SMSU1

Samsun University – Kavak Vocational School

Motor Vehicles and Transportation Technologies Department

Heavy Equipment Operator Program Course Contents

I. Semester

Semester									
Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре	
Ti101	Atatürk's Principles and Revolution History-I	2	0	0	2	2	2	Compulsory	
Revolution. New Monarchy Perio Empire. Nationa	Ottoman modernization. European Ottomans, Constitutional Monarch d, Tripoli and Balkan Wars. Cause of Struggle preparatory period. Con I Pact. TBMM Period: Formation of Struggle preparation preparation of Struggle preparation preparat	ny an s of ' gres:	d Un Work s. Siv	ion a d Wa /as C	and Progre r I. World Congress,	ess S Wai the	Society. II. r I: Sharin	. Constitutional g the Ottoman	
Course Code	Course Name	Т	Р	Ĺ	ECTS	С	Hours	Type	
MO101	Maths	3	0	0	4	3	3	Compulsory	
Transactions Related to Numbers. Bibliographers. Rooted Fanciers. Methods of Separation of Factors. Polynomials. Solutions of inequality systems with one and two unknowns of the first order. Absolute Value. Ratio-proportion. Functions and Graphics. Solutions of first order systems of equations with one and two unknowns. Trigonometry.									
Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type	
MO107	Engine Technology	2	1	0	4	3	3	Compulsory	
Internal Combustion Engine History and Technological development. Clasification of ICEs. Technical terms. Thermodynamics properties. Theoretical otto cycle. Theoretical dual cycle. Real otto cycle. Real dual cycle. Engine lubrication systems. Engine cooling systems. Fuel injection systems. Turbochage systems. Engine test and maintenance. Engine maintenance and settings.									
Course Code	Course Name	Т	Р	┙	ECTS	C	Hours	Туре	
MO121	Heavy Equipments-I	2	0	0	3	2	2	Compulsory	
excavator, Whe loader. Attachm	heavy equipment operator. Class el Excavator, Shovel Excavator, Ar ents; Hammers, Grapples, Buckets) umbo machine. Cranes. Mobil cran	nphik . Doz	oious zers.	exca Back	avator. Lo thoe Load	ader	s, wheel	loader crawler	
Course Code	Course Name	Т	Р	L	ECTS	C	Hours	Type	
MO123	Workshop-I	0	3	0	3	2	3	Compulsory	
Maintenance and repair of heavy equipment machinery. Classification of heavy equipment. Mechanical workplace Environment. Occupational safety rules in the workshop. Mechanical Hand Tools. Measurement tools. Mechanical Workshop Machines.									
Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре	
İMO125	Scientific Principles of Technology	3	0	0	4	3	3	Compulsory	
Basic concepts, units and transformations. Scalar and vector quantities. Statics. Kinematics. Dynamics. Work, power and energy. Pressure and fluids. Mechanical and electromagnetic waves. Electricity and magnetism.									
Course Code	Course Name	Т	D	1	ECTS	^	Hours	Type	

magnetism.

Course Code Course Name T P L ECTS C Hours Type

TDi101 Turkish Language L 2 0 0 2 2 2 2 Compulsory

TDi101 Turkish Language-I 2 0 0 2 2 Compulsory

Definition of language. The relationship between nation and language. The relationship between language

Definition of language. The relationship between nation and language. The relationship between language and culture. Family of languages, the place of Turkish language among other languages. Historical development of Turkish language. The current situation of Turkish language, its history and current examples, vernacular, accent, dialect. Definition of grammar and its sections, features of Turkish language. Phonetic, phonetic of Turkish, its features and classification of phonemes. Grammatical rules of Turkish. Punctuations. Word structure of Turkish and particles, derivational affix, inflexional suffix.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
YDİ101	Foreign Language-I	2	0	0	2	2	2	Compulsory

Greetings. Brainstorming about the mutual expectations. Ice breakers. To be. Possessive adjectives. Countries. Describing jobs. Simple present tense. Word order. WH questions. Expressing likes/dislikes. Foods and drinks. Ordering. Speaking about food from all over the World. Writing and speaking about free time activities. Making dialogues using frequency adverbs. Reading passage about basketball and vocabulary practice. Talking and writing about what people are doing. Using present progressive. Understanding the polite rules of talking on the phone and acting. Talking about past events using simple past tense. Was/were. Understand an article about past and present.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре
İMO109	Professional Ethics	2	0	0	3	2	2	Elective
Evaming the concepts of othics and morality. Evaming the othical systems. Investigate the factors that								

Examine the concepts of ethics and morality. Examine the ethical systems. Investigate the factors that play o role in the formation of morality. Examine the ethics of profession. Analyzing the results of corruption and unethical behavior in professional life. Examine the concept of social responsibility.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO111	Business law	2	0	0	3	2	2	Elective

Introduction to business law. Important laws of labor law. The basic concepts of labor law. Application areas of labor law. Types of employment contracts. Jobs where work contract is prohibited. Rights and obligations of workers and employers arising from the employment contract. Termination of employment contract, working hours, leave and wages. The concept of social security. Trade union law. Collective bargaining law. Industrial action. Lockout. Rights and interests disputes.

Course Code	Course Name	T	P	L	ECTS	С	Hours	Type
İMO113	Occupational health and Safety	2	0	0	3	2	2	Elective

Occupational Health and safety overview. Security Culture. Occupational health and safety law No. 6331. Occupational accident and occupational illness. Risk Assessment. Fire. Emergency Plan and exercise. Emergency Plan and Risk Factors for Exercise Health and safety. Working with Screen tools-manual lifting-Health and safety signs. Occupational Safety in ship, Shipyard and Industry, Safety in indoor areas. Safety studies in welding and electricity. Safe Use Of Work Equipment, Working High. Case study.

Course Code	Course Name	T	Р	L	ECTS	С	Hours	Type
İMO115	Environmental Protection	2	0	0	3	2	2	Elective

Introduction of the course, topics and activities and evaluation. Environmental regulation. Risk analysis: By interpreting the analysis results, threats. Waste storage. Waste regulation and control. Personal protection methods. International health and safety alerts.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO117	Communication	2	0	0	3	2	2	Elective

The concept and definition of communication. Communication Process. Verbal Communication. Body Language. Barriers to communication. Effective communication. Information Technologies and Communication. Communication in Business Life.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO119	First Aid	2	0	0	3	2	2	Elective

Basic applications of first aid. First and second evaluation. Basic life support in adults. Basic life support in children and infants. First aid in respiratory obstruction. External and internal bleeding. Wound and wound types. Regional injuries, first in the head and spine fractures. First aid in upper extremity fractures, dislocations and sprains, First aid in hip and lower limbs fractures, dislocations and sprains. First aid in diseases requiring emergency care. First aid in poisoning, heat stroke, burns and freezes, foreign body escape. Emergency transport techniques Fast transport techniques in short distance. Moving patients or injured by creating a stretcher.

II. Semester

Course Code	Course Name	Т	Р	L	ECTS	C	Hours	Type
ATİ102	Atatürk's Principles and	2	0	0	2	2	2	Compulsory
	Revolution History-II							

Political revolutions: Abolition of the Sultanate, Declaration of the Republic, Abolition of the Caliphate. Political parties and political events established in the period of Atatürk and represented in the Turkish Grand National Assembly. Legal reform and legal order. Revolutions in education. Revolutions in culture and social area. Revolutions in economic area. Turkish foreign policy in Atatürk period (1923-1930). Turkish foreign policy in Atatürk period (1930-1938). Principles of Atatürk and complementary principles. After Atatürk's Turkey.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO102	Fuels and Oils	2	0	0	2	2	2	Compulsory

Crude Oil. Fuels. Natural Gas. LPG, Liquefied petroleum gas. Gas. Jet fuels and gas oil. Diesel fuels, fuel oil. Liquefied petroleum gas (LPG). Alternative motor fuels. Mineral oils and their properties. Synthetic oils and their properties. Additives. Used oils. Waste Oils, collection and recovery.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре
İMO106	Materials Tecnology	2	0	0	2	2	2	Compulsory

Mechanical, physical, chemical and thermal properties of materials, classification of metals. Material group to be used, reason for preference. Atomic structure, atomic models, atomic bonds. Unit cell, space cage, Bravais cages. Atomic fill factor, the presence of densities from crystal structure, allotropy. Solidification-melting behavior, cooling of pure and alloyed material. Dentritic structure, equilibrium diagrams and types. Iron carbon balance diagram. Austenite, ferrite, perlite, cementite, ledeburite concepts. The critical temperatures in the equilibrium diagram, the contributions of the alloying elements. Cast iron and places of use. Heat treatments applied to steels.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре
İMO120	Internship	0	0	0	10	0	0	Compulsory

Getting to know the workplace and getting information about the work done. Learning the planning and work flow of workplace applications. To be able to analyze the hierarchical order and human relations in business life, to fulfill the duties and responsibilities related to the profession. To examine business practices, participate in applications and report the work done.

Course CodeCourse NameTPLECTSCHoursTypeIMO122Workshop-II030323Compulsory

Excavability, excavation with martop. Mechanized gallery opening, full section gallery opening machines and partial section gallery opening machines. Mechanized production excavations and support systems, excavation with plow, digging with drum cutter-loaders. Excavation with continuous cutters, excavation with ANS method. Other excavation methods, hydromechanical excavation. Filling operations, fill amount and material, fill methods, manual fill, gravity fill, mechanical fill with conveyor, hydraulic fill and pneumatic fill. Water slip, water and well hydrology in nature, pumps and their dimensions and drainage in underground operations. Underground haulage systems, cutaway haulage systems, railway haulage, truck haulage, excavation and transport with LHD. Underground transport systems, belt conveyors. Underground transport systems, Chain conveyors. Underground haulage systems, Gravite haulage. Underground transport systems, Compressed air systems. Underground operations, lighting, communications, signaling, monitoring.

Course CodeCourse NameTPLECTSCHoursTypeiMO124Technical Drawing120423Compulsory

Definition of technical drawing, presentation of tools and materials, explanation of the image paper measurements. Presentation of letters, teaching letter format features. Geometric drawings. Polygon drawings. Oval, ellipse, spiral drawings. Scale definition, definition of projection and types of projection. Dimensioning, identification of cross sections scanning lines. Description of profile drawings, half circle, explanation of depressed profile drawings. Projection of Solids. Architectural drawing applications.

Course CodeCourse NameTPLECTSCHoursTypeiMO126Statics and Strength210433Compulsory

Vector Operations. Force Systems. Mass Center. Statics. Linear Motion, Curvilinear Motion. Relative Motion. Work and Energy. Stress Concept and Stress-Strain Relations. Bending. Torsion. Shear forcebending moment diagrams. Shear Stress, Stress Transformations-Mohr Circle.

Course CodeCourse NameTPLECTSCHoursTypeiMO130Heavy Equipments-II200322Compulsory

Excavability, excavation with martop. Mechanized gallery opening, full section gallery opening machines and partial section gallery opening machines. Mechanized production excavations and support systems, excavation with plow, digging with drum cutter-loaders. Excavation with continuous cutters, excavation with ANS method. Other excavation methods, hydromechanical excavation. Filling operations, fill amount and material, fill methods, manual fill, gravity fill, mechanical fill with conveyor, hydraulic fill and pneumatic fill. Water slip, water and well hydrology in nature, pumps and their dimensions and drainage in underground operations. Underground haulage systems, cutaway haulage systems, railway haulage, truck haulage, excavation and transport with LHD. Underground transport systems, belt conveyors. Underground transport systems, Chain conveyors. Underground haulage systems, Gravite haulage. Underground transport systems, Compressed air systems. Underground operations, lighting, communications, signaling, monitoring.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре
TDİ102	Turkish Language II	2	0	0	2	2	2	Compulsory

Definition of language. The relationship between nation and language. The relationship between language and culture. Family of languages, the place of Turkish language among other languages. Historical development of Turkish language. The current situation of Turkish language, its history and current examples, vernacular, accent, dialect. Definition of grammar and its sections, features of Turkish language. Phonetic, phonetic of Turkish, its features and classification of phonemes. Grammatical rules of Turkish. Punctuations. Word structure of Turkish and particles, derivational affix, inflexional suffix.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре
YDİ102	Foreign Language II	2	0	0	2	2	2	Compulsory

Talking about clothes. Using comparative adjectives. Making dialogues about shopping. Speaking activity about fashion. Describing appearances and personalities of people, Using "be like" and "look like". Speaking and writing activity about describing our friends. Talking about tourist sites. Using can/can't. Listening and comprehending a passage about city attractions. Talking about places around town. Using "There is" and "There are". Reading a text about favourite places around town and vocabulary gain. Talking about vacation activities. Using past tense. Reading text about describing a hotel. Talking about future plans. Using future tense. Listening activity about travel plans and follow-up activities. Reading text about travel activities.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре
İMO108	Measuring Technology	2	1	0	3	3	3	Elective

SI unit system and derived units. Calipers. Micrometer. Comparators. Angle measurement. Surface control. Screw gauges. Feeler gauge. Sources of error in measuring instruments. Calibration of measuring instruments.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO110	Professional Mathematics	2	1	0	3	3	3	Elective

Linear Equation Systems. Matrix. Limits and Continuity. The concept of derivative, rules of differentiation. Integral. Differential equations. Statistics.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO114	Diesel Engines Technology	2	1	0	3	3	3	Elective

Diesel Engine Classification, advantages and disadvantages of diesel engines. Diesel cycle, Dual cycle. Combustion in diesel engines, Knock and ignition delay in diesel engines. Diesel Fuel System. Common rail fuel System. Turbocharging Systems. Intercooler.

Course Code	Course Name	Т	Р	L	ECTS	C	Hours	Type
İMO116	Entrepreneurship and	2	0	0	3	2	2	Elective
	Innovation							

Entrepreneurship approaches. Entrepreneurship culture. Types of entrepreneurship. Entrepreneurship functions. Entrepreneurship fields. Entrepreneurship process. Business idea and resources. Business idea development. Business plan and elements. Preparing business plan. Local, national and international context of entrepreneurship.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO118	Soil Types and Excavation	2	1	0	3	3	3	Elective
	Technology							

Soil types and properties. Classification of soils. Soil recognition through observation and in the field. The concept of excavability. Excavation determination methods. Excavation tools and methods. Classification of excavability.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO128	Basic Information Technologies	2	1	0	3	3	3	Elective

Entry. Computer (definition, functions). Hardware concept in computer. The concept of software on the computer. Operating systems. Internet (definition, function), internet protocols, internet services (e-mail, ftp). Browse the web. Using MS-Excel. Using MS-Excel (Professional applications). Introducing Microsoft Office, Using MS-Word (petition, writing and CV). Using MS-Word (Relation and table). Using MS-Powerpoint. Technical report writing rules. Preparing a report / presentation.

III. Semester

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре
İMO201	Automotive Electrics and	2	1	0	4	3	3	Compulsory
	Electronics							

Electrical Principles, Magnetism. Electricity Measurement Units. Ohm's Law. Kirchoff's Laws (Series, Parallel and Mixed Circuit Theory). Current Tasks and Working Principles, Types of Batteries Power Structure Electrolyte, Battery Tag, Factors Affecting Battery Capacity, Battery Electrolyte Preparation. Battery controls and charging. Control of Starter System Maintenance and Defects. Types of Cable Used in Starter Circuit and Starter Circuit. Charge system, mission, structure and types. Working Principles, Controls and Maintenance of Alternators. Lighting, Fog Headlamps Short and Long Headlamp Controls and Headlamp Adjustments. Front and Rear Park Circuit, Signal Circuit, Reverse Circuit, Horn Circuit Brake Warning Lamp circuit. Indicator system, signal transmission techniques and sensor types, digital display systems.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO203	Hydraulic-Pneumatic	2	1	0	5	3	3	Compulsory

Hydraulic systems, properties of hydraulic systems, unit systems, hydraulic pneumatic symbols, solving problems related to force transmission in hydraulic circuit, drawing hydraulic pneumatic symbols. Hydraulic fluid and oil reservoirs, showing the hydraulic circuit elements. Hydraulic pump and motors, hydraulic cylinders, connecting and operating the hydraulic circuit elements. Directional control valves, pressure control and flow control valves, other circuit elements. Hydraulic circuit diagrams, installation and operation of hydraulic circuits. Electrohydraulic circuit diagrams, installation and operation of electrohydraulic circuits. Introduction to pneumatic systems, drying of air and control of conditioners, pneumatic circuit elements. Compressors, pneumatic cylinders, pneumatic motors, pneumatic valves, other pneumatic circuit components, connection and operation of pneumatic circuit elements. Pneumatic circuit diagrams, connection and operation of pneumatic circuit elements. Electropneumatic circuit diagrams, pneumatic and electropneumatic circuit installation.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре	
İMO205	Machine Science and Elements	2	1	0	5	3	3	Compulsory	
	nachine elements. Shape changes								
	nciples. Binding elements. Solvab						vable bind	ding elements.	
	d hub binding elements. Belt-pulley	med	hani	sms.		els.			
Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре	
İMO209	Heavy Equipment Maintenance	2	1	0	4	3	3	Compulsory	
	and Repair-I								
	of fault diagnosis. Definition and obje								
	diagnosis. Features that need to be								
	ent. Communication in the service		onom	y in	the service	e. S	ervice wo	rk flow charts.	
	service staff. Car receipt processing								
Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре	
İMO223	Heavy Equipment-III	2	0	0	3	2	2	Compulsory	
	tion on lifting machines and lifting								
systems on liftin	g machines. Examination of load a	ssun	nptio	ns ai	nd basic p	rinci	oles in the	e calculation of	
lifting machines	. Inspection of main beams, hea	d be	ams	and	I side bea	ams	of traveling	ng currencies.	
	am structures of traveling cranes.								
	aveling bridge connection constru								
	revolving circles and revolving tow					of a	ascending	tower cranes.	
	cranes. Examination of floating cra	nes,	rota	ing c					
Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре	
İMO225	Workshop-III	0	3	0	3	2	3	Compulsory	
General informa	tion on lifting machines and lifting	g sys	stems	s. In:	spection o	of rai	ls, wheels	s from moving	
systems on liftin	g machines. Examination of load a	ssun	nptio	ns ai	nd basic p	rincip	oles in the	calculation of	
lifting machines	. Inspection of main beams, hea	d be	ams	and	I side bea	ams	of traveling	ng currencies.	
Inspection of be	am structures of traveling cranes.	Ben	ding	tens	ion and d	lefled	tion in tra	aveling cranes.	
Inspection of tra	aveling bridge connection constru	ction	s. Ĕx	kamii	nation of	leg d	cranes, co	onsole cranes.	
	revolving circles and revolving tow								
	cranes. Examination of floating cra						J		
Course Code	Course Name	Т	Р	Ĺ	ECTS	С	Hours	Туре	
İMO211	Professional Foreign Language	3	0	0	3	3	3	Elective	
To be able to communicate in a foreign language. To use technical foreign language. Learning technical									
foreign language. Learning technical terms related to profession/ Internal combustion engines' term.									
TOTEIGH TANGUAG	e. Learning technical terms relate	d to	prof		n/ Interna		mbustion		
	e. Learning technical terms relate derstanding maintenance and repai				on/ Interna		mbustion		
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preparing an accident report when necessary. Control of documents requiring obligations regarding vehicle and driver. Making accident occurrence and avoidance analysis of sample accident events. Bent, twisted, broken and need to be replaced. Cost analysis of the parts to be renewed. labor cost, paint, transportation. work done outside the business. Features of traffic and automobile insurance. Application of insurance transactions on damaged vehicles. Insurance appraisal procedures. Rights and restrictions provided by insurance. To prepare damage report, expertise.

IV. Semester

Course Code	Course Name	Т	Р	L	ECTS	O	Hours	Type
İMO202	Power Transmission Bodies	2	1	0	4	3	3	Compulsory
	pasic concepts. Clutch systems. Med							
	nical gear boxes. Torque converter	. Pla	netar	y gea	ar mecha	nism	s. Automa	itic gearboxes.
•	d axles. Differential.							
Course Code	Course Name	Т	Р	L	ECTS	C	Hours	Туре
İMO204	Transport Technique	2	1	0	4	3	3	Compulsory
	ort. Classification of materials and of							
techniques. Plar	nning and design of material flow in p	rodu	ction	. Craı	ne constru	ıctior	and desig	gn of elements.
Chain and chair	n driven. Mechanical brake construc	tions	. Mo	veme	nt mecha	nism	s in crane	constructions.
Crane types ar	nd construction. Crane construction	n. E	Belt o	conve	eyor desi	gn. (Chain cor	veyor design.
Construction of pneumatic and hydraulic transport systems.								
Course Code	Course Name	Т	Р	L	ECTS	C	Hours	Type
İMO206	Mechanism Technique	2	1	0	4	3	3	Compulsory
Detachable Bin	idings. Undetachable Bindings. T	rans	miss	ion (Organs.	Rete	ntion Elei	ments. Power
Transmission at	Long Distances. Cam design.							
Course Code	Course Name	Т	Р	L	ECTS	C	Hours	Type
İMO208	Pumps and Compressors	2	1	0	4	3	3	Compulsory
Pumps. Making	fluid calculations. Examination of	pres	sure-	-flow	and pow	er gr	aphs of a	pump (Pump
characteristic cu	rves). Faults that may occur in the p	ump	and	maint	tenance. (Comp	ressors. F	Faults that may
occur in the com	pressors and maintenance.							
Course Code	Course Name	Т	Р	L	ECTS	O	Hours	Type
İMO212	Heavy Equipment Maintenance	2	1	0	4	3	3	Compulsory
	and Repair -II							
Fault finding ru	les. Repair catalogs. Reading the	para	amete	ers.	The path	to b	e followed	d when failure
diagnosis is no	t possible. Common diagnostic e	quip	ment	t. Us	e of con	nmor	diagnost	tic equipment.
Dragonog in th	e diagnostic unit. Actions performe	م م	n the	diad	moetic ur	it D	acida an	the method of
Processes in th	e diagnostic driit. Actions penomi	ou o	1 1110	uia	jiiosiic ui	ווו. ט	coluc on	the method of

troubleshooting. Preparation of spare parts list. Preparation of repair orders. Occupational health and safety measures during repair.

Course Code	Course Name		2	L	ECIS	ن	Hours	Туре	
İMO226	Heavy Equipment Operation	0	3	0	4	2	3	Compulsory	
Excavators. Spreading machines. Compression machines. Loader. Heavy Equipment operation.									
Regulations on the Heavy Equipment operation. Operation, maintenance, safety for operator.									
Course Code	Course Name	T	Р	L	ECTS	C	Hours	Type	
İMO214	Factory Organization	2	1	0	3	3	3	Elective	

Introduction of factory operation and construction site main units. Drawing of factory operation and site layout plans. Water supply and waste water treatment processes in factories and enterprises. Thermal processes of factory process waters and other fluids. Introduction of factory operation and construction site energy systems. Introduction of dust holding and exhaust systems. Introducing factory energy systems. Comparison of sample factory, operation and site layout plans.

Course Code	Course Name	T	Р	L	ECTS	С	Hours	Type
İMO216	Service Equipment	2	1	0	3	3	3	Elective

Structures of tools and apparatus used in service workshops in mechanical workshops. Devices, machines and apparatus that should be available in service mechanical workshops. Efficient use of the necessary apparatus in the service. Establishing the service mechanical workshops. Planning the workshop according to the working features. Productivity in mechanical workshops. Planning the use of machines and devices used in the mechanical workshops. Precautions to be taken against work accidents mechanical workshops. On-site inspection of a sample service workshop. Knowledge and skills that employees must possess according to the characteristics of the service workshop. The effect of knowledge and skills of service workers on efficiency. New technologies developing in the creation of service equipment.

Course Code	Course Name	Т	Р	L	ECTS	C	Hours	Type
İMO218	Quality Assurance and	3	0	0	3	3	3	Elective
	Standards							

Concept of Quality. Standard and Standardization. The importance of the standard in the production and service sector. Management quality and standards. Environmental standards. Quality management

system models. Strategic management. Participating in management. Process management system. Resource management system. Quality control in production. Inspection and sampling. Total quality control. Control Diagrams.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре
İMO220	Computer Aided Drawing	2	1	0	3	3	3	Elective

AutoCAD window, menu bar, toolbars, shortcut menus, mouse usage, dialog boxes, command features. File operations, opening a new file, logging into an existing file, saving, saving a large number of files in a session, exiting a file, exiting AutoCAD. Straight line command, delete command, point input (point input with Cartesian coordinates, point input with polar coordinates). Object docking modes Drawing commands: point drawing, rectangular drawing, unified line, circle drawing, arc drawing. Drawing area boundaries, Unit system and line settings, Drawing items selection, Magnification and reduction, Image shift, Bird's eye view. Practice with learned information. Function keys, Modes on / off, Status line buttons, (Tab spacing, grid alignment points, Horizontal and vertical parallel to coordinates, Enable / disable Dynamic UCS, Enable / Disable dynamic input, Enable / disable display of line thicknesses). Drawing commands: Thick solid line, Ring, Inner solid plane shapes, Combined line, Polygon, Resurfacing, Beam, and related applications. Drawing commands: Freehand line, Curve line, Divide by equal spacing, Divide by length value, Multiparallel line, Area bounding, Zone creation, Scan and related applications. Drawing commands: Freehand line, Curve line, Divide by equal spacing, Divide by length value, Multiparallel line, Create region bound, Create region, Scan and related applications. Editing commands: cropping, mirroring, rotating, scaling, stretching, stretching, moving, shifting copying, chamfering, rounding, pruning. Layers, colors, dimensioning, writing function, blocks and attributes.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Туре
İMO222	Alternative Engines and Fuel	2	1	0	3	3	3	Elective
	Systems							

Advantages and disadvantages of internal combustion engines. Alternative fuels. LPG fuel properties. LPG Fuel system. CNG fuel properties. Wankel engine. Stirling engine. Electricity vehicles. Hybrid vehicles.

Course Code	Course Name	Т	Р	L	ECTS	С	Hours	Type
İMO224	Comfort Systems	2	1	0	3	3	3	Elective

Central Lock Systems. Automatic car widow Systems. Electric car Seats. Indicating Systems. Audio and Video Systems. Airbags. Fuel Cutting switch. Immobilizer. Alarm Systems.