with this purpose, on the one hand, the repetitive acquisitions and explanations at different subject and grade levels with a spiral approach, and on the other hand, the learning outcomes aimed to be achieved in a holistic and one-time manner were included. Outcomes and explanations in both groups are competent, up-to-date, valid and capable of being interrelated with life during the education and training period of the relevant discipline. These outcomes and their demarcating explanations refer to a plain content with an aspect of providing integrity in the perspective of competencies, skills and values at the level of grades and education degrees. Thus, a total of curriculums providing meaningful and permanent learning, durable and interrelated with previous learning, integrated with other disciplines and daily life around values, skills and competencies has been constituted.

1. CURRICULUM DEVELOPMENT PROCESS IN VOCATIONAL AND TECHNICAL EDUCATION

Vocational and technical education field curriculums are designed to prepare the individuals for the business life and based on the labour market needs and the approach of job analysis. In this approach, the profession profile is defined by analyzing the professions and the tasks/duties and processes assigned for the member of the profession are determined. On the one hand, while the curriculum aims to provide the students with the necessary knowledge, skills, manners and attitudes for fulfilling the relevant tasks and processes via courses and their outcomes; educational activities are planned in a way to prepare individuals for business life in accordance with this framework.

The developed curriculum is a detailed plan comprising the preparation, implementation and evaluation of the educational activities.

This plan is prepared in such a manner that

- It will raise members of profession meeting the requirements of the sector, having the national and international knowledge, skills and competencies.
- It will provide internal and vertical transfer opportunities for individuals at all proficiency levels.
- It will present the individuals convenient options in line with their differences and characteristics.

To that end, a curriculum approach based on the analysis of task and profession has been adopted in vocational and technical education.

The curriculum development process is made up of the stages below:

Analysis : Labor market needs analysis / skill needs analysis / training needs analysis / occupation analysis / national occupational standards

Planning : Specification of the curriculum approach and establishing a framework according to the approach

Development : Preparation of curriculum documents

Implementation : Approval and implementation of the curriculums

Evaluation : Monitoring, evaluation and updating of applications

Within this process, a commission has been established with the participation of labor market representatives, field teachers, specialist academicians in the field and representatives of civil society organizations to carry out the analysis, design and development stages. In the commission studies, the data from the European Qualifications Framework (EQF), the Turkish Qualifications Framework (TQF), international developments, the emerging developments in business life and professions, 3rd and 4th level of national occupational standards and national competencies, feedbacks from educational institutions and practitioners, international classifications and standards, educational policies, protocols, Research and Development (RD) reports, data from the Turkish Statistical Institute (TSI) and other institutions / associations have been referenced.

The curriculum frameworks prepared at the end of this process are based on the competencies of more than one profession within the framework of interdisciplinary curriculum perception. The vocational competencies generating the focus of the curriculum are separated into two units. These are “basic vocational skills” and “advanced or specific vocational skills” related to the profession. In vocational and technical education curriculums, it's aimed to provide the students with the basic vocational skills by means of workshops, labs and vocational courses, and advanced or specific vocational skills through on-site vocational training and elective vocational courses.

By means of on-site vocational training, outcomes comprising the knowledge and skills required by the branch, necessitating the implementation and practicing of mainly the tasks, projects, experiments and the services are included.

Elective vocational courses aim to ensure the students adapt to the changes in science, industry and technology easily. These courses have been designed in a structure compatible with the properties of the school (students' interests and needs, educational environments, etc) and with the regional needs of the sector.

2. THE CURRICULUM PERSPECTIVE

The basic objective of our education system is to raise individuals having knowledge, skills and behaviours integrated with our values and competencies. While knowledge, skills and behaviors are tried to be achieved through the curriculums, our values and competencies function as a horizon and a connection that provide integrity among these knowledge, skills and behaviours.

Our values are our own heritage from the national and spiritual resources of our society, which have reached today and will be transferred to our future. Competencies are our operational integrities that enable this heritage to participate and contribute to life and humanity.

2.1. VALUES

Current developments of our era are one of the reasons for the diversification in professions, trade and economy; even the most important one. The diversification in the labor market instruments, frequent use of virtual platforms has weakened face to face communication. This rapid change has revealed how important the human factor is in the work done and in the quality of the goods produced.

Raising members of professions who have national, spiritual, ethical and all humanistic values, stimulating cooperation and reliance between tradesmen and craftsmen; nascence of values like kindness, love, respect have become a social requirement. Professional associations, -Ahi Brotherhood community being in the first place- have regulated the cultural and social life of Turkish society as well as the professional life.

Professionals doing their job within the framework of moral principles always stand out from other colleagues. The Ahi Brotherhood culture is the supreme example of professional ethics in our history. The spread of values such as love, respect, solidarity, philanthropy, cooperation, justice, honesty and reliability, which are the building blocks of this culture, will bring dynamism to the business and commercial world.

2.2. COMPETENCIES

With the transition of societies from the technology age to the information age, the expectations of the society from the future members have also changed in the axis of scientific, technological, social changes and developments that have occurred in recent years. These developments and advancements necessitate providing the students with the competencies and skills such as cognitive ones like critical and original thinking, researching, problem solving; social ones like cultural and social participation, entrepreneurship, communication, developing empathy; personal ones like self-control, self-confidence, stability, leadership along with basic knowledge and skills.

As the skill ranges of the students, the competencies that will be needed in their personal, social, academic and business lives at a national and international level are defined in the Turkish Qualifications Framework (TQF). TQF defines eight key qualifications and describes them as follows:

- 1. Communication in the native language:** Means the interpretation and expression of notions, thoughts, opinions and facts both verbally and in written (listening, speaking, reading and writing); having a linguistic interaction, convenient within all the social and

cultural contexts like education and training, workplace, home and entertainment, so as to be able to generate new ideas.

2. **Communication in foreign languages:** Mostly, shares the basic skill aspects of communication in native language and is based on the skills of interpretation, expression and comprehension of the feelings, thoughts, notions, facts and opinions both verbally and in written within a range of convenient social and cultural contexts like education, training, workplace, home and entertainment according to the requests and needs of the person. Communication in foreign languages also requires the skills of mediation and intercultural understanding. Competency level of the individual will vary between different languages with the aspects of listening, speaking, reading and writing depending on the individual's social and cultural background, environment, needs and interests.
3. **Mathematical competence and basic competencies in science/technology:** Mathematical competence is the improvement and implementation of mathematical thinking style to solve a range of problems encountered in daily life. The processes, activities and knowledge built on a steady arithmetical skill are emphasized. Mathematical competence includes the ability and willingness to use mathematical modes of thinking (logical and spatial thinking) and presenting (formulas, models, constructs, graphs and tables) to varying degrees. Competence in science refers to the ability and willingness to utilize methodology and the existence of the knowledge to explain the natural world in order to define questions and produce evidence-based results. Competence in technology is considered as the application of the methodology and knowledge within the context of meeting the perceived human wants and needs. Competence in science and technology involves understanding of the changes resulting from human activities and the responsibilities of each individual as a citizen.
4. **Digital competence:** Involves the safe and critical use of information communication technologies for business, daily life and communication. This competence is supported by means of basic skills such as access to information and the use of computers for the evaluation, storage, production, presentation and exchange of information, as well as engaging in common networks and communicating via the Internet.
5. **Learning to learn:** It is the ability to pursue and insist on learning so that the individual can organize his / her learning action individually or as a group in such a way to involve the effective time and information management. This competence involves the individual's awareness of learning needs and processes through recognizing the existing potentials and the ability of the individual to deal with challenges for a successful learning action. It means seeking for counselling support and making use of it as well as gaining new knowledge and skills, processing and adapting them to oneself. Learning to learn motivates learners to rely on previous learning and life experiences to use and apply the knowledge and skills in various contexts such as home, workplace, education and training environment.

- 6. Social and citizenship competencies:** These competencies include the personal, interpersonal and intercultural competencies; involve all courses of action enabling individuals to participate in diversifying society and working life effectively and constructively; providing them to be equipped with the qualifications to resolve conflicts when needed. Citizenship competence equips individuals to fully participate in civic life based on knowledge of social and political concepts and structures, and a commitment to democratic and active participation.
- 7. Taking initiative and entrepreneurship:** States the ability of individuals to turn their thoughts into action. It also includes the ability to plan and manage projects to achieve goals besides innovative thinking and taking risks. This competence supports everyone not only at home and in the community, but also in business life so that they can be aware of the context and conditions of their work and seize job opportunities; it also provides a basis for the more specific knowledge and skills needed by people who engage in or contribute to social and commercial activities. It also includes awareness of ethical values and supporting good governance.
- 8. Cultural awareness and expression:** It is an appreciation of the importance of expressing opinions, experiences and feelings more productively using a variety of mass media, including music, performing arts, literature and visual arts.

3. ASSESSMENT AND EVALUATION

Assessment is defined as the representation of the observations after surveying a quality, with numbers or other symbols; and evaluation is the process of concluding by comparing the assessment results with a standard. Assessment and evaluation practices defining the extent to which the knowledge, skills and attitudes specified in the curriculum outcomes are achieved have an important place in making the education effective and successful in the education-training process. Assessment and evaluation practices enable the specification and correction of deficient learning and the conducting of effective guidance in the process with feedback. It is essential for the assessment instruments to be used in education to have sufficiently high validity and reliability and objectively reveal whether the students have learned the intended behaviours to be taught to them and the levels of competency and determination they have reached in these behaviours. Traditional and performance-based evaluation approaches should evenly take part in the curriculums of vocational and technical education institutions. Traditional assessment, also called result-based assessment, is predominantly used to measure acquisitions based on cognitive skills. Assessment instruments in traditional approach consist of true/false, matching, gap filling, short-answer, open ended and multiple-choice question types. Type of the question to be used is determined depending on the cognitive-skill level of the curriculum outcomes. Performance-based assessment, on the other hand, includes practices and tasks that will enable students to transfer their knowledge and skills to real life, taking into account their individual differences. Evaluation doesn't depend on a certain time in this approach in which students are expected to create a product or perform a task including more than one skill; it is carried out throughout the process. Individuals are expected to transform the knowledge they obtained

into skills by putting them into practice in vocational and technical education where psychomotor skills requiring mind-muscle coordination are predominant. On the purpose of assessing the process and the product that they present by integrating their knowledge and skills, students are asked to perform a task or an operation by means of experiments, projects, practices, etc and the results obtained are evaluated in accordance with predetermined criteria. In order to make a performance based evaluation, it is required to evaluate and score the performances of the students for the assigned performance-tasks with the appropriate one of check-list, rating scale, rubric, etc; consisting of previously prepared criteria. Students can be ensured to take part in the training process with the improvement of their critical thinking skills by using self-assessment and peer- assessment forms along with these evaluation approaches. While preparing assessment instruments, manners and behaviours needed for the skill should also be taken into consideration; a holistic structure appropriate for observing the cognitive, affective and psychomotor features as a whole should be constituted.

As diversity in education is influenced by the dynamics such as the individual, course content, social surroundings, school potentials, etc, the role of the education practitioners is considerably important in providing the efficiency of assessment and evaluation applications. The curriculum doesn't set certain limitations for the practitioners in terms of assessment instruments and methods that can be used in the assessment process, it only guides. However, necessary technical and academic standards should be observed within the preferred assessment and evaluation instrument and method.

4. CERTIFICATION

The graduate student is given a diploma showing his / her field and branch, and a business licence, as well as a certificate of the relevant professions that can be accessed through elective vocational courses. Along with an additional Europass certificate/diploma including the information of the basic competencies gained through training period within the scope of Turkish Qualifications Framework; a document representing the name of the business in which the student had his/her traineeship or on-site vocational training, the name of the learning unit taken and accomplished; is arranged for the requestor graduates of vocational and technical secondary education programs.

5. MINING TECHNOLOGY FIELD

5.1. CURRICULUM OBJECTIVES

The "mining" sector, which has an indispensable place in human and social life, has been one of the most effective factors for the developed countries to reach their level of technology and welfare throughout history. Mining, along with agriculture, is one of the two basic production areas that meet the raw material needs of societies.

Developed countries that use their natural resources effectively owe their existing economic power to this. Mining sector has a special importance because of its direct contributions to the economy and the inputs it provides to other areas of the economy, especially the manufacturing sector.

The mining sector, which has the highest added value and employment creation capacity among the sectors, prevents migration to the city and accelerates regional development because it is mostly carried out in rural areas. For this reason, it is clear that special attention should be given to the sector in formulating both economic and social development policies. It should not be ignored that as a result of following the correct plans and policies, the sector will make significant contributions to economic indicators such as production, employment, etc. and will be a driving force for the country's manufacturing industry.

In the mining branch, it is aimed to provide the knowledge, skills and competencies related to surface mining operations, underground mining operations, drilling, computer aided drawing, hydraulic pneumatic, mine topography, basic electricity and ore enrichment.

Mining Technology Field Curriculum Framework includes:

1. Mining Branch.

In this direction, a formal curriculum has been prepared in accordance with national and international standards for the Mining Technology Field and the professions under it.

Students completing the curriculum will have such common knowledge, skills and competencies as:

- In line with modern era skills and design-based thinking approach, gaining skills that will provide vocational development on topics such as “vocational ethics and Ahi Brotherhood, occupational health and safety, technological developments and industrial transformation, environmental protection, entrepreneurial ideas, business establishment and execution, intellectual and industrial property rights”,
- Performing operations related to the structure of the earth's crust, magma and rocks, motions of the earth's crust, minerals, petrography and the formation of energy raw materials,
- Producing geometric drawings, drawing views, dimensioning, transferring surface treatment signs to the drawing, drawing sketch, perspective and production drawings in accordance with TS EN ISO Standards and technical drawing rules,
- Using machine connection and motion transmission elements, explaining the machines used in underground and surface mining,
- Occupational health and safety measures in mines, concept of mining, boron and other mineral types, mineral searching methods, the importance of our country's mineral resources in the world in terms of economy and geopolitics,

Besides,

In Mining Branch:

- Performing basic mechanical operations,
- Performing the operations of underground mining with national and international standards, appropriate legislation, methods and equipment,
- Topographic measurement, calculation and drawing,

- Making two-dimensional drawings using the drawing program, using feature and definition commands, creating a drawing library and drawing perspective in accordance with TS EN ISO Standards, occupational health and safety and technical drawing rules,
- Performing the operations of surface mining with national and international standards, appropriate legislation, methods and equipment,
- Knowing the hydraulic and pneumatic system elements, making the necessary calculations, knowing their symbols and to draw a system diagram,
- Preparing conductors for connection, connecting conductors, setting up simple electrical circuits, doing phase control and changing the direction of engine rotation in line with occupational health and safety measures,
- Conducting ore enrichment processes,

5.2. DURATION

Total duration of the field program has been planned as 4 years.

5.3. REFERENCE DOCUMENTS AND LEGAL BASES

While the program was being prepared, the below-listed reference documents and bases were taken into consideration along with the educational legislation and reflected in the components of the curriculum.

- ISCED-F classification
- Labor Law No. 4857
- Social Insurance and General Health Insurance Law No. 5510
- Occupational Health and Safety Law No. 6331
- Occupational Health and Safety Risk Assessment Regulation
- Regulation on Emergency Situations in Workplaces
- Regulation on Health and Safety Measures to be Taken in Workplace Buildings and Extensions
- Regulation on the Use of Personal Protective Equipment in Workplaces
- Health and Safety Signs Regulation
- Mining Law No. 3213
- Regulation on the Protection of Employees from the Dangers of Explosive Environments
- Regulation on the Protection of Employees from Vibration Related Risks
- Regulation on Protection of Employees from Noise Related Risks
- Regulation on Health and Safety Measures in Working with Screened Devices
- Regulation on Manual Transportation
- Regulation on Health and Safety Conditions in the Use of Work Equipment
- Geothermal Resources and Natural Mineral Waters Law Implementation Regulation
- Personal Protective Equipment Regulation
- Regulation on Health and Safety Measures in Working with Chemical Substances
- Regulation on Occupational Health and Safety in Mining Workplaces

5.4. ANATOLIAN VOCATIONAL AND ANATOLIAN TECHNICAL CURRICULUM WEEKLY COURSE SCHEDULES

- Mining Activities Implementation Regulation
- Mechanization-Press Worker 4th Level National Occupational Standard published in the Official Gazette no. 29791(Repeated) and dated 04.08.2016
- Mechanized Excavation Operator 4th Level National Occupational Standard published in the Official Gazette no. 29791(Repeated) and dated 04.08.2016
- Gallery Opening Machine Operator 4th Level National Occupational Standard published in the Official Gazette no. 29868 (Repeated) and dated 25.10.2016
- Underground Preparatory Worker 4th Level National Occupational Standard published in the Official Gazette no. 29868 (Repeated) and dated 25.10.2016
- Reagent Preparer 4th Level National Occupational Standard published in the Official Gazette no. 29791 (Repeated) and dated 04.08.2016
- Driller 4th Level National Occupational Standard published in the Official Gazette no. 30255 (Repeated) and dated 29.11.2017
- Repair-Scanning-Dismantling Worker 4th Level National Occupational Standard published in the Official Gazette no. 30003 (Repeated) and dated 10.03.2017
- Vertical and Inclined Wells Crane Operator 4th Level National Occupational Standard published in the Official Gazette No. 30003 (Repeated) and dated 10.03.2017
- Monorail-Rack Track Rail Operator 4th Level National Occupational Standard published in the Official Gazette no. 30003 (Repeated) and dated 10.03.2017
- Underground Production Worker 4th Level National Occupational Standard published in the Official Gazette no. 30179 (Repeated) and dated 13.09.2017
- Crushing-Sieving Plant Supervisor 4th Level National Occupational Standard published in the Official Gazette no. 30104 (Repeated) and dated 22.06.2017
- Well Maintenance and Repair Worker 4th Level National Occupational Standard published in the Official Gazette no. 30446 (Repeated) and dated 09.06.2018
- Central Monitoring Operator 4th Level National Occupation Standard published in the Official Gazette no. 30617 (Repeated) and dated 06.12.2018

5.4. ANATOLIAN VOCATIONAL AND ANATOLIAN TECHNICAL CURRICULUM WEEKLY COURSE SCHEDULES						
VOCATIONAL AND TECHNICAL ANATOLIAN HIGH SCHOOL						
ANATOLIAN VOCATIONAL AND ANATOLIAN TECHNICAL PROGRAM						
MINING TECHNOLOGY FIELD						
(MINING BRANCH) WEEKLY COURSE SCHEDULE						
COURSE CATEGORIES	COURSES	GRA DE 9	GRA DE 10	GRA DE 11	GRADE 12	
					AVP	ATP
COMMON COURSES	TURKISH LANGUAGE AND LITERATURE (*)	5	5	5	5	
	RELIGIOUS CULTURE AND MORAL KNOWLEDGE	2	2	2	2	
	HISTORY	2	2	2	-	
	TR. REVOLUTION HISTORY AND KEMALISM	-	-	-	2	
	GEOGRAPHY	2	2	-	-	
	MATHS	6	5	-	-	
	PHYSICS	2	2	-	-	
	CHEMISTRY	2	2	-	-	
	BIOLOGY	2	2	-	-	
	PHILOSOPHY	-	2	2	-	
	FOREIGN LANGUAGE	5	2	2	2	
	PHYSICAL EDUCATION AND SPORTS / VISUAL ARTS / MUSIC	2	2	2	-	
	HEALTH KNOWLEDGE AND TRAFFIC EDUCATION	-	-	1	-	
TOTAL		30	28	16	11	
VOCATIONAL COURSES	VOCATIONAL DEVELOPMENT WORKSHOP	2	-	-	-	Academic Support Courses
	GENERAL GEOLOGY	2	-	-		
	MACHINE COMPONENTS AND MINING MACHINERY	2	-	-		
	TECHNICAL DRAWING	3	-	-		
	INTRODUCTION TO MINING (*)	2	-	-		
	BASIC MECHANICAL OPERATIONS		3			
	UNDERGROUND MINING OPERATIONS (*)	-	6	-		
	MINING TOPOGRAPHY	-	3	-		
	COMPUTER AIDED DRAWING	-	2	-		
	SURFACE MINING OPERATIONS (*)	-	-	6		
	DRILLING	-	-	3		
	HYDRAULIC PNEUMATIC	-	-	2		
	BASIC ELECTRICITY	-	-	2		
	ORE ENRICHMENT	-	-	4		
ON-SITE VOCATIONAL TRAINING (*)	-	-	-	24		
TOTAL ACADEMIC SUPPORT COURSE HOURS		-	-	-	-	31
TOTAL VOCATIONAL COURSE HOURS		11	14	17	24	-
TOTAL ELECTIVE VOCATIONAL COURSE HOURS (**)		-	-		7	-
TOTAL ELECTIVE COURSE HOURS (**)		2	-	9		-
GUIDANCE AND ORIENTATION		-	1	1		1
TOTAL COURSE HOURS		43	43	43		43

NOTES:(*) Courses which cannot be regarded as achieved with the year-end grade point average according to the Regulation on Secondary Education Institutions of the Ministry of National Education

(**) Explanations related to elective vocational courses and elective courses are given in the Implementation Principles of the Curriculum Framework.

5.5. IMPLEMENTATION PRINCIPLES OF THE CURRICULUM FRAMEWORK

1. The program has been designed as 4 years. Weekly course schedule includes common courses, vocational courses, elective courses, elective vocational courses and academic support courses.
2. The courses that comprise basic vocational skills of the field are involved in the 9th grade whereas the courses that comprise vocational skills of the branch are involved in the 10th and 11th grades. At 12th grade, academic support courses are implemented for Anatolian Technical Program whereas on-site vocational training and elective vocational courses are implemented in Anatolian Vocational Program.
3. Branch education is carried on by considering regional and sectoral needs, school equipment, and the teachers available at school, physical capacity of the school and interest and needs of the students.
4. The students selected with central exam score graduate from Anatolian Technical Program by completing academic support courses or depending upon their preferences they graduate from Anatolian Vocational Program on completing elective vocational courses and also on-site vocational training courses at 12th grade.
5. The students who are selected in Anatolian Vocational Program according to their field of secondary education can apply to Anatolian Technical Program in case of having the necessary qualifications in accordance with the relevant legislation.
6. Branch courses in 11th grade will be held at school in case there are no workplaces that are convenient education units for the practice in accordance with the relevant legislation.
7. The students at Anatolian Vocational Program will continue on-site vocational training along with the elective vocational courses in 12th grade.
8. The students at Anatolian Technical Program will select one of the course tables which encompass the academic support courses at 12th grade. The courses included in the tables are based on the rules/decisions published in the Journal of Announcements of Board of Education and the secondary education curriculums in practice.
9. Vocational courses are planned consecutively within the bounds of possibility or without destroying the integrity of the course hours indicated on the weekly course schedule.
10. Vocational courses indicated with (*) sign are compulsory courses to be achieved for the field and branch. These courses will not be regarded as successful with year-end grade point average in accordance with the Ministry of National Education, Regulation on Secondary Education Institutions.
11. The elective courses at 9th grade will be selected from the vocational courses table in compliance with the decisions published in Journal of Announcements of Board of Education.
12. The total of elective courses and elective vocational courses has been planned as 9 course hours at 11th grade. These courses will be selected from the elective courses table, the elective vocational courses table, field/branch vocational courses or other field/branch

vocational courses in the direction of the decisions published in Journal of Announcements of Board of Education.

13. Anatolian vocational program students will select 7 lesson hours from the table of elective vocational courses in the curriculum framework in the 12th grade.
14. It is possible to get more than one certificate on field and branch by attending elective vocational courses.
15. Learning unit durations that belong to the course in course information forms are determined by the group teachers' board without changing the duration of course hours indicated in the weekly course schedule of vocational courses.
16. Course information forms will be referred with curriculum framework taken as a basis while education and training about vocational courses are planned.
 - a. So as to achieve the outcomes of vocational courses in the curriculum framework, subjects (content) in the course information forms, outcome explanations and application activities / practices will be referred.
 - b. Application activities / practices in the course information forms are selected by the vocational field group teachers' board so as to practise the utmost implementation activities by taking the physical capacity and equipment of the school, number of students into consideration in accordance with the learning outcome. In addition, different application activities / practices can be performed.
17. The content of the on-site vocational course is prepared by the group teachers' board considering the learning outcome including all knowledge and skill necessary for each branch and requiring mainly the performing and practicing of work, project, experiment and services.
18. Internship is applied in order to ensure the students develop their vocational knowledge, skill, attitude and behaviour, comply with the production and service environment and working life by being acquainted with the facilities and instruments that are not available at school. The content of the internship program is prepared by the group teachers' board so as to provide the implementation of practicing, work, project, experiment or service by grounding on the outcomes of relevant grade/grades.
19. Occupational health and safety measurements should be taken while applying the course and learning unit outcomes. The measurements that need to be taken in accordance with the occupational health and safety legislation stated in the reference documents are included by taking the features of the fields and branches in course information forms into account. Accordingly, occupational health and safety issues within the course information forms and the curriculum framework are negotiated at group teachers' board in order to raise individuals who make necessary skills and information related to occupational health and safety a habit.

5.6. COMPULSORY (*) VOCATIONAL COURSES TABLE

Branches	Grade	Anatolian Vocational Program	Anatolian Technical Program
Mining	9	Introduction to Mining	Introduction to Mining
	10	Underground Mining Operations	Underground Mining Operations
	11	Surface Mining Operations	Surface Mining Operations
	12	On-Site Vocational Training	-

6. COURSES

6.1. COMMON COURSES

Common courses are the courses that each student takes until they graduate from secondary education, which provide a minimum common general culture, aim to ensure awareness and power about being sensitive towards social problems, contribute to the economic, social and cultural development of the country, and prepare the students for higher education programs.

In the common courses in the weekly course schedule, the courses, course hours and programs determined by the Board of Education are applied.

6.2. VOCATIONAL COURSES

Vocational courses are the courses that orient the students to the higher education programs and / or the occupation and working areas that they aim and enable them to develop in this direction.

9TH GRADE VOCATIONAL COURSES AND OUTCOMES

GENERAL GEOLOGY COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about the structure of the earth's crust, magma and rocks, motions of the Earth's crust, minerals, petrography and the formation of energy raw materials.

Grade : 9

Weekly Course Hours : 2

Learning Unit	Structure of the Earth's Crust
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to explain geological times and properties of rocks. Students will be able to explain the tectonic movements and the structure formed as a result of tectonism. Students will be able to explain the external forces and the effects of the structures formed. Students will be able to explain the hydrogeology and the effects of hydrogeology.
Learning Unit	Magma and Rocks Formed by Magma
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to explain the physical and chemical properties of magma. Students will be able to explain the properties and formation of plutonism, volcanism, and metamorphism. Students will be able to explain the periods of geological times and

	their role in rock formation.
Learning Unit	Motions of the Earth's Crust
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the types and effects of earthquakes. 2. Students will be able to explain the epeirogenic and orogenic movements.
Learning Unit	Mineralogy
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the genus and types of minerals. 2. Students will be able to explain the principal elements of the rocks.
Learning Unit	Petrography
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain rock analysis methods. 2. Students will be able to explain the formation and petrographic properties of metallic minerals. 3. Students will be able to explain the sources and properties of industrial raw materials.
Learning Unit	Formation of Energy Raw Materials
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the formation and types of fossil fuels. 2. Students will be able to explain geothermal energy sources and uses. 3. Students will be able to explain the sources of radioactive raw materials and protection measures against radioactive effects.
Learning Unit	Physical and Chemical Properties of Petroleum and Natural Gas
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain petroleum and natural gas. 2. Students will be able to explain the physical and chemical properties of petroleum and natural gas. 3. Students will be able to explain the formation process of petroleum and natural gas.
Learning Unit	The Petroleum System and Its Basic Components
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain a petroleum system. 2. Students will be able to explain the mechanism of petroleum formation and the species-migration relationship. 3. Students will be able to explain the source rock, reservoir, cap rock and their types.
Learning Unit	Petroleum Basins and Basin Types
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain petroleum basins, basin types and basin formation mechanisms. 2. Students will be able to explain the petroleum formation mechanism and basin relationship. 3. Students will be able to explain the distribution and types of petroleum basins around the world.
Learning Unit	Petroleum Traps and Their Types
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the petroleum trap and the mechanism of the trap formation. 2. Students will be able to explain the types of petroleum traps. 3. Students will be able to explain the types of petroleum in our country and the regions where they are located by type.
Learning Unit	Petroleum Exploration Methods and Other Types of Petroleum
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the methods of petroleum exploration. 2. Students will be able to explain the sorting of petroleum exploration methods.

	3. Students will be able to explain gas hydrates, oil-shale, tar-sand and list where they can be found in our country.
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MACHINE COMPONENTS AND MINING MACHINERY COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about using machine connection and motion transmission elements and explaining the machines used in underground and surface mining under occupational health and safety measures.

Grade : 9

Weekly Course Hours : 2

Learning Unit	Connectors
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to connect the machine parts with screws, bolts, threaded rod and nuts under occupational health and safety measures. 2. Students will be able to connect the machine parts with pins, pivot pins, wedges and segments from the safe connection elements under occupational health and safety measures. 3. Students will be able to connect the machine parts with rivets and welding under occupational health and safety measures.
Learning Unit	Motion Transmission Elements
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to assemble the machine parts using shaft and journal under occupational health and safety precautions. 2. Students will be able to explain the types of sliding and rolling bearings and their fields of use. 3. Students will be able to explain the types of fixed, sliding, movable and flexible clutches and their uses. 4. Students will be able to conduct the motion transfer operations with cams, pulleys and belts used on benches under occupational health and safety measures. 5. Students will be able to explain the types of gear wheels and their uses.
Learning Unit	Underground Mining Machines
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the characteristics and working principles of underground excavation and loading machines under occupational health and safety measures. 2. Students will be able to explain the characteristics and working principles of underground loading machines under occupational health and safety measures. 3. Students will be able to explain the characteristics and working principles of underground transportation machines under occupational health and safety measures. 4. Students will be able to explain the working principles of wells, cranes, cableways and other machinery and auxiliary equipment used in underground mines under occupational health and safety measures. 5. Students will be able to explain the characteristics and working principles of underground drilling machines under occupational health and safety measures.
Learning Unit	Surface Mining Machines
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the surface drilling process and the features and working principles of drilling machines under occupational health and safety measures. 2. Students will be able to explain the characteristics and working principles of surface drilling and filling machines under occupational

	<p>health and safety measures.</p> <ol style="list-style-type: none"> 3. Students will be able to explain the characteristics and working principles of surface excavation and loading machines under occupational health and safety measures. 4. Students will be able to explain the characteristics and working principles of surface crushing and conveying machines under occupational health and safety measures. 5. Students will be able to explain the characteristics and working principles of marble cutting machines in surface mines under occupational health and safety measures.
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TECHNICAL DRAWING COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about creating geometric drawings, extracting view and dimensioning / using surface symbols, production and perspective drawing.

Grade : 9

Weekly Course Hours : 3

Learning Unit	Geometric Drawings
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to write Italic and Roman standard writing in accordance with the technical drawing rules (TS EN ISO Standards). 2. Students will be able to perform line studies with free hand and drawing sets. 3. Students will be able to draw geometric shapes in accordance with technical drawing rules.
Learning Unit	Extracting View
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to draw views of various workpieces with free hand and drawing sets. 2. Students will be able to draw cross-sectional views of various workpieces with free hand and drawing tools.
Learning Unit	Dimensioning and Surface Operations
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to do the dimensioning of the workpieces they draw. 2. Students will be able to show the surface roughness values of the workpieces they draw on the picture by using the appropriate symbols. 3. Students will be able to show the tolerance values of the workpieces they draw on the picture by using the appropriate symbols.
Learning Unit	Sketch, Perspective and Production Drawing
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to draw sketch pictures of various workpieces on standard drawing papers. 2. Students will be able to draw perspective pictures of various workpieces on standard drawing papers. 3. Students will be able to draw production pictures of various workpieces on standard drawing papers.

INTRODUCTION TO MINING COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about the occupational health and safety measures in mines, the concept of mining, boron and

other types of minerals, mineral exploration methods, the economic and geopolitical importance of mineral resources in our country.

Grade : 9

Weekly Course Hours : 2

Learning Unit	Basic Mining Concepts
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the basic terms of general mining used in mining technology. 2. Students will be able to explain the types of minerals and mineral resources, mineral production methods and the economic and geopolitical importance of the mineral resources in our country in the world.
Learning Unit	Types of Minerals
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the formation of the coal mineral and the production of coal by various methods under occupational health and safety measures. 2. Students will be able to explain the formation of the marble mineral and marble production by various methods under occupational health and safety measures. 3. Students will be able to explain the formation of the chrome, copper, zinc-lead, iron and production of these minerals by various methods under occupational health and safety measures.
Learning Unit	Bor (Boron) Mineral
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the formation, production and enrichment methods of boron mineral under occupational health and safety measures. 2. Students will be able to explain the importance of boron mine for our country and the world and the products obtained from boron mineral under occupational health and safety measures.
Learning Unit	Mineral Exploration Methods
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the method of exploration by drilling under occupational health and safety measures. 2. Students will be able to explain the search method with remote sensing under occupational health and safety measures. 3. Students will be able to explain the classical search method under occupational health and safety measures. 4. Students will be able to explain geophysical-goelectric and geomagnetic exploration methods under occupational health and safety measures.

10TH - 11TH GRADE VOCATIONAL COURSES AND OUTCOMES

MINING BRANCH

BASIC MECHANICAL OPERATIONS COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about performing basic mechanical operations under occupational health and safety measures.

Grade : 10

Weekly Course Hours :3

Learning Unit	Measurement and Control
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to measure the length with measurement control tools suitable for the piece whose length is to be measured. 2. Students will be able to measure the diameters of various pieces with measuring instruments. 3. Students will be able to make surface and angle checks of the parts.
Learning Unit	Marking
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to make the material surfaces ready for marking by mechanical cleaning methods. 2. Students will be able to do the production drawing on the piece with the marking tools.
Learning Unit	Straightening
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to straighten disfigured shapes. 2. Students will be able to straighten disfigured sheets and check their smoothness.
Learning Unit	Machining
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to do machining on metal materials with a hand saw and hand cutter. 2. Students will be able to do chipless machining on metal materials with hand shears and lever shears.
Learning Unit	Filing
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to chip off metal material surfaces with the file and get a smooth surface. 2. Students will be able to chip off metal material surfaces with the file and obtain an inner and outer cylindrical surface.
Learning Unit	Bending-Twisting
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to bend and twist the metal materials with cold forming hand tools. 2. Students will be able to bend and twist the metal materials with cold forming machines.
Learning Unit	Drilling-Countersinking
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to drill on the drilling stands. 2. Students will be able to countersink holes drilled in the drilling stands. 3. Students will be able to sharpen broken or dull drills.
Learning Unit	Threading
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to thread the holes with a tap. 2. Students will be able to thread a shaft with a die.
Learning Unit	Soldering
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to heat the metal materials with a soldering iron and do soft soldering. 2. Students will be able to heat the metal materials with an oxy-gas flame and do brazing.

UNDERGROUND MINING OPERATIONS COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about the underground mining under occupational health and safety measures, national and international standards and relevant legislation, with relevant methods and tools.

Grade : 10

Weekly Course Hours : 6

Learning Unit	Preparation Operations (Gallery / Tunnel / Well Drilling)
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the drilling process in the underground mining under occupational health and safety measures, with the appropriate method, equipment. 2. Students will be able to explain the blasting process in the underground mining under occupational health and safety measures, with the appropriate method, equipment. 3. Students will be able to explain the connection support process in the underground mining under occupational health and safety measures, with the appropriate method, equipment. 4. Students will be able to explain the preparations in vein in the underground mining under occupational health and safety measures, with the appropriate method, equipment.
Learning Unit	Opening a Gallery with a Gallery Opening Machine
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the control procedures of the underground working area under the occupational health and safety measures, with the appropriate method and equipment. 2. Students will be able to explain the control procedures of underground machinery and equipment under the occupational health and safety measures, with the appropriate method, equipment. 3. Students will be able to explain the underground excavation procedures with the appropriate method and equipment under occupational health and safety measures. 4. Students will be able to explain the periodic control procedures of the underground gallery opening machine under occupational health and safety measures, with the appropriate method, equipment.
Learning Unit	Ventilation Operations
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the control procedures of the ventilation system in the underground mining under occupational health and safety measures, with the appropriate method, equipment. 2. Students will be able to explain the control processes of gas and dust measurements in the working environment in the underground under occupational health and safety measures, with the appropriate method, equipment.
Learning Unit	Production Operations
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the production methods used in the underground mining under occupational health and safety measures, with the appropriate method, equipment. 2. Students will be able to explain the production processes in the underground mining under occupational health and safety measures, with the appropriate method, equipment.
Learning Unit	Drainage and Transportation
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the drainage process in the underground mining under occupational health and safety measures, with the appropriate method, equipment. 2. Students will be able to explain the transportation process in the underground mining under occupational health and safety measures, with the appropriate method, equipment.

	3. Students will be able to explain the transportation process with monorail and rack track rail in the underground mining under occupational health and safety measures, with the appropriate method, equipment.
Learning Unit	Transportation in Wells and Galleries
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the transportation process from vertical wells under the ground with the appropriate method and equipment under occupational health and safety precautions. 2. Students will be able to explain the transportation process from underground inclined wells (cableway, inclined shaft) with appropriate method and equipment under occupational health and safety measures.
Learning Unit	Support Operations
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the type of support according to the production method in the underground mine with the appropriate method and equipment, taking occupational health and safety measures. 2. Students will be able to explain the support process in the main galleries and wells underground by taking the occupational health and safety precautions with appropriate methods and equipment. 3. Students will be able to explain the support process in the underground vein with the appropriate method and equipment by taking occupational health and safety measures.
Learning Unit	Repair / Scanning Operations
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the repair procedures in underground inclined shafts, main galleries and wells with appropriate methods and equipment under occupational health and safety measures. 2. Students will be able to explain the scanning procedures in the underground mine with the appropriate method and equipment under occupational health and safety measures.
Learning Unit	Mechanization Operations
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the assembly and disassembly of the machines used underground with the appropriate method, tools and equipment under occupational health and safety precautions. 2. Students will be able to explain the maintenance and repair procedures in underground mining with the appropriate method, tools and equipment under occupational health and safety measures.

MINING TOPOGRAPHY COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about the topographic measurement, calculation and drawing under occupational health and safety measures.

Grade : 10

Weekly Course Hours : 3

Learning Unit	Topographic Measurements
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to make preparations for topographic measurement under occupational health and safety measures. 2. Students will be able to measure heights (levelling) under occupational health and safety measures. 3. Students will be able to measure optical distance (tachometer) and

	angle under occupational health and safety measures.
Learning Unit	Topographic Measurement, Calculations and Drawing
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to make underground measurement and calculation and create a map under occupational health and safety measures. 2. Students will be able to make surface measurement and calculation and create a map under occupational health and safety measures. 3. Students will be able to map the areas that are measured with the drawing program under occupational health and safety measures.

COMPUTER AIDED DRAWING COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about making two-dimensional drawings with the drawing program, using the feature and definition commands, creating a drawing library and drawing perspective in accordance with TS EN ISO Standards, occupational health and safety and technical drawing rules.

Grade : 10

Weekly Course Hours : 2

Learning Unit	Two Dimensional Drawing
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to make pre-drawing settings in the CAD program. 2. Students will be able to create a drawing page in a CAD program. 3. Students will be able to use two-dimensional drawing commands. 4. Students will be able to use drawing editing commands. 5. Students will be able to use image control commands.
Learning Unit	Feature and Description
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to add text to images. 2. Students will be able to size the images. 3. Students will be able to use feature and inquiry commands. 4. Students will be able to manage layers, colours and lines.
Learning Unit	Perspective Drawing and Library
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to create a drawing library. 2. Students will be able to draw isometric perspectives. 3. Students will be able to print out the drawings.

SURFACE MINING OPERATIONS COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about surface mining under occupational health and safety measures, according to national, international standards and appropriate legislation, with the correct method, tools and equipment.

Grade : 11

Weekly Course Hours :6

Learning Unit	Drilling in Open Cast
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the process of marking the points to be drilled in the open cast with the appropriate method and equipment and under occupational health and safety measures. 2. Students will be able to explain the process of setting up the drilling machine in the open cast, using the appropriate method and

	<p>equipment and under occupational health and safety measures.</p> <p>3. Students will be able to explain the drilling process in the open cast with the appropriate method and equipment and under occupational health and safety measures.</p>
Learning Unit	Blasting in Open Cast
Learning Outcomes	<p>1. Students will be able to explain the preparation process for open cast explosion with the appropriate method and equipment and under occupational health and safety measures.</p> <p>2. Students will be able to explain the blasting process in the open cast with the appropriate method and equipment and under occupational health and safety measures.</p>
Learning Unit	Excavation / Loading / Transportation in Open Cast
Learning Outcomes	<p>1. Students will be able to explain the excavation and loading process in the open cast with the appropriate method, equipment and under occupational health and safety measures.</p> <p>2. Students will be able to explain the transportation and unloading process in the open cast with the appropriate method, equipment and under occupational health and safety measures.</p>
Learning Unit	Drainage in Open Cast
Learning Outcomes	<p>1. Students will be able to explain the process of setting up a water pump in the open cast with the appropriate method and equipment under occupational health and safety measures.</p> <p>2. Students will be able to explain the process of discharging the water from the open cast with the appropriate method and equipment under occupational health and safety measures.</p>
Learning Unit	Supply, Maintenance and Repair in Open Cast
Learning Outcomes	<p>1. Students will be able to explain the process of bringing the consumables used in the open cast to the work area with the appropriate method and equipment under occupational health and safety measures.</p> <p>2. Students will be able to explain the maintenance and repair processes of the tools and machines used in the open cast under occupational health and safety measures.</p>

DRILLING COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about drilling under occupational health and safety measures, according to national, international standards and appropriate legislation, with the correct method, tools and equipment.

Grade : 11

Weekly Course Hours :3

Learning Unit	Drilling Machinery and Equipment
Learning Outcomes	<p>1. Students will be able to explain drilling machines and main components under occupational health and safety measures.</p> <p>2. Students will be able to explain the units and standards used in drilling under occupational health and safety measures.</p> <p>3. Students will be able to explain the drilling tool strings, drills and casing pipes under occupational health and safety precautions.</p> <p>4. Students will be able to explain the basic drilling parameters under occupational health and safety measures.</p>
Learning Unit	Drilling Mud and Pumps

Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the drilling mud and its types under occupational health and safety measures. 2. Students will be able to explain basic pressure and flow calculations under occupational health and safety measures. 3. Students will be able to explain the drilling pump and its types under occupational health and safety measures. 4. Students will be able to explain basic drilling hydraulic calculations under occupational health and safety measures.
Learning Unit	Drilling Techniques
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the core drilling technique under occupational health and safety measures. 2. Students will be able to explain the rotary drilling technique under occupational health and safety measures. 3. Students will be able to explain the air / foam drilling technique under occupational health and safety measures.
Learning Unit	Drilling Rescue, Cementing
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the well problems and rescue operations in drilling under occupational health and safety measures. 2. Students will be able to explain oil-geothermal-gas drillings under occupational health and safety measures. 3. Students will be able to explain the cementing operations under occupational health and safety measures. 4. Students will be able to explain well control under occupational health and safety measures.

HYDRAULIC AND PNEUMATIC COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about recognizing hydraulic and pneumatic system elements, making the necessary calculations, recognizing their symbols and drawing a system diagram under occupational health and safety measures.

Grade : 11

Weekly Course Hours : 2

Learning Unit	Hydraulic Principles
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to make calculations about mass, force and pressure. 2. Students will be able to make calculations about hydrostatics. 3. Students will be able to make calculations about hydrodynamics. 4. Students will be able to select suitable hydraulic oil in hydraulic systems. 5. Students will be able to select and use hydraulic symbols. 6. Students will be able to draw a simple hydraulic circuit.
Learning Unit	Hydraulic Systems
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to select the hydraulic tank and equipment. 2. Students will be able to select the hydraulic filter and equipment. 3. Students will be able to select the hydraulic pumps and do the related calculations. 4. Students will be able to select the hydraulic motors and do the related calculations. 5. Students will be able to select the hydraulic valves. 6. Students will be able to select the hydraulic cylinders and do the related calculations.

	<ol style="list-style-type: none"> 7. Students will be able to select the hydraulic pipes, hoses and fittings and do the related calculations. 8. Students will be able to select and maintain the hydraulic accumulators.
Learning Unit	Pneumatic Systems
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to check and calculate the circuit elements used in the preparation of air. 2. Students will be able to select the pneumatic cylinders and do the related calculations. 3. Students will be able to select the pneumatic motors and do the related calculations. 4. Students will be able to select the pneumatic valves. 5. Students will be able to draw a pneumatic circuit. 6. Students will be able to maintain the pneumatic circuits.

BASIC ELECTRICITY COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about preparing conductors for connection, connecting the conductors, setting up simple electrical circuits, making phase control and changing the direction of motor rotation under occupational health and safety measures.

Grade : 11

Weekly Course Hours : 2

Learning Unit	Preparing Conductors for Connection
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to cut the conductors. 2. Students will be able to peel the insulator on the conductor. 3. Students will be able to bend the conductors.
Learning Unit	Adding and Connecting Conductors
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to make a single straight joint. 2. Students will be able to make a double straight joint. 3. Students will be able to make a connection with the terminal. 4. Students will be able to connect the conductors to the terminal. 5. Students will be able to connect a grounded plug and cable to the socket.
Learning Unit	Establishing Electrical Circuit and Phase Control
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to set up a simple electrical circuit and run it. 2. Students will be able to make a simple phase (energy) check. 3. Students will be able to change the direction of engine rotation with simple intervention.

ORE ENRICHMENT COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about the ore enrichment procedures under occupational health and safety measures, according to national, international standards and appropriate legislation, with the correct method, tools and equipment.

Grade : 11

Weekly Course Hours : 4

Learning Unit	Sampling
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the sampling process from the selected points with the appropriate method and equipment under occupational health and safety measures. 2. Students will be able to explain the sample analysis process with the appropriate tool, method and equipment under occupational health and safety measures.
Learning Unit	Crushing / Screening / Classification
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the process of crushing various materials with the appropriate method and equipment under occupational health and safety precautions. 2. Students will be able to explain the screening process of various materials with the appropriate method and equipment under occupational health and safety precautions. 3. Students will be able to explain the stocking process of various materials with the appropriate method and equipment under occupational health and safety measures.
Learning Unit	Enrichment Operations
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the process of ore enrichment with the appropriate method and equipment under occupational health and safety measures. 2. Students will be able to explain the sampling and stocking processes after ore enrichment with the appropriate method and equipment under occupational health and safety measures.
Learning Unit	Packaging, Loading and Transportation
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the product packaging process with the appropriate method and equipment under occupational health and safety measures. 2. Students will be able to explain the product loading and transportation procedures with the appropriate method and equipment under occupational health and safety measures.

6.3. ON-SITE VOCATIONAL TRAINING

Students carry out on-site vocational training in the enterprises which operate on the branch that students are educated in accordance with Regulation on Secondary Education Institutions of the Ministry of National Education. The course content of on-site vocational training is determined by the coordinator teachers, field teachers in the school and the authorities of the enterprise, taking into account the regional needs and the vocational area in which the enterprise operates. The students of the program types which do not involve on-site vocational training attend job trainings in accordance with the related legislation.

6.4. ACADEMIC SUPPORT COURSES

The courses within the scope of academic support in the 12th grade of Anatolian Technical Program are courses that allow students to progress in line with their target higher education programs.

6.5. ELECTIVE VOCATIONAL COURSES

Elective Vocational Courses are courses that enable students to develop themselves in various programs in accordance with their interests and desires, and to improve their personal abilities

in the field they aim and tend to. Elective vocational courses make up an occupation or an important part of an occupation.

For this reason, elective vocational courses should be chosen by paying attention to the prerequisite learnings and the connections between the courses in accordance with the principle of horizontal and vertical coherence of their acquisitions.

6.5.1. CERTIFICATE COURSES TABLE

Branch	Certificate	Courses	Course Hours
All Field Branches	Digital Skills	Programming	3
		Digital Design	2
		Social Media	2

6.5.2. ELECTIVE VOCATIONAL COURSES TABLE

Course	Grade	Course Hours
Marble Manufacturing Techniques	11-12	5
Marble Working Drawing Course	11-12	2
Marble Plate Manufacturing	11-12	3
Material Knowledge	11-12	2
Mechanical Operations	11-12	2
Programming	11-12	3
Digital Design	11-12	2
Social Media	11-12	2

MARBLE MANUFACTURING TECHNIQUES COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about manufacturing of marble products with cutting and processing machines in accordance with all kinds of projects under occupational health and safety measures.

Grade : 12

Weekly Course Hours : 5

Learning Unit	Measuring for Production
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to take the appropriate size for the product to be manufactured and draw its sketch picture. Students will be able to prepare the polishing machine for production under occupational health and safety measures.
Learning Unit	Marble Polishing
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to remove the roughness of the marble plate before the polishing stage under occupational health and safety

	<p>measures.</p> <ol style="list-style-type: none"> Students will be able to polish the marble slabs and check the quality of the polish under occupational health and safety measures.
Learning Unit	Cutting with Circular Saws
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to cut the marble in side cutting machines and miter saw machines under occupational health and safety measures. Students will be able to create a profile on the marble slabs in the side cutting machine and milling machine according to the manufacturing picture under occupational health and safety measures.
Learning Unit	Basic Marble Turning
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to prepare the marble lathe machine for production under occupational health and safety measures. Students will be able to turn the marble cylindrically in accordance with the drawing under occupational health and safety measures.
Learning Unit	Marble Profile Turning
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to drill holes in all kinds of natural stones on a marble lathe machine and enlarge it in preparation for profile turning under occupational health and safety measures. Students will be able to perform profile turning the marble according to the drawing under occupational health and safety measures.
Learning Unit	CNC Marble Turning
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to perform CNC programming on all kinds of natural stones on the marble CNC lathe machine under occupational health and safety measures. Students will be able to perform profile turning on CNC lathe machine to match the marble drawing under occupational health and safety measures.
Learning Unit	Marble Processing in CNC Milling
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to perform programming on the marble CNC vertical processing machine under occupational health and safety measures. Students will be able to process the marble according to the drawing on a CNC vertical processing machine under occupational health and safety measures.
Learning Unit	Marble Bonding
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to prepare the glue and additives under occupational health and safety measures. Students will be able to bond the marble with various adhesives under occupational health and safety measures.
Learning Unit	Marble Carving / Relief
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to draw the pattern on the marble under occupational health and safety measures. Students will be able to perform carving and relief on the marble under occupational health and safety measures.
Learning Unit	Marble Coating
Learning Outcomes	<ol style="list-style-type: none"> Students will be able to prepare coating and assembly elements for mechanical coating and apply it under occupational health and safety measures. Students will be able to perform mortar facade coating under occupational health and safety measures.

MARBLE WORKING DRAWING COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about interior project drawings with a computer in accordance with TS EN ISO DIN Standards, technical drawing rules and architectural and interior design project regulations and under occupational health and safety measures.

Grade : 12

Weekly Course Hours : 2

Learning Unit	Drawing Interior Elements with Computer
Learning Outcomes	<ol style="list-style-type: none">1. Students will be able to draw the interior fireplace with the relevant commands in a CAD program.2. Students will be able to draw the interior furniture with the relevant commands in the CAD program.3. Students will be able to draw the interior lighting fixtures with relevant commands in CAD program.4. Students will be able to draw the interior elements of a wet place with various commands in the CAD program.5. Students will be able to draw the interior heating and cooling elements with various commands in the CAD program.
Learning Unit	Bathroom and Kitchen Design
Learning Outcomes	<ol style="list-style-type: none">1. Students will be able to draw the front views using the bathroom and kitchen layout plan in accordance with the technical drawing and CAD drawing technique.2. Students will be able to design bathroom items in accordance with technical drawing and CAD drawing technique.3. Students will be able to design kitchenware in accordance with the technical drawing and CAD drawing technique.
Learning Unit	Bathroom and Kitchen Modelling
Learning Outcomes	<ol style="list-style-type: none">1. Students will be able to draw by using three dimensional solid model drawing and editing commands in CAD program.2. Students will be able to draw by using surface model drawing and editing commands in CAD program.3. Students will be able to convert data between CAD / CAM programs.

MARBLE PLATE MANUFACTURING COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about cutting slabs from all kinds of marble blocks, polishing, sizing, quality control, colour selection and packaging under occupational health and safety measures.

Grade : 11

Weekly Course Hours : 3

Learning Unit	Preparation for Cutting Marble Slabs
Learning Outcomes	<ol style="list-style-type: none">1. Students will be able to do the regular maintenance of marble machines under occupational health and safety measures.2. Students will be able to clean and maintain treatment facilities under occupational health and safety measures.3. Students will be able to reuse the leftover marbles under occupational health and safety measures.

Learning Unit	S / T Marble Slab Cutting
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to make block marble cutting preparation under occupational health and safety measures. 2. Students will be able to cut the block with a circular saw (ST) under occupational health and safety measures.
Learning Unit	Marble Slab Cutting with Gangsaw
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to prepare for cutting with the gangsaw under occupational health and safety measures. 2. Students will be able to cut the block with the gangsaw under occupational health and safety precautions.
Learning Unit	Marble Slab Polishing and Filling
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to prepare the caliber polishing machine under occupational health and safety measures. 2. Students will be able to polish the slabs and tiles with the caliber polishing machine under occupational health and safety measures. 3. Students will be able to fill the hollow slabs using the filling machine under occupational health and safety precautions.
Learning Unit	Slab / Tile Quality Control and Colour Selection
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to prepare for marble tile and slab quality control under occupational health and safety precautions. 2. Students will be able to perform marble tile and slab quality control and colour selection under occupational health and safety precautions.

MATERIAL KNOWLEDGE COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about the material science, iron production, steel production, heat treatment of steels, corrosion, non-ferrous materials, material inspection methods and powder metallurgy according to TS EN ISO Standards and under occupational health and safety measures.

Grade : 11-12

Weekly Course Hours : 2

Learning Unit	Material Science
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to define and classify the material. 2. Students will be able to select the material that fits the design. 3. Students will be able to define alloys and explain how to make alloys. 4. Students will be able to explain allotropy-phase transformations and draw equilibrium diagrams.
Learning Unit	Iron Production
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the crude iron production. 2. Students will be able to explain cast iron production.
Learning Unit	Steel Production
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the methods of steel production. 2. Students will be able to make the classification of the steels. 3. Students will be able to explain the effects of additives in steel and steel standards.
Learning Unit	Heat Treatment of Steels

Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the goals of heat treatment. 2. Students will be able to explain the annealing process in steels. 3. Students will be able to explain the hardening process in steels. 4. Students will be able to explain the surface hardening processes.
Learning Unit	Corrosion
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the types of corrosion. 2. Students will be able to explain the methods of corrosion protection.
Learning Unit	Non-Ferrous Materials
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain non-ferrous metals. 2. Students will be able to explain plastic materials. 3. Students will be able to explain composite materials.
Learning Unit	Material Inspection Methods
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain simple experiments to the materials in the workshop. 2. Students will be able to explain the technological experiments applied to materials. 3. Students will be able to explain the mechanical tests applied to materials. 4. Students will be able to explain non-destructive material inspection methods.
Learning Unit	Powder Metallurgy
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the powder production methods. 2. Students will be able to explain the powder shaping methods. 3. Students will be able to explain the sintering concepts. 4. Students will be able to give information about the free form production system. 5. Students will be able to give information about finishing processes.

MECHANICAL OPERATIONS COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about welding, drilling and threading under occupational health and safety measures and in accordance with TSE Standards.

Grade : 11-12

Weekly Course Hours : 2

Learning Unit	Welding
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to join simple parts by arc welding. 2. Students will be able to cut with oxy acetylene welding.
Learning Unit	Drilling and Threading
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to drill holes in the specified diameter on the drill stand. 2. Students will be able to thread the designated place with tap. 3. Students will be able to thread the designated place with die.

PROGRAMMING COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about the basic algorithms, visual block programming, programming devices that can form a communication network and game programming.

Grade : 11-12

Weekly Course Hours : 3

Learning Unit	Block-Based Programming
Learning Outcomes	<ol style="list-style-type: none">1. Students will be able to describe the functions of a program presented in a block-based programming tool.2. Students will be able to plan basic algorithms using appropriate techniques in block-based programming tools.3. Students will be able to debug a program presented in a block-based programming tool.4. Students will be able to arrange a program presented in the block-based programming tool by developing it according to the given criteria.5. Students will be able to select the most suitable decision structures to adapt an algorithm.6. Students will be able to create an original project that includes all programming structures.
Learning Unit	Internet of Things
Learning Outcomes	<ol style="list-style-type: none">1. Students will be able to explain the functions of circuit elements.2. Students will be able to perform applications with block-based programming tools.3. Students will be able to write a program for the internet of things with the programming language.4. Students will be able to use software language on microcontroller board hardware.5. Students will be able to design a system using a simulation tool (Packet Tracer).
Learning Unit	Game Programming
Learning Outcomes	<ol style="list-style-type: none">1. Students will be able to perform basic coding and user interaction processes.2. Students will be able to arrange the character and environment.3. Students will be able to perform animation and simulation processes.4. Students will be able to publish the created game after testing.

DIGITAL DESIGN COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about drawing in accordance with technical drawing rules, printing the designs prepared by making three-dimensional designs on the computer, creating and managing a website using ready-made web contents, preparing animations under occupational health and safety measures.

Grade : 11-12

Weekly Course Hours : 2

Learning Unit	Digital Design
Learning Outcomes	<ol style="list-style-type: none">1. Students will be able to use tools to help design.2. Students will be able to add shape to the working plane.3. Students will be able to create new shapes by grouping shapes.4. Students will be able to create a new shape by subtracting another shape from one shape.5. Students will be able to create original shapes using import.6. Students will be able to export their design for other applications or

	3d printing.
Learning Unit	Ready Web Page
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to install the content management software and plug-in. 2. Students will be able to adjust the settings related to the website in the administration panel. 3. Students will be able to perform content and category operations. 4. Students will be able to perform the menu and page operations.
Learning Unit	Making Animation
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to adapt the working screen to themselves. 2. Students will be able to add standard shapes to the working plane. 3. Students will be able to perform operations on objects with design tools. 4. Students will be able to change the parametric properties of the inserted shape. 5. Students will be able to improve added shapes using modification tools. 6. Students will be able to add texture to designed objects using the Material Editor. 7. Students will be able to add a camera to the project to be used in animation. 8. Students will be able to develop animations using keyframes. 9. Students will be able to render the project. 10. Students will be able to explain the rendering tools used as plug-ins.

SOCIAL MEDIA COURSE

Course Objectives : In this course, it is aimed to provide the students with the knowledge and skills about collecting news messages from the media, collecting news about an institution and conducting a public relations campaign, e-commerce applications, data analysis and graphics.

Grade : 11-12

Weekly Course Hours : 2

Learning Unit	E-Commerce
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the basic concepts of e-commerce. 2. Students will be able to explain the types of e-commerce. 3. Students will be able to list the marketing stages in e-commerce. 4. Students will be able to explain the technical infrastructure and security elements required for e-commerce. 5. Students will be able to follow the legal regulations related to e-commerce.
Learning Unit	Social Media
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to share things in accordance with ethical rules and within the scope of basic rights and freedoms while using social media. 2. Students will be able to use social media taking the responsibilities of legal rules without hiding its identity. 3. Students will be able to protect themselves against cyber violence while using social media. 4. Students will be able to explain the digital brand management and the necessity of digital transformation.

	<ol style="list-style-type: none"> 5. Students will be able to explain the social media tools. 6. Students will be able to create a content plan for social media platforms. 7. Students will be able to do social media analysis and reporting. 8. Students will be able to create crisis communication campaign planning and implementation in social media.
Learning Unit	Data Analysis and Graphics
Learning Outcomes	<ol style="list-style-type: none"> 1. Students will be able to explain the concepts of data and information. 2. Students will be able to explain the types of data and data sources around them. 3. Students will be able to collect data with data collection tools and create a data set. 4. Students will be able to prepare data in the form of tables. 5. Students will be able to recognize the graphic types and make the graphic selection suitable for the purpose. 6. Students will be able to create data-driven graphs using data visualization tools.

6.6. ELECTIVE COURSES

Elective courses that enable students to develop themselves in various programs in accordance with their interests and desires, improve their personal abilities in the field they aim and tend to.

While selecting an elective course, other schedules which belong to the course, if there is any, follow an order and the courses which are required to be taken previously are considered.



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