

0252312 NUMERICAL ANALYSIS (2,0,0) 2

Introduction to Numerical Analysis/ Mathematical Modelling/ Errors/ Solution of Non-Linear Equations/ Solution of Linear Equation Systems/ Differences/ Least Square Method/ Interpolation/ Numerical Integration/ Solution Ordinary and Partial Differential Equation

0651211 DESIGN GEOMETRY AND TECHNICAL DRAWING (2,2,0) 3

Standards/ Geometric Constructions/ Multiview Projection (Orthographic Presentations)/First Angle Projection (E- Method)/Third Angle Projection (A-Method)/ Sectional Views/ Isometric/ Dimetric Drawing/ Dimensioning

0651212 COMPUTER AIDED TECHNICAL DRAWING (2,2,0) 3

Surface Quality and Symbols/ Tolerances/ Intersection/ Assembly Drawing/ Steel Structural Drawing/ Introduction to Cad* Software/ Projection and Assembly Drawing Application With Cad* Software (*> “Cad” Is the Abrivation of “Computer Aided Design”)

0651512 STATICS (3,0,0) 3

System of Vectors/ Fundamental Concepts in Statics/ Plane and Space Statics/ Friction/ Distributed Forces/ Center of Mass/ Systems of Structures/ Internal Forces and Diagrams/ Method of Virtual Work

0652311 MEASUREMENT TECHNIQUES AND EVALUTATION (2,0,0) 2

Measuring Concept/ Importance of Measurement in Engineering Applications/ Tolerances/ Allowance Tolerances/ Importance of Iso Allowance Systems in Applications/ Calibration and Usage of Measurement Instruments and Equipment Using Manufacturing/ Macro and Micro Geometrical Measurements/ Screw and Gear Measurement Methods

0652312 MANUFACTURING PROCESSES I (4,0,0) 4

Concepts of Technology/ Production/ and Manufacturing/ Casting/ Welding/ Forming and Forging/ Machining Methods and Principles/ Applications and Manufacturing Processes

0652321 MATERIAL SCIENCE 1 (4,0,0) 4

Definitions and Classification of Engineering Materials/ Atomic Structure/ Bond Types and Properties/ Crystal Structure and Properties/ Crystal Structure Faults/ Deformation of Metallic Materials/ Solidification of Metals/ Diffusion of Metals/ Phases Laws and Diagrams/ Phases Transformations/ Fe-C System/ Heat Treatment for Metals/ Material Inspections/ Corrosion and Protection of Metal Materials

0652511 DYNAMICS (3,0,0) 3

Kinematics; Vector Functions/ Differential Characteristics of the Curves/ Fundamental Principles/ Kinematics of Particles/ Kinematics of Rigid Bodies/ Compound Motions/ Coriolis’s Theorem/ Kinetics; Geometry of Mass/ Fundamental Law of Classical Mechanics; General Theorems/ Applications of Particles and Rigid Body / D’alembert’s Principle

0652521 STRENGTH OF MATERIALS 1 (4,0,0) 4

Basic Definitions and Principles/ Shear Force and Bending Moment Diagrams/ Axial Loaded Members/ Mohr’s Circle/ Thin Walled Pressure Vessels/ Direct Shear Stresses/ Moments of Inertia of Plane Areas/ Pure Bending/ Torsion/ Elastic Curve/ Combined Stresses/ Buckling.

0652712 FLUID DYNAMICS (3,0,0) 3

Fundamental Concepts/ Hydro-Aerostatics/ Integral Analysis : Bernoulli and Energy Equations/ Differential Analysis : Continuity/ Euler and Navier-Stokes Equations/ Dimensional Analysis and Similitude: Buckingham Pi Theorem/ Viscous Flow in Ducts : Laminar and Turbulent Flows/ Local Head Losses/ Introduction to Open Channel Flow/ Introduction to Turbomachinery

0652722 THERMODYNAMICS (4,0,0) 4

Basic Concepts of Thermodynamics/ Properties of Pure Substances/ The First Law of Thermodynamics/ The Second Law of Thermodynamics/ Entropy/ The Second-Law of Thermodynamics/ Entropy/ Second-Law Analysis of Engineering Systems/ Power Cycles/ Refrigeration Cycles/ Gas and Gas-Vapor Mixtures/ Chemical Reactions

0653111 THERMAL TURBO MACHINERY (3,0,0) 3

Introduction/ Thermodynamics of Steam/ Rankine Cycle/ Steam Engines/ Classification of Steam Turbines/ Impuls Turbines; Calculation of Blade and Stage Efficiency/ Reaction Turbines; Calculation of Blade and Stage Efficiency/ Turbine Losses/ Pressure and Velocity Diagrammes/ Design Aspects of Steam Turbines.

0653112 GAS TURBINES (3,0,0) 3

Introduction and History/ Fundamental Equations of Thermodynamics and Gas Dynamics/ Classification of Gas Turbines/ Gas Cycles ;Theoretical Cycles: Carnot Cycles/ Stirling Cycles/ Ericsson Cycle and Brayton Cycle/ Actual Cycles of Gas Turbines; Simple Cycle/ Regenerative Cycle/ Maximum Net Work/ Intercooling and Reheating.

0653121 NUCLEAR ENERGY POWER PLANTS (3,0,0) 3

Energy Sources and Nuclear Energy/ Mass-Energy Conversion and Atomic Reactions/ Fusion and Fission Energies/ Radioactivity/ Nuclear Reactor Physics/ Chain Reaction and Multiplication Factor/ Neutron Loss and Critical Conditions/ Calculation of Critical Dimensions/ Introduction to Nuclear Power Reactors/ Classification of Power Reactors and Technical Properties/ Main Elements of Power Reactors/ Operational Characteristics of Reactors/ Nuclear Fuel Cycles/ Economic and Ecologic Study of Nuclear Energy

0653122 HYDRAULIC MACHINES (3,0,0) 3

Introductions and General Information/Load Losses in Pipelines/Pump Characteristics/Euler Laws/The Design of Runner Impeller/ The Design of Snail/Pump Characteristic Curves/Dimension Numbers/Similarity and Model Theory of Hydraulic Machines/Cavitations of Hydraulic Machines/ Hydraulic Turbine/Pelton Turbine/Francis and Kaplan Turbines

0653132 ANALAYSIS OF ENERGY GENERATION SYSTEMS (2,0,0) 2

Basic Concepts/ Energy Generation System Components/ Energy Generation Systems/ Energy Analysis of Energy Generation System/ Exergy Analysis/ Exergy Analysis of Energy Generation System/ Thermoekonomi/ Exergoekonomi/ Exergy Costs

0653211 MACHINE DESIGN I (3,0,0) 3

Design Under Dynamic Loads/ Shafts and Axles/ Shaft-Hub Joints/ Key Couplings / Press Fitting/ Bolts/ Nuts/ Screws and Bolted Joints/ Welded Joints/ Riveted Joints / Brazing and Adhesive Joints/ Springs/ Couplings and Clutches

0653212 MACHINE DESIGN II (3,0,0) 3

Theory of Lubrication and Lubricants/Sliding Bearings/Rolling Bearings/Belting/Chain Drives/Gears

0653221 COMPUTER AIDED DRAWING (3,0,0) 3

Comparison Between Computer-Aided Drawing and Classical Drawing/ Introduction to Hardware and Software/ Drawing/ Modifying/ Dimension/ Settings/ View/ Section/ Assembly Drawing and Editing.

0653222 COMPUTER AIDED DESIGN (3,0,0) 3

Introduction to Hardware and Software/ Surface and Solid Modelling/ Assembly/ Structural Analysis/ Dynamic Modelling and Simulation

0653231 CONSTRUCTION ELEMENTS (3,0,0) 3

Design of Machine Elements and Mechanisms Used in Hydraulic and Pneumatic Power Transportation Systems.

0653232 INTRODUCTION TO TRIBOLOGY (3,0,0) 3

The Steps in Product Design/ Concept Development/ Technical and Economical Evaluation/ Objective Design

0653241 DESCRIPTIVE GEOMETRY I (2,0,0) 2

Transition Surfaces and Developments/ Surface and Solid Intersections/ Helix and Other Curvilinear Surfaces/ Applications in Cad

0653242 DESCRIPTIVE GEOMETRY II (2,0,0) 2

Projection/ Geometry Component/ Intersection Problem/ Surface Projection/ Surface Intersections/ Solid Modelling Logic

0653251 COMPUTER AIDED DESIGN IN MANUFACTURING (2,0,0) 2

Principles of Industrial Design/ Classical and Modern System in Industrial Design/ Computer Aided Drawing/ Test/ and Finite-Element Analysis Techniques in the Application of Computer Aided Design/ Usage and Application of Fea (Fem) Programs/ Modelling in Design Programs/ Solid and Surface Applications/ and Selection of Material and Manufacturing Process

0653261 INTRODUCTION TO DESIGN TECHNICS (2,0,0) 2

Scientific Research/ Defining the Problem/ Concept Development/ Technical and Economical Evaluation

0653311 METAL FORMING 1 (3,0,0) 3

Plasticity and Microstructure/ Cold and Hot Forming/ Mechanical Principles of Metal Forming/ Metal Forming Mechanics/ Fundamentals of Pass Design/ Force/ Work and Heat in Forming Processes/ Force and Work in Forging/ Stamping/ Extrusion/ Rolling/ Drawing and Sheet Metal Forming Processes

0653312 METAL FORMING 2 (3,0,0) 3

Plastic Forming Machines/ Classification/ Characteristics and Selection/ Principles of Tool and Equipment Design/ Special Machines/ Automation and Numeric Control Applications/ Facilities/ Errors and Corrections/ Standards

0653321 INDUSTRIAL MATERIALS (3,0,0) 3

Classification/ Properties/ Heat Treatments/ Standards and Utilisation Fields in the Iron-Based Materials/ Classification/ Properties/ Heat Treatments/ Standards and Utilisation Fields in the Non Iron-Based Metal and Alloys/ Physical/ Electrical/ Thermic and Magnetic Properties in the Metallic Materials/ Welding and Soldering Materials/ Magnetic Materials/ Classification/ Properties in the Plastic/ Ceramic and Composite Materials and Composite Structures/ Election Criteria in the Engineering Applications

0653322 MACHINING I (3,0,0) 3

Principles of Machining and Classification of Machining Processes/ Factors That Affect Machining/ Cutting Tool Materials/ Turning/ Shaping/ Drilling/ Milling and Grinding/ Manufacturing and Operation Time in Machining/ High Speed Machining

0653331 MANUFACTURING PROCESS 2 (3,0,0) 3

Material and Process Characteristics in Casting/ Welding/ and Forming Processes/ Process Sequences/ Machines and Equipment Used/ Manufacturing Defects and Elimination

0653332 WELDING TECHNIQUES I (3,0,0) 3

Joining Methods Without Welding/ Principles of Welding Processes for the Purpose of Joining and Filling/ Welding Machines/ Devices and Equipment/ Filler Metals and Auxiliaries/ Standards/ Thermal Cutting Processes

0653341 DIE MANUFACTURING TECHNIQUES (3,0,0) 3

Principles of Forming and Forging With Die/ Die Types/ Forging and Stamping Dies/ Sheet Metal Forming Dies/ Plastic Injection and Forming Die and Molds/ Design of Dies and Die Components/ Die Materials/ Die Manufacturing/ Tolerances/ Finish Processes/ Reverse Engineering and Rapid Prototyping Applications in Die Manufacturing

0653342 MATERIAL SELECTION IN MECHANICAL ENGINEERING (2,0,0) 2

Introduction to Mechanical Behavior of Materials/Physical Basis of Elasticity and Plasticity/One Dimensional Mechanical Models/Linear Elasticity/ Hooke's Law/Viscoelastic Response/1d Viscoelastic Models/Maxwell Model/Kelvin Model/Fatigue/Material Selection Criterion/Case Studies in Material Selection

0653351 PRESSURE DIE CASTING (2,0,0) 2

Principle of Pressure Die Casting/ Machines and Automation/ Molds and Design/ Mold Materials and Cooling of Molds/ Pressure Die Cast Materials and Melting Furnaces/ Casting Defects and Prevention Methods

0653352 JIGS AND FIXTURES (2,0,0) 2

Manufacturing Quality and Effecting Factors/ Types and Functions of Jigs and Fixtures/ Supporting and Locating Principles/ Clamping and Workholding Principles / Classification/ Design and Manufacturing of Jigs and Fixtures/ Festing and Clamping Principles and Methods/ Mechanical Analysis of Jig and Fixtures Systems

0653361 MATERIAL SCIENCE 2 (2,0,0) 2

Classifications/ Qualifications/ Heat Treatment and Usage of Ferrous Materials/ Classifications/ Qualifications/ Heat Treatment/ Standards and Usage of Nonferrous Materials/ Classifications and Qualifications of Plastic/ Ceramic and Structures of Composite Materials/ Criteria of Material Selection in Engineering Applications.

0653371 JOINING TECHNIQUES (2,0,0) 2

Principles of Joining Techniques - Joining Techniques Without Welding - Pressure and Melt-Based Welding Methods - Join Inspections - Thermic Cutting Processes

0653411 SYSTEM DYNAMICS AND SIMULATION (2,0,0) 2

Modeling/ Analysis and Simulation of Mechanical and Electrical Systems

0653412 MACHINE DYNAMICS (3,0,0) 3

Introductory Concepts on Machine Dynamics/ Description of Kinematic and Dynamics Problems/ Mathematical Modeling of Mechanical Systems/ Force Analysis on Machinery/ Balancing/ Mass Balancing on Rotating Machinery/ Mass Balancing of Machinery With Cycling Motion (Crank – Rocker Mechanisms)/ Damped/ Undamped and Free Vibrations of One Dof Systems

0653422 KINEMATICS I (3,0,0) 3

Basic Concepts/ Kinematic Chains/ Degree of Freedom/ Constrained Motion/ 4-Bar Linkage and Grashoff Theorem/ Connection Angles/ Rocker Graphs/ Velocity and Acceleration of Planar Motion

0653512 STRENGTH OF MATERIALS 2 (3,0,0) 3

Unsymmetrical Bending/ Torsion of Noncircular Bars/ Helical Springs/ Shear Center/ Statically Indeterminate Systems/ Dynamic Loading/ Energy Methods/ Curved Beams

0653611 PRINCIPLES OF IC ENGINES (3,0,0) 3

Definitions/ Classification/ Thermodynamic Analysis of Ic Engine Cycles/ Fuels/ Knock/ Carburation/ Gasoline Injection Systems/ Ignition Systems/ Fuel Pumps/ Injectors/ Regulators/ Recent Developments and Strategies in Engine Technology.

0653612 VEHICLE VIBRATIONS (3,0,0) 3

Vibration and noise assessment criteria/ Vibration and Noise Signals/ Vehicle Vibration & Noise Sources/ Perception of Vibration & Noise/ Road Induced Noise & Vibration/ Vibration Analysis Techniques/ Response of Single Degree of Freedom System/ Nonlinear Analysis/ Modal Behaviour of Structures/ Vehicle Suspension Modes/ Suspension of Structure/ Measurement of Structural Dynamic Parameters/ Tyre Characteristics/ Tyre Forces and Moments/ Road Inputs/ Vehicle Response.

0653621 AN INTRODUCTION TO INTERNAL COMBUSTION ENGINES (3,0,0) 3

Historical Review/ Definitions/ Classification/ Thermodynamic Analysis of Ic Engine Cycles/ Combustion/ Actual Cycles of Ic Engines/ Ic Engine Fuels/ Knock/ Power Calculation/ Theory of Charge Exchange Processes.

0653622 INTERNAL COMBUSTION ENGINES 1 (2,0,0) 2

Mixture Formation in Spark Ignition Engines/ Carburation/ Carburettors/ Working Process in An Simple Carburettor/ Calculations of the Air/Fuel Ratio/ Tunings That Must Be Added to the Simple Carburettor/ Insufficiencies of Carburettors/ Stratified-Charge Engines/ Fuel Injection and Its Systems/ Types/ Powerful Output Control of the of System/ Ignition/ Ignition With Systems/ Spark Plugging.

0653631 DESIGN OF IC ENGINE AND IT'S PARTS (3,0,0) 3

The Necessity of Engine Design and Design Factors/ Pistons/ Connecting Rod/ Crank Shaft/ Engine Block and Liner/ Cylinder Head/ Bearings/ Valves/ Camshaft/ Cooling and Lubrication Systems and Their Calculations/ Technological Advances and Practise in Engine Design

0653632 WEAR, LUBRICATION AND COOLING IN IC ENGINES (3,0,0) 3

Lubrication and Principles/ Lubrication Systems in Internal Combustion Engines/ Lubricating Oils- Oil Ageing and Oil Consumption/ Engine Oil Additives/ Their Functions/ Their Reactions Produced on the Rubbed Surfaces/ Lubricating Oil Analysis/ Oil Drain Periods/ Calculation of Oil Pump and Filter/ Calculation of Minimum Oil Film Thickness in Bearings/ Illustrations of Engine Lubrication Systems/ Wear in Internal Combustion Engines and Factors Effecting Wear/ Wear Mechanisms/ Friction and Factors Effecting Friction/ Cooling in Internal Combustion Engines and Cooling Systems/ System Components/ Calculation of Water Pump/ Calculation of Radiator/ Illustrations of Engine Cooling Systems.

0653641 ENGINE DYNAMICS (3,0,0) 3

Kinematics of Crank-Connecting Rod Mechanism/ Kinematics of Piston/Kinematics of Connecting Rod/Reduction of Masses/ Forces Caused By the Moving Engine Parts/Engine Balancing/General Engine Dynamics.

0653711 HEAT TRANSFER (3,0,0) 3

General Definitions and Concepts/ Fourier Equation/ Heat Conduction Differential Equation and Temperature Distributions/ One Dimensional Heat Conduction and Composite Walls/ Convection Equation/ Boundary Layer/ Forced Convection-Internal Flows/ External Flows/ Tube Bundles/ Natural Convection/ Heat Exchangers/Radiation

0653712 MEASUREMENT TECHNIQUE (3,0,0) 3

Measurement Technique/ Temperature Measurement/ Humidity Measurement/ Mass and Length Measurement/ Time and Velocity Measurement/ Calibration and Control/ Calibration Errors/ Infinite Calibration Errors/ Finite Calibration Errors

0653721 FLUID DYNAMICS 2 (3,0,0) 3

Conservation Equations/ Stream Function/ Potential Function/Source/ Sink/ Doublet/ Vortex Solutions/ Exact Solutions for Viscous Flows/ Low Reynolds Number Flows (Lubrication Theory) / Boundary Layer Flows / Gas Dynamics/ Quasi-One-Dimensional Isentropic Flow / Normal Shock Waves

0653722 INSTALLATION TECHNIQUES (3,0,0) 3

Waste Water Systems/ Clean Water Systems/ Hot Water Systems/ Sanitary Systems/ Pool Systems and Applications

0653731 ENGINEERING THERMODYNAMICS (3,0,0) 3

Rankine Cycle/ Heat Engines/ Heat Pumps/ Ideal Gas Mixtures/ Air-Water Vapor Mixtures/ Mechanical Compression and Absorption Refrigeration Systems

0653732 REFRIGERATION TECHNIQUES (3,0,0) 3

Second Law of Thermodynamics and Reverse Carnot Cycle/ Methods of Refrigeration/ Vapor Compression Cycle/ Refrigerants/ Compressors/ Condensers/ Evaporators/ Refrigerant Flow Controls/ Air-Cycle Refrigeration/ Absorption Systems/Steam-Jet Refrigeration/ Cooling Towers and Evaporative Condensers/ Calculating the Cooling Load

0653741 HEATING TECHNIQUE (3,0,0) 3

Heating Systems/ Components of Central Heating Systems and Major Piping Distribution Systems/ Importance of Insulation/ Insulation Report and Project/ Real Heat Loss Calculations/ Location of Heaters/ Approximate Heat Loss Calculations/ Boiler Room Design and Layout/ Determination of Boiler Quantity/ Boiler and Chimney Calculations/ Coal and Fuel Storage Calculations

0653742 THERMAL PROCESSES (3,0,0) 3

Evaporators: Types/ Auxiliary Equipment/ Capacity/ Heat and Mass Balances/ Dühring's Principle/ Enthalpy-Composition Diagrams/ Multiple Effect Evaporation/ Distillation: Vapor-Liquid Equilibrium/Boiling Point Diagrams/ Raoult's and Henr's Laws/ Constant Boiling Mixtures/ Distillation Methods/ Rectification/ Fractionating Column Design/ Heat and Mass Balances/ Stage Calculations/ Extraction: Types/ Liquid-Liquid Extraction; Solid-Liquid Extraction; Triangular Diagram/ Graphical Solution/ Multi-Effect and Counter Flow Extraction Calculations/ Solubility and Equilibrium Diagrams/ Humidification/ Dehumidification and Water Chilling/ Heated Wall Columns/ Wet Bulb Temperature Theory/ Cooling Tower Types/ Flow Rate Equations for Heat and Mass Transfer in Packed Columns/ Graphical Solution/ Gas Absorption: Two Phase Flow and Pressure Drop in the Tower/ Liquid Phase Mass Transfer in Packed Columns

0653751 HEATING AND VENTILATION (3,0,0) 3

Heating Systems/ Components of Central Heating Systems and Major Piping Distribution Systems/ Importance of Insulation/ Insulation Report and Project/ Real Heat Loss Calculations/ Location of Heaters/ Approximate Heat Loss Calculations/ Boiler Room Design and Layout/ Determination of Boiler Quantity/ Boiler and Chimney Calculations/ Coal and Fuel Storage Calculations/ Ventilation Systems/ Air Flow-Rate Determination/ Diffuser Selection/ Air Duct Calculations

0653752 ENGINEERING ECONOMY (2,0,0) 2

Importance of Heat Energy in Processes/ Heat Recovery in the Process Industry/ Armature Selection to Achieve Energy Economy in the Process Industry/ Energy Lost Calculations in Heat Recovery Systems/ Influence of Heat Recovery on Interest and Payback

0653761 ADVANCED THERMODYNAMICS (2,0,0) 2

First and Second Laws Applied to Chemical Processes/ Nernst Theory and the Third Law of Thermodynamics/ Gibbs and Helmholtz Equations/ Evaporation As Chemical Reaction/ Heterogeneous Reactions/ Reaction Order/ Dissociation Order/ Dissociation of Combustion Gases/ Plasma Condition of Matter

0653771 GAS INSTALLATIONS (2,0,0) 2

Unit Systems/ Properties of Gas Pipes; Fittings/ Valves and Installations/ Expansion of Gas Pipes/ Solution/ Installation Elements/ Their Installation/ Condensation and Corrosion in Installations/ Solutions/ Insulation/ Dimensioning and Equipment Selection/ High Pressure Gas Piping/ Low Pressure Gas Piping/ Gas Piping/Steam Distribution Systems/ Applications and Examples

0653831 TRANSPORTATION SYSTEMS (2,0,0) 2

Introduction and Construction of Machines Used in Material Handling

0654022 LABORATORY (2,0,0) 1

Practical Knowledge Based on Manufacturing Processes and Technologies and Applications of These By Making Several Measurements and Experiments

0654028 LABORATORY (2,0,0) 1

Applied Studies of the Courses Governed By the Automotive Subdivision of the Department of Mechanical Engineering: Carburetors/ Ignition Systems/ Visual Analysis of Fuel Pumps and Injectors/ Derivation of the Valve Timing Diagram. Performance Tests of the Engines.

0654111 HYDRAULICS AND PNEUMATICS (3,0,0) 3

Fundamentals of Hydraulics/ Hydraulics Fluids and Their Specifications/ Hydraulics Cylinders/ Pumps: Types and Calculations/ Valves/ Hydraulics Systems Design/ Basic Concepts of Pneumatic/ Pneumatic Valves/ Pneumatic Circuits and Systems/ Pneumatic Control Systems.

0654112 COMPRESSORS (3,0,0) 3

Introduction/ Compressor Types/ Thermodynamics of Compressors/ Design of Reciprocating Compressors/ Radial Flow Compressors/ Multi Stage Compressors/ Non-Dimensional Quantities for Compressor Characteristics/ Axial-Flow Compressors/ Elementary Theories/ Axial Compressor Characteristics

0654121 CONSTRUCTION OF TURBO MACHINERY (3,0,0) 3

Thermodynamics Calculations/ Manufacturing/ Materials of Turbo Machinery Parts/ Strength and Dimension of Turbo Machinery Parts.

0654122 ENERGY PLANTS (3,0,0) 3

Introductions and General Information of Plants/Hydraulic Power Plants/Plants With Using Coal/ Plants With Using Fuel-Oil/Gas Turbine Plants/Diesel Engine Plants/Combined Plants/Nuclear Plants/Heat-Power Plants/Comparing Thermal Power Plants/Condensation System/Preparing Fuel Systems/Power Plant Failure

0654131 GAS TURBINES (3,0,0) 3

Introduction and History/ Fundamental Equations of Thermodynamics and Gas Dynamics/ Classification of Gas Turbines/ Gas Cycles ;Theoretical Cycles: Carnot Cycles/ Stirling Cycles/ Ericsson Cycle and Brayton Cycle/ Actual Cycles of Gas Turbines; Simple Cycle/ Regenerative Cycle/ Maximum Net Work/ Intercooling and Reheating.

0654132 ENERGY PLANTS AND OPERATING (2,0,0) 2

Comparison and Features of Energy Generation Plants/ The Main Parts of Energy Generation Plants/ Cost Analysis and Operating of Energy Plants.

0654141 HYDRAULIC MACHINES (3,0,0) 3

Introductions and General Information/Load Losses in Pipelines/Pump Characteristics/Euler Laws/The Design of Runner Impeller/ the Design of Snail/Pump Characteristic Curves/Dimension Numbers/Similarity and Model Theory of Hydraulic Machines/Cavitations of Hydraulic Machines/ Hydraulic Turbine/Pelton Turbine/Francis and Kaplan Turbines

0654142 RENEWABLE ENERGY SYSTEMS (2,0,0) 2

Introduction to Energy Resources/ Solar Energy/ Geothermal Energy/ Wind Energy/ Energy From Oceans: Otec/ Wave Energy/ Tidal Energy/ Biomass Energy/ Fusion Energy.

0654151 ENERGY ECONOMY (3,0,0) 3

General Information About Energy Plants/The Factors That Improved Efficiency/The Methods of Utilization From Waste Energy

0654161 INDUSTRIAL HYDRAULICS (2,0,0) 2

Hydraulic Components/ Pressure and Energy Losses of Hydraulic Systems/ Using of Lubricants in the Hydraulics Systems/ System Design and Applications.

0654171 ENERGY SYSTEMS OPTIMIZATION (2,0,0) 2

Basic Concepts of Optimization/ Methods of Optimizing Energy Systems/ Objective Function (Thermodynamic/ Economic/ Thermoeconomy)/ Optimization Methods/ Linear Programming/ Non-Linear Programming/ Simplex Method/ Application of Optimization on Energy Conversion Plants

0654211 TRANSPORTATION TECHNICS I (3,0,0) 3

Provide Students With Knowledge About Selection of Material Handling Equipments And Design of Transportation Systems

0654212 TRANSPORTATION TECHNICS II (3,0,0) 3

Design and Selection of Material Handling Systems Used in Industry.

0654221 CONSTRUCTION TECHNICS I (3,0,0) 3

The Production Types/ Design and Calculations of Machine Design

0654222 CONSTRUCTION TECHNICS II (3,0,0) 3

The Principals of Machine Design

0654231 MACHINE ELEMENTS 3 (2,0,0) 2

Dynamics of Clutches/ Non-Cylindrical Gears/ Worm Gears/ Gear Boxes/ Gear Systems

0654311 CASTING TECHNIQUES I (3,0,0) 3

Non Ferrous Metals/ Structural Properties/ Importance in Industry/ Casting Methods of Non Ferrous Metals/ Applications/ Casting Faults and Prevention Methods

0654312 CASTING TECHNIQUES 2 (3,0,0) 3

Solidification of Metals/ Fluidity and Casting Ability/ Models and Model Design/ Runner System/ Feeder Design/ Mold and Core Materials and Preparations/ Molding Methods and Equipment/ Casting Failures

0654321 WELDING TECHNICS II (3,0,0) 3

Weldability- Welding Stresses and Formal Distortions- Metallurgical Principles- Welding of Alloyed Steels- Welding of Nonferrious Materials- Heat Treatments Related to Welding- Special Welding Techniques

0654322 COMPUTER AIDED MANUFACTURING (CAM) (3,0,0) 3

Hardware/ Software for Cam Systems and Their Properties. Numerical Controlled Machine Tools/ Manufacturing Systems and Cam. Modelling By Cad/Cam Techniques/ Selection of Process Parameters/ and Tooling. Tool Paths Generation/ Post Processing and Graphical Simulation

0654331 MACHINE TOOLS (3,0,0) 3

Classification of Machine Tools/ Machine Tool Driving Systems and Machine Construction/ Power and Efficiency/ Design Principles of Machine Tools/ Metal Cutting Machine Tools/ Functions of Machine Tools and Using Them in Manufacturing/Maintenance and Control

0654341 MACHINING II (3,0,0) 3

Introduction to Cutting Mechanics/ Cutting Tool Selection and Design/ Broaching/ Sawing/ Finishing Operations/ Screw and Gear Machining Methods/ Grinding By Abrasive Belts/ Main Principles of Non Traditional Machining Methods.

0654342 NUMERICAL CONTROLLED MACHINE TOOLS (2,0,0) 2

Numerical Control/ Nc/ Cnc and Dnc Machine Tools/ Structure and Components of Control Systems/ Construction Properties of Nc and Cnc Machine Tools/ Manual Programming/ Computer Aided Programming/ High Speed Cnc Machine Tools and Their Properties.

0654351 DIE MANUFACTURING TECHNIQUES (3,0,0) 3

Principles of Forming and Forging With Die/ Die Types/ Forging and Stamping Dies/ Sheet Metal Forming Dies/ Plastic Injection and Forming Die and Molds/ Design of Dies and Die Components/ Die Materials/ Die Manufacturing/ Tolerances/ Finish Processes/ Reverse Engineering and Rapid Prototyping Applications in Die Manufacturing

0654352 MANUFACTURING SYSTEMS (2,0,0) 2

Definitions and Concepts/ Modern and Classical Manufacturing Systems/ Group Technology/ Computer Aided Process Planning/ Material Requirements Planning/ Flexible Manufacturing Cells and Systems (Fms)/ Computer Integrated Manufacturing Systems (Cim)/ Expert Systems/ Automated Storage and Retrieval Systems (As/Rs)/ Handling and Robotic Systems in Manufacturing

0654361 QUALITY MANAGEMENT (2,0,0) 2

Quality Concept/ Quality Techniques/ Quality Control/ Inspection and Tests/ Quality Insurance/ Quality Improvement/ Quality Planning/ Quality Costs/ Total Quality Management/ Quality Standards/ Documentation of the Quality Management/ Interior Audit/ Certification/ Proses Control/ Quality Circles/ Calibration/ Quality Improvement Methods/ Iso 9000 Standards

0654362 PLASTIC MATERIALS AND FORMING (2,0,0) 2

Definition & Signification of Polymers/ Chemical & Physical Structures of Polymers/ Classification & Properties of Plastic Materials; Thermal/ Chemical/ Flammable/ Electrical/ Mechanical Properties of Plastic Materials/ Applications of Plastic Materials/ Destructive Tests of Plastic Materials/ Forming Methods of Plastic Materials/ Extrusion/ Injection/ Pressure and Transfer Molding/ Pressure Forming/ Thermal Forming/ Rolling/ Casting/ Joining/ Machining/Design Techniques/ Faults in Forming/ Standards of Plastic Materials

0654371 COMPOSITE MATERIALS IN MANUFACTURING (2,0,0) 2

Composite Materials/ Definition and Signification/ Classification/ Reinforcement Materials/ Matrix Materials/ Interface Interaction Between Matrix and Reinforcement/ Comparing With Other Materials/ Manufacturing/ Properties and Application Areas of Mmc/ Manufacturing/ Properties and Application Areas of Pmc/ Manufacturing/ Properties and Application Areas of Cmc/ Corrosion Behaviour of Composite Materials and Testing Methods.

0654381 PLC CONTROLERS AT MANUFACTURING (2,0,0) 2

Terminology of Programmable Logic Controllers and Peripheral Units/ Industrial Application Areas of Plc/ Relay Logic/ Memory Areas and Their Types/ Ladder Program Software/ Input and Output Modules for Digital and Analog/ Instruction Sets/ Examples of Plc Ladder Program/ Scada(Supervisor Control and Data Acquisition)Logic

0654411 AUTOMATIC CONTROL I (3,0,0) 3

Introduction/ Modelling and Dynamics of Dynamic Systems/ Laplace Transform/ Time Domain Specifications/ Pid Control Design/ Ziegler-Nichols Tuning and Determination of Control Parameters/ Bibo Stability/ Routh-Hurwitz Stability Criterion/ Root Locus Analysis

0654412 AUTOMATIC CONTROL II (2,0,0) 2

Feedback and Forward Control Systems

0654421 MECHANICAL VIBRATIONS (2,0,0) 2

Basic Concepts of Mechanical Vibrations/ Modelling of Mechanical Systems/ Single Degree of Freedom (Dof) Systems/ 2-Dof Systems/ Multiple Dof Systems/ Eigenvalue Problem/ Vibration Kontrol Techniques/ Vibration Isolation

0654422 INDUSTRIAL ACOUSTICS AND NOISE (2,0,0) 2

Description of Noise/ Measurement of Noise/ Description of Industrial Noise Sources/ Noise Isolation

0654432 INTRODUCTION TO ROBOTIC ENGINEERING (2,0,0) 2

Introduction to Basic Robotic Engineering/ Kinematics and Dynamics

0654442 KINEMATICS II (2,0,0) 2

Cam Mechanisms/ Motion Diagrams/ Determination of Cam Profiles/ Design of Cam Mechanisms/ Force Transmission in Mechanisms/ Special Mechanisms

0654452 PROCESS CONTROL APPLICATIONS (2,0,0) 2

Industrial Control Systems/ Components and Design

0654611 MOTOR VEHICLES I (3,0,0) 3

Tractive Resistances/Axle Loads/ The Parameters That Affects the Tyre-Road Friction Coefficient/ Tractive Force Etc. Speed Diagram/ Driving Analysis With Different Tractive Powers at Variable Road Conditions/ Cornering Stability/ Traction Limits of Motor Vehicles/Transmission Systems/ Clutches/Gearboxes/ Drivelines/ Universal Joints/ The Differential/ Steering/ Tyres

0654612 MOTOR VEHICLES 2 (3,0,0) 3

Classification of The Brake Systems/Principles of Braking/Physics of Braking and Stopping Distance/Braking Performance/Optimum Brake Forces/Hydraulic Brake Systems/Pneumatic Brake Systems/ Driving Safety.

0654621 INTERNAL COMBUSTION ENGINES 2 (2,0,0) 2

Mixture Formation/ Combustion Process in Compressed Ignition Engine/ Soot Formation/ Injection Systems/ Regulators/ 2-Stroke Engines/ Supercharging/ Air-Cooled Engines/ New Developments in Diesel Engine Technology and Design.

0654622 FUELS AND COMBUSTION (2,0,0) 2

Energy Matter/ Demanded Features From the Fuels/ Solid Fuels (Coal)/ Demanded Features From the Coal/ Carbonisation of Coal/ Liquidification and Gasification of Coal/ Liquid Fuels (Petrol)/ Petrol Formation/ Demanded Features From the Liquid Fuels/ Gaseous Fuels/ Combustion and Combustion Theories/ Combustion of Solid (Coal)/ Liquid and Gaseous Fuels/ Solid Fuels Combustion Systems/ Liquid Fuels Combustion Systems/ Gaseous Fuels Combustion Systems.

0654711 STEAM BOILERS (3,0,0) 3

Theoretical Fundamentals/ Firing Equipment and Installation/ Circulation in Boilers/ Feed Water Conditioning/ Boiler Instrumentation/ Boiler Management/ Fuel and Combustion/ Efficiency and Fuel Consumption/ Heat Transfer/ Boilers Dimensioning/ Boiler Heating Surfaces

0654712 PROCESS DESIGN (3,0,0) 3

Material Balance/ Energy Balance/ Equipment Selection/ Design of Petrochemical Plants/ Design of Fertilizer Plants/ Design of Oil Plants/ Design of Dairy Plants/ Design of Building Automation/ Design of Building Mechanical System.

0654721 AIR CONDITIONING (3,0,0) 3

Psychrometry/ Air Conditioning Systems/ Air Duct Systems/ High Pressure Systems/ Fan-Coil Systems/ Heat Gain Calculations/ Air Duct Calculations/ Equipment/ Drafting Calculations/ Air Conditioning Control Systems

0654722 SOLAR ENERGY AND HEAT PUMP SYSTEMS (3,0,0) 3

Introduction-Solar Irradiation/ R-Factors/ Plane Solar Collectors/ Optimum Collector Angle/ Active Heating By Solar Energy/ Heat Pumps/ Heat Pumps Utilization Air/ Water and Soil/ Combined Solar Energy-Heat Pump Systems

0654731 PROCESS CONTROL (3,0,0) 3

On-Off and Continious Control/ Examples of On-Off Control/ Continious Control/ Types/ Electronic/ Pneumatic/ Hydroelectric Control Elements and Stability/Industrial Applications

0654732 GENERAL PROCESS TECHNIQUES (3,0,0) 3

Dispersely Distributed Phase Flow-Pneumatic Transport/ Hydraulic Transport/ Separation Process/ Mixing/ Sedimentation/ Absorption/ Extraction/ Drying and Types/Spraying Film Flows/Non-Newtonian Flows

0654741 REFRIGERATION AND AIR CONDITIONING (3,0,0) 3

Refrigeration Cycles/ Thermodynamics of Systems With Mechanical Compressions/ Refrigerants/ Refrigeration Equipment/ Heat Transfer and Cooling Load Calculations/ Thermal Properties of Air/ Cooling and Heating of Moist Air/ Adiabatic Mixtures/ Air Conditioning Systems/ Summer Air Conditioning/ Cooling Load Calculation/ Psychrometry/ Winter Air Conditioning/ Other Air Conditioning Systems/ All-Water Systems/ Air-Water Systems

0654742 ENERGY MANAGEMENT (3,0,0) 3

General Structure of the Turkish Industry/ Energy Consumption of Processes/ Energy Management Principles/ Energy Savings-Investigation Methods/ Energy Accounting/ Measurement/ Instrumentation and Process Control/ Energy and Mass Balances/ Combustion Systems of Power Plants/ Boiler Efficiency/ Steam Generations and Distribution Systems/ Insulation/ Ovens/ Heating/ Ventilation and Air Conditioning/ Drying Processes/ Waste Heat and the Environment/ Solar Energy and Heat Pump Systems/ Optimization of Cogeneration Systems

0654751 HEAT TRANSFER 2 (2,0,0) 2

Boiling Regimes and Heat Transfer/ Condensation Heat Transfer/ Transient Heat Transfer/ Multidimensional Heat Transfer/ General Principles of Radiation/ Staephan-Boltzman and Kirchoff Laws/ Black Body Radiation/ Shape Factor/ Heat Transfer Between Grey Surfaces/ Gas Radiation

0654752 INDUSTRIAL AIR CONDITIONING (2,0,0) 2

Evaporation of Water in Most Air and Mass Transfer/ Refrigeration Systems/ Air Conditioning Using Evaporative Cooling (Textile Air Conditioning)/ All Water Air Conditioning Systems/ Air-Water Systems/ Calculation of Air Ducts and Construction

0654761 PLANING OF PLANTS BY PROCESS TECHNIQUES (2,0,0) 2

Mass Flow/ Equipment Selection in Process Installations/ Process Plant Layout/ Industrial Appliations

0654762 APPARATUS DESIGN (2,0,0) 2

Thermal Theory of Apparatus/ Thermal Calculations of Apparatus/ Dimensioning of Apparatus/ Stress Analysis of Apparatus/ Structure of Apparatus

0654771 MASS TRANSFER (2,0,0) 2

Introduction/ Definitions/ Concepts/ Units/ Conservation and Continuity Equations of Multi-Component Systems/ Principles of Diffusion/ Diffusion Coefficient/ Diffusion in Gases/ Liquids and Solids/ Steady State Diffusion Models/ Mass Transfer With Chemical Reaction/ Homogenous and Heterogenous Reactions

0654772 MASS TRANSFER 2 (2,0,0) 2

Convective Mass Transfer/ Laminar Flow/ Turbulent Flow/ Two Phase Flow/ Phase Equilibrium/ Macroscopic Balances for Multicomponent Systems/ Mass Transfer at Phase-Interface/ Mass Transfer Coefficients/ Applications/ Design of Continious Systems/ Design of Non-Continious Systems/ Momentum/ Heat and Mass Transfer

0653432 AGRICULTURAL MACHINES I (2,0,0) 2

Agricultural Tractors/ Mechanics of Tractors.

0654431 AGRICULTURAL MACHINES II (2,0,0) 2

Soil Structure/ Soil Working Machines

0654632 VEHICLE AND ENVIRONMENT POLLUTION (3,0,0) 3

The effects of Motor Vehicles on environment and human/ Pollutant effects/ Classification of the Pollution caused by the vehicles/ The methods used to obstruct the formation of pollutants and/or reduce the amount of pollutants/ Standards