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| **2018-2019 AUTUMN – ENGLISH COURSE CATALOGUE** |
| Faculty | Engineering |
| Department | Automotive Engineering |
| Course Code | Course Name | ECT | Course Content |
|  ME101 | Introduction to Mechanical /Automotive Engineering | 6 | History and emergence of mechanical and automotive engineering. Basic concepts and subjects, fields of work, qualifications and skills of mechanical and automotive engineers, an overview of the mechanical and automotive engineering curriculums at Okan University**.** |
|  ME201 | Computer Aided Technical Drawing |  5 | The first half of this course is devoted to drafting by hand and the second half is devoted to using CAD (Computer Aided Design) . Instrumental drawing, multiview projections, sectional views, auxiliary and oblique views , dimensioning and tolerancing, 3D sketching (include extruding, protrusions, revolving etc.). |
|  ME207 |  Engineering Materials |  8 |  Classification of materials. Atomic structure and interatomic bonding. The structure of crystalline solids. Crystalline and noncrystalline materials. Imperfections in solids. Mechanical properties of materials. Phase diagrams and phase transformations. Metal alloys. Structure and properties of ceramics, polymers and composites. Electrical, magnetic, thermal and optical properties of materials. Performance of materials in service. |
|  ME209 |  Thermodynamics I |  7 |  Introduction to thermodynamics, ideal gasses, internal energy, enthalpy, energy transfer by work, heat and mass, the first and second laws of thermodynamics, refrigerators and heat pumps, Carnot cycle, entropy, reversibility. |
| ME305 |  Machine Design I |  5 |  Review of load analysis, materials, stress and strain. Types of failures, fracture mechanics, static failure theories, stress theories, modified Mohr theory, safety factors, reliability. Linear, bending and torsional impact. Fatigue for elements under torsional, bending and axial stress. Influence of surface and size on fatigue strength. Fatigue life with random varying loads. Surface damage with corrosion, adhesive and abrasive wear. Surface fatigue failures. |
| ME307 | Fluid Mechanics I | 5 | Hydrostatics, kinematics of flow, continuity equation, Euler’s and Bernoulli’s equations, viscous flow equations, head loss in ducts and piping systems, momentum theorems, dimensional analysis and similitude, potential flow, circulation and vorticity. |
| ME313 | Systems and Control | 5 | Modeling in time domain and frequency domain, time response, stability, steady state errors, block diagrams, root locus and frequency techniques, design by root locus and frequency techniques. |
| ME315 | Mechanical Experimental Lab I | 5 | Statistical basics of engineering experiments are presented. The components of a measurement systems are defined. |
| AUTO303 | Vehicle Development Fundamentals |   5 |   Products portfoglio plan, vehicle specs preparation, Project management principles, Vehicle architecture, vehicle drive train selection, vehicle performance calculations, fuel consumption calculations, vehicle homologotion principles, safety issues, design FMEA. |
|   ME309 |   Dynamics | 5 | Dynamics of particles: Rectilinear and curvilinear motion. Newton's laws, momentum and angular momentum methods. Work and energy. System of particles. Dynamics of rigid bodies in plane motion; kinematics. Work and energy methods for rigid bodies. |
| ME458 | Introduction to Finite Element Analysis | 5 | Application of finite element methods to different mechanical engineering areas. These areas include stress analysis, heat transfer and fluid flow. |
| AUTO497 | Automotive Engineering Design | 4 | In this course which consists of the design of a complex system, process, device or product, within the framework of preferrably a multi-disciplinary engineering problem, under realistic constraints, and taking into consideration social, economic and environmental conditions as well as relevant national and international standards and characteristics of sustainability and manufacturability, without compromising ethical principles, the student is required to document the requirements specification and the design in conformance with international standards. |
| AUTO473 | Automotive Aerodynamics and Thermal Systems |  5 |   Basic principles of aerodynamics and heat transfer, effect of aerodynamics in car design, basic thermal systems in vehicles, design principles of thermal systems, ergonomics and comfort principles related to thermal systems design. |
| AUTO409 | Automotive Lab | 8 | Weekly experiments from different areas of automotive engineering. A weekly report is written for every experiment. |
|  AUTO407 | Vehicle Dynamics | 5 | Tire modeling, longitudinal vehicle dynamics, driveline dynamics , lateral vehicle dynamics (kinematic model, bicycle model, stability), suspension modeling (suspension kinematics, camber, quarter car model, half car model, vibration, frequency response), roll dynamics (roll angle, anti-roll bars, roll-over), steering mechanism (ackermann steering) hydraulic boost, electric boost, caster angle, toe angle), trailer dynamics, trailers with steering. |
|  ME453 | Thermodynamics II | 5 | Vapor power and gas cycles. Refrigeration cycles. Thermodynamic relations. Mixtures of gases, application to Hygrometry and air conditioning. Chemical reactions. Combustion. Chemical equilibrium. |