Eastern Mediterranean University

"Virtue, Knowledge, Advancement"

FACULTY OF ENGINEERING

MECHANICAL ENGINEERING DEPARTMENT

GRADUATE PROGRAM

2024/2025
ACADEMIC YEAR

www.emu.edu.tr/en

THE WORLD UNIVERSITY RANKINGS 2024 601-800

QS STARS RATED FOR EXCELLENCE 2019 TEACHING

QS STARS RATED FOR EXCELLENCE 2019 FACILITIES

QS STARS RATED FOR EXCELLENCE 2019 INCLUSIVENESS

QS STARS RATED FOR EXCELLENCE 2019 INTERNATIONALIZATION

ABOUT EMU

The Eastern Mediterranean University (EMU) based on the Mediterranean Island of Cyprus was established in the year 1979 in Northern Cyprus. Since then, EMU has grown exponentially to claim its position as a worldwide renowned public university, with over 55,000 graduates and currently providing education to over 20,000 students. EMU stands as a Times Higher Education Ranking University in the 601-800 band, 5-Star achieving university awarded by the QS ranking intuition, with over 100 undergraduate and schools programs, over 80 post graduate programs and providing education to students from more than 100 countries. The university that has 3 km^2 campus. Students of EMU benefit from a wide variety of sports facilities. A modern stadium with a capacity of 5,000 seats, tartan athletics track, cardio center, spinning and TRX halls and an open area of 66,500 m^2 for sports and closed sports complex with a capacity of 3,500 seats are only some of the facilities from which students can benefit. EMU offers a colorful and high quality campus life enriched by numerous social and cultural activities organized by more than 50 student clubs and international student associations operating under the International Office. EMU has a fully equipped Health Center with 13 specialist doctors and a private ambulance. As well as the Health Center, there are over 30 research centers some of which directly provide services for students. Students can directly benefit from the services of the Center for Psychological Counseling, Guidance and Research (PDRAM) and the Center for Graduate Communications and Career Research.

FACULTY OF ENGINEERING

The EMU Engineering Faculty was established in 1983, and as of today has 9050 graduates. Presently, the faculty has 22 undergraduate, 8 post graduate and 5 PhD programs in 5 departments with about 2800 students from 35 different countries. The mission of the EMU Engineering Faculty is to contribute to betterment of our society through the pursuit of innovative education, active learning and cutting edge scientific research in a competitive and sustainable environment and maintain our regional leadership by setting a good example. We also aim to provide opportunities and create an esteemed academic environment for the exchange of diversity of cultures, social, political and ideological knowledge and professional talents among the students as well as the faculty.

MECHANICAL ENGINEERING DEPARTMENT

The Department of Mechanical Engineering (ME) is one of the first three departments established in this University. The graduate program of the department was started in 1990. The Department offers programs of study leading to the degrees of Bachelor of Science (B.S.) in Mechanical & Mechatronics Engineering, Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) in Mechanical Engineering. The Mechanical Engineering Department has the largest population of international students in EMU at present. The BS Mechanical and Mechatronics Engineering programs are accredited by ABET (Accreditation Board for Engineering and Technology). The mission of the Mechanical Engineering Department is to cultivate on the creation integration, transfer and application of knowledge relevant to the disciplines of Mechanical and Mechatronics Engineering. The purpose of the post graduate program is to contribute to the technological improvement to serve national and international communities. Through continuously developing our educational and research programs, our graduates become professional leaders who can apply their knowledge and skills to work on the engineering problems encountered by community and industry.

ADMISSION REQUIREMENTS

For Master's and PhD programs, evidence of English language proficiency is required. If you do not have a valid English language qualification that meets the EMU requirements your level will be assessed by examination at EMU. For details, please check https://grad.emu.edu.tr/en/admission/english-language-requirement

M.Sc. in Mechanical Engineering

M.Sc. program requires a minimum CGPA of 2.75/4.0 (or international equivalent) in a related science or engineering discipline; for applicants with CGPA below 2.75 (between 2.5 and 2.75) the departmental graduate committee may ask the candidates to take a number of deficiency courses from the undergraduate program before they are admitted to the program.

Ph.D. in Mechanical Engineering

For the Ph.D. program the standard academic entry requirement is a minimum CGPA of 3.0/4.0 (or international equivalent) obtained from a related science or engineering undergraduate discipline. The applicant is also required to have a Master's Degree in a mechanical engineering-related field and submit a research proposal (brief explanation about his/her research interests).

For PhD applicants with undergraduate CGPA in the range (2.75-3.00)/4.00, an international conference paper or an international indexed journal paper (Web of Science or Scopus indexed), and for those in the range (2.50-2.75)/4.00 an international indexed journal paper (Web of Science or Scopus indexed) is required as an additional requirement, respectively.

PhD Candidates must submit a detailed research proposal with a brief literature review, research scope, objectives, methodology and plan before the admission. PhD Candidates must choose a stream/ field of study i.e. Thermal Science, Mechanics, Materials and Manufacturing, Mechatronics, and must find a Supervisor in the relevant stream before the start of the formal studies. The Supervisor must be appointed as the Advisor of Masters and PhD Candidates.

For PhD Candidates, in case of deficiency of 2 Maths Courses in their MS transcripts, they must be advised to take Math Courses as deficiency before the start of PhD Program.

Admission of applicants to the PhD program is subject to the availability of a supervisor in the proposed research field.

TUITION FEE & SCHOALRSHIP

Scholarships and research assistantships to deserving candidates. For more information and details on the application process, admission requirements, Tuition fees, scholarship opportunities and research assistant opportunities please visit the EMU's Institute of Graduate Studies and Research website. https://grad.emu.edu.tr/en

PROGRAM REQUIREMENTS

The fields of study in the Mechanical Engineering Department are classified into three groups: Thermal-fluid Science and Energy; Materials and Manufacturing; Mechanics and Machine Design, and Electromechanical Systems. Students accepted for the graduate program should have taken the courses or their equivalents as given below. Otherwise the candidate will be asked to take all or some of the courses not taken before.

a. Thermal-fluid Science Energy: Thermodynamics (MENG 245, 246), Heat Transfer (MENG 345), Fluid Mechanics (MENG 353)
b. Materials and Manufacturing: Materials Science (MENG 286), Manufacturing Processes (MENG 364), Strength of Materials (MENG 222)
c. Mechanics and Machine Design: Dynamics of Machinery (MENG 331)), Control System (MENG 332), Machine Elements (MENG 375, 376)
d. Mechatronics: Systems Control (MENG332), Mechatronic Components and Instrumentation (MECT361), and Industrial Automation (MECT444).
e. Engineering Mathematics courses are prerequisite for students in all of three groups besides familiarity in one computer language.

MASTER OF SCIENCE

A Master student needs to take 7 Technical courses and 2 Non-credit courses (Seminar and Advanced writing) as one of Master degree requirement. Two MATH courses, as approved by the department, are compulsory for every student. Please note that the listed courses below can only be taken instead of one mathematic course of MS program.
Besides MATH and Non-credit courses, a student needs to take at least 3 departmental courses (i.e., with MENG code). The remaining 2 courses are elective and can be taken with the permission of concerned supervisor.
A Master student can take an undergraduate course (from area electives with MENG 400 code), which will be counted as one of the three departmental courses required to be taken.

CURRICULUM

Course Code	Course Title	Credit	Lecture Hour (hrs/week)	Lab / Tutorial (hrs/week)
MENG500	M.S. Thesis	No-Credit	-	-
REQ1	Required Course	3	3	-
REQ2	Required Course	3	3	-
REQ3	Required Course	3	3	-
REQ4	Required Course	3	3	-
REQ5	Required Course	3	3	-
REQ6	Required Course	3	3	-
REQ7	Required Course	3	3	-
MENG598	Seminar	No-Credit	-	-

DOCTORATE OF PHILOSOPHY

A PhD student needs to take 7 Technical courses and 2 Non-credit courses (Seminar and Advanced writing) as one of Master degree requirement. However, advanced writing can be exempted for a student if he/she has already taken this course in Master program. Two MATH courses, as approved by the department, are compulsory for every student. Please note that the listed courses below can only be taken instead of one mathematic course of PHD program. Besides MATH and Non-credit courses, a student needs to take at least 3 departmental courses (i.e., with MENG code). The remaining 3 courses are elective and can be taken with the permission of concerned supervisor. A PhD student, contrary to a Master student, is not allowed to take any undergraduate course (with 400 code). After fulfilling the course requirement, the student is required to register for PhD qualifying exam with the advisor. Prior to appear in exam, applicant (or supervisor) must update graduate school by filling the relevant form. This exam consists of two parts; written and oral exams. The objective of the written exam is to test the student's background in the proposed field of research. The streams and the relevant subjects of the written exam are as follows:

a- Thermal Energy and Fluid Science group

- Applied Mathematics
- Heat Transfer
- Thermodynamics
- Fluid Mechanics

b- Materials and Manufacturing group

- Applied Mathematics
- Materials Science
- Manufacturing Processes
- Strength of Materials

c- Mechanics and Machine Design group

- Applied Mathematics
- Machine Elements
- Dynamics and Vibration
- System Control

d- *Mechatronics/Electro-Mechanical group*

- Applied Mathematics
- System Control
- Electromechanical Systems
- Industrial Automation

The exam depending on the instructor could be open or close book. The exam (written & oral) is organized and evaluated by a committee with ***at least three members.*** To qualify exam, a student should secure at least 65% marks in each subject. Students who fail the qualifying examination are allowed to retake the exam for the second time only after three months. In case a student successfully qualifies exam, s/he must appear for oral exam, preferably within a week. S/He is expected to explain his research plan thoroughly. Further requirements for thesis and graduation are outlined in "Lisansüstü Öğretim Yönetmeliği". Prior to appoint of a Ph.D thesis jury, the candidate must have: (a) At least one paper published (or accepted) related to his/her thesis research field in SCIE journal. (b) Secured minimum 21 points from the scientific activities described in the list of EMU Academic Assessment Criteria. The distribution of marks for publications is as below:

Type	Points
SCIE	**20**
Other Activities: Int. Journals, Conference, etc	**8, 3**

CURRICULUM

Course Code	Course Title	Credit	Lecture Hour (hrs/week)	Lab/Tutorial (hrs/week)
MENG600	Ph.D. Thesis	No-Credit	-	-
REQ1	Required Course	3	3	-
REQ2	Required Course	3	3	-
REQ3	Required Course	3	3	-
REQ4	Required Course	3	3	-
REQ5	Required Course	3	3	-
REQ6	Required Course	3	3	-
REQ7	Required Course	3	3	-
MENG699	Ph.D. Qualifying Exam	No-Credit	-	-

CORE COURSES

MENG 502 Advanced Finite Element Method (3,0) 3
Introduction to Finite Element Method; Variational formulation and approximation; Analysis of stress and strain; Constitutive equations; Plane problems of elasticity; The finite element concept; One and two dimensional finite element formulation techniques; Transformations, assembly and solution techniques; Introduction to three-dimensional finite elements; Introduction to plane elastic-plastic problems; Introduction to time-dependent problems; FEM of Beam Structures; Meshless method and computational Mechanics, Galerkin metodu, Analysis of plates and shells composites. Introduction to time-dependent problems; Finite element analysis for contact problems Project assignments of one-and two-dimensional problems. Preliminary concepts and linear finite elements; Nonlinear finite element analysis procedures.

MENG 511 Applied Computational Methods for Engineers (3,0) 3
The course is an applied approach to solve different types of equations that arise in engineering analysis. The course contains: solution of systems of linear algebraic equations, eigen-value problems; nonlinear equations; polynomial approximation, numerical differentiation and integration; ordinary differential equations and partial differential equations.

MENG515 – Multidisciplinary Design Optimization (3,0) 3
Multidisciplinary Design Optimization (MDO) deals with the optimization of several engineering disciplines simultaneously. It provides the opportunity to find the optimal solution of a system accounting for the interactions between the different disciplines. The topics covered include: Introduction to Optimization, Design Architectures, Unconstrained & Constrained Optimization, KKT Conditions, Genetic Algorithm, Particle Swarm Optimization, Simulated Annealing, Multi-Objective & Hybrid Optimization, Design of Experiments, Robust Design & Meta-Modeling, FMEA, VMEA, Post Optimality Analysis.

MENG 522 Fracture Mechanics (3,0) 3
Mechanism of fracture and crack growth. The elastic crack-tip stress field, the crack-tip plastic zone. The energy principle; energy release rate, criterion for crack growth, crack resistance, compliance, J-Integral and tearing modulus. Dynamic fracture mechanics and crack arrest. Plane strain fracture toughness, plane stress and transitional behaviour. Elastic-plastic fracture, fatigue crack propagation, fracture resistance of materials. Application of fracture mechanics. Prediction of fatigue crack growth.

MENG 525 Elasticity (3,0) 3
Analysis of stress and strain. Constitutive equations. Plane problems of elasticity. Torsion and flexure of beams. Variational methods, theorems of minimum potential energy and complementary energy. Approximate solution by means of variational methods. Introduction to plate theory.

MENG 533 Advanced Mechanical Vibrations (3,0) 3
1D Wave examples (strings), Sound in fluids, Acoustic impedance, Source energy, intensity and power, Sources, reciprocity, Green's functions, etc., Sound absorption and absorbing materials, Sound in waveguides, mufflers and silencer, Sound in enclosures

MENG 534 Modelling and Simulation of Mechatronic Systems (3,0) 3
The course offers a systematic approach to modelling and simulation techniques, emphasizing the integration of mechanical, electrical, and computational components and their interactions in mechatronic systems. Students will develop a strong theoretical foundation and gain practical skills necessary for the analysis, design, and optimization of complex mechatronic systems.

MENG 542 Components of Energy Systems (3,0) 3
Piping systems, Heat exchangers, Prime movers, pumps, fans, nozzles, turbines, modeling and simulation, Steady-state simulation, Transient simulation, System optimization and risk analysis, Uncertainty analysis, Fluid transients.

MENG 541 Advanced Thermodynamics (3,0) 3
The first and second laws of thermodynamics. The two laws combined: the destruction of energy. Energy generalized. Single-phase, multiphase and chemical reactive systems. Refrigeration and power generation. Thermodynamic design.

MENG543 Building Energy Modelling and Simulation (3,0) 3
Fundamentals of building energy modelling and simulation. Energy benchmarks and metrics. Importance of climatic and weather data, weather data files and sources. Steady state and dynamic methods for energy modelling. Thermal modelling of building elements and zone models. Ventilation modelling: Simple tools, analytical methods, zonal network models and computational fluid dynamics (CFD). Plant components and system modelling. Topology of the plant component models. Derivation of model equations. Occupant modelling and comfort. Human thermoregulation and thermal comfort indices. Building performance optimization and model calibration.

MENG 544 Advanced Heat Transfer (3,0) 3
Conservation principles; mass, momentum and energy. Fluid stresses and flux laws; boundary layer theory and the integral equations of the boundary layer. Momentum and heat transfer in laminae in external and internal flow. Momentum and heat transfer in turbulent external and internal flow; natural convection.

MENG 545 Transport Phenomena (3,0) 3
Heat, mass and momentum transfer with emphasis on the analogies between them. Introduction to transport phenomena. Heat, mass and momentum diffusivities. The balance or conservation concept. One and more dimensional balance equation. Steady-state transport. Transport with a net convection flux. Fluid flows in duct. Heat and mass transfer in duct flow. Unsteady-state transport. Transport coefficient.

MENG 546 Advanced Internal Combustion Engines (3,0) 3
Review of basic principles of engine operation. Thermo-chemistry and properties of engine working fluids. Thermodynamic analysis of engine processes. Mathematical modeling and simulation of engine processes and cycles. Study of various engine schemes.

MENG 547 Energy Management and Utilization (3,0) 3
Energy consumption, conservation and resources. Energy audits, economic analysis. Management and organization of conservation programs. Analysis of thermal-fluid systems. Energy conservation in combustion systems, steam and condensate systems. Heat exchangers, heat recovery and insulation. Energy conservation in industrial system, industrial cogeneration. Power circuits, electrical machinery, electrical energy conservation. Industrial energy use profiles.

MENG 548 Power Generation Systems (3,0) 3
Thermal power plants, steam power plants, solar thermal power plants, Organic Rankine Cycle, Gas Turbines, Carbon dioxide power cycles, Diesel power plants, Other power generating systems, Economic analysis of power plants, power plant simulation and performance analysis.

MENG 551 Advanced Fluid Mechanics (3,0) 3
Fundamentals equations, flow kinematics and special forms of governing equations. Two-dimensional potential flow, three-dimensional potential flow. Viscous flow: incompressible flow and compressible flow of fluids.

MENG 559 Transport Phenomena in Porous Media (3,0) 3
Emphasis on the principle of mechanics of fluid flow through a porous medium, (continuity equation, momentum equation with its extensions), heat transfer through a porous meduium (energy equation with its extensions to more complex situation), mass transfer, force convection, external natural convection, internal natural convection and mixed convection in a porious medium and their application for solving engineering problems.

MENG 561 Manufacturing Systems Engineering (3,0) 3
CAD/CAM Hardware; CAD/CAM software, Integrative manufacturing Planning and control, Group Technology, Computer Integrated manufacturing (CIM), Modeling methodologies and analysis tools for CIM, Systems analysis and design methods, Computer Assisted Systems Engineering (CASE).

MENG 562 Advanced CAD/CAM (3,0) 3
Principles of CAD, Mathematical theory of graphics, Principles of geometric modeling, Terminology of bezier curves, B splines and NURBS, Parametric representation of curves and surfaces; Principles of NC technology and its components, Adaptive control technology, Necessities and types of precise tooling in NC based manufacturing, Advanced methods for NC program of instructions, Information requirements of manufacturing, Role of group technology in CAM, Contribution of CAD/CAM and NC technology in advanced manufacturing

MENG 574 Space Systems Engineering (3,0) 3
Space Systems Engineering combines multidisciplinary engineering fields to realize high-performance space systems and system components. The topics covered include: introduction to systems engineering & spacecraft subsystems, space environment and its effect on design, orbital mechanics, dynamics of spacecraft, mission analysis, launch systems, spacecraft design & sizing, spacecraft subsystems, space propulsion systems, spacecraft structures & mechanisms, attitude control system, power systems, thermal systems, telecommunications, telemetry, command, data handling and processing, ground system design & sizing, space manufacturing, assembly, integration and verification, reliability & cost, space law & regulations.

MENG 575 Advanced Biomechanics (3,0) 3
Introduction to mechanics and biomechanics; Static, Kinematic and Dynamic concepts for analyzing musculoskeletal joint motion; Joint mechanics; Musculoskeletal tissues and tissue modeling; Biomaterials; Joint prosthesis design and analysis; Implant materials and coating; Musculoskeletal and artificial joint contact and tribology; Software for analyzing human body joints.

MENG 555 Computational Fluid Dynamics (CFD) (3,0) 3
Introduction, vector and tensor algebra; Governing equations; Equilibrium equations; Diffusion equation; Euler equation; Advection equations; advection-diffusion equation; boundary and initial conditions; Permeative and stream function-vorticity approach; Approximate methods. Finite difference, weighted residual-finite elements, finite volume; Accuracy and error analysis, Higher order schemes; Staggered grid concept; Pressure correction schemes; Flow in porous media, turbulent flow modeling.

MENG 582 Plastic Forming of Metals (Plasticity) (3,0) 3
Stress, Strain, Macroscopic plasticity and yield criteria, Work hardening, Plastic instability, Strain rate and temperature, Ideal work, Slab analysis, Formability, Forming limits, Advanved forming processes

MENG 583 Application of Virtual Reality (VR) in Manufacturing (3,0) 3
Design-Centered Virtual Manufacturing (VM) – part modeling, rapid prototyping, virtual assembly, and prototyping of mechanical systems. Production-Centered VM-shop floor planning, virtual manufacturing cell, virtual manufacturing process. Virtual Machining-constructing a virtual operation, process simulation and prediction, virtual numerical control. VR Instruments-hardware, software, VR programming.

MENG 584 Advanced Manufacturing Processes (3,0) 3
Advanced materials and material Technologies, Materials developed through Space Related Technologies, Advanced processes for plastic forming and casting; Precision machining-sources of error (Thermal, Static, Dynamic, Process Related), Precision machining processes, Vibration and thermal assisted machining, High-speed processing, Application of FEM in machining, Flexible manufacturing systems [FMS]..

MENG 587 Mechanical Behavior of Materials (3, 0) 3
Elastic properties Mechanical tests Micro-plasticity of crystals and plastic deformation Grain boundaries Strain-hardening Creep Strengthening mechanisms(solute-hardening, precipitation-hardening) Fracture-brittle fracture (Griffith theory) Ductile fracture (ductile-brittle transition) Fatigue fracture.

MENG 588 Nanostructured Materials (3, 0) 3
The course is focused on describing different types of nanostructured materials, and to provide explanations to the unique properties of nanostructured materials. The nature is full of nanostructured materials with fascinating organization and function. Some of these will be described with emphasis on structure-function relationships. Similar nanostructures and their use in some current technology areas will also be addressed. Self-association phenomena, preparation methods, and characterization methods will be discussed.

ELECTIVE COURSES

In order to meet the compulsory two mathematics course requirement of the graduate program, the course must be selected from the following pool of courses after the approval of the concerned advisor/supervisor:

CIVL543 Finite Element Method
COMP587 Artificial Intelligence
COMP588 Computational Intelligence
EE 521 Linear System Theory
EE 571 Probability Theory & Stochastic Processes
IENG511 Optimization Theory
IENG512 Advanced Linear Programming
IENG518 Non-Linear Optimization
IENG581 Design and Analysis of Experiment
IENG583 Advanced Statistics
MATH572 Computational Methods in Partial Differential Equations for Science and Engineering
MATH587 Advanced Engineering Mathematics
MATH687 Advanced Methods of Applied Mathematics
MENG502 Advanced Finite Element Method
MENG511 Applied Computational Methods for Engineers
MENG555 Computational Fluid Dynamics
PHYS511 Mathematical Methods for Engineers & Scientists I
PHYS611 Mathematical Methods for Engineers and Scientists II

FACULTY MEMBERS

Murat ÖZDENEFE

Chair of the Department, Associate Professor of Mechanical Engineering. Dr. Özdenefe gained his BSc. from Mechanical Engineering Department, Çukurova University. Dr. Özdenefe then received his MSc. in Mechanical Engineering Department, Eastern Mediterranean University. He completed His PhD in School of Mechanical, Aerospace and Civil Engineering, The University of Manchester with the PhD. project "Phase Change Materials and Thermal Performance of Buildings in Cyprus". Dr. Özdenefe's research interests are: Building Heat Transfer, Building Thermal Performance Simulation, Phase Change Materials, Energy Auditing, Passive Buildings.

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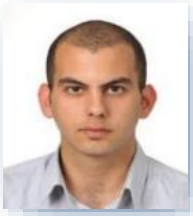

Devrim AYDIN

Vice Chair of the Department, Associate Professor of Mechanical Engineering. Dr. Aydin gained his BSc. and MSc. from Mechanical Engineering Department, Yildiz Technical University. He completed His PhD. in Institute of Sustainable Energy Technology, Engineering Faculty, The University of Nottingham with the PhD. project "Investigation of innovative thermochemical energy storage processes and materials for building applications". Dr. Aydin's research interests are: Thermal energy storage, adsorption/absorption materials and processes, evaporative cooling, desiccant systems, power cycles, low carbon buildings, drying systems, solar energy systems and water harvesting technologies. Extension No: 1045 ; Office No: ME 127; | E-mail: devrim.aydin@emu.edu.tr

Uğur ATİKOL

Chair of the Graduate Committee, Professor of Mechanical Engineering. Dr. Atikol is a Professor of Mechanical Engineering. He received his B.S degree from the University of Leicester and M.Sc. degree from the University of Manchester. He completed his Ph.D. in Eastern Mediterranean University. Dr. Atikol`s research interests are Energy Management, Planning and Utilization, Solar Energy and Desalination. He has been the director of EMU Energy Research Center since 2004.

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Hasan HACISEVKI

Professor of Mechanical Engineering. Dr. Hacisevki received his B.S, M.S and Ph.D. degrees from Eastern Mediterranean University. Dr. Hacisevki`s research interests include Experimental studies in Fluid Dynamics, Automotive Engineering and Mechanical Design.

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Qasim ZEESHAN

Professor of Mechanical Engineering. Dr. Qasim Zeeshan received his B.E. Mechanical Degree from National University of Sciences and Technology (NUST), Pakistan. He received his MS and PhD in Flight Vehicle Design from Beihang University (BUAA), China. His research interests include Aerospace Vehicle Design, Multidisciplinary Design and Optimization (MDO), Manufacturing Systems Engineering, Industry 4.0, Machine Learning and application of Modern Meta-Heuristic Optimization Techniques, and Composite Materials.

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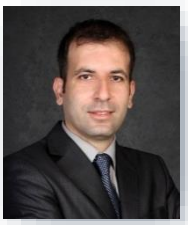

Babak SAFAEI

Associate Professor of Mechanical Engineering. Dr. Babak Safaei is director of Nanotechnology and Multifunctional Structures Research Center (NMSRC) at Eastern Mediterranean University. He also has an honorary position as Visiting Associate Professor at University of Johannesburg, South Africa. He received his PhD. degree in Mechanical Engineering from Department of Mechanical Engineering at Tsinghua University. His research interests focus on Computational Mechanics; Micro and Nano Mechanics; Advanced Manufacturing; Design of Lightweight Structures; Composite and Nano Composite Materials; Lithium-Ion Batteries, Nonlocal Theories and Mechanical Vibration.
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Cafer KIZILÖRS

Lecturer in Mechanical Engineering. Dr. Cafer Kizilörs received his B.S, M.Sc. and PhD degrees from Eastern Mediterranean University. His current research interests include Statics, Dynamics, Fracture Mechanics and Materials.
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Fuat EGELİOĞLU

Professor Emeritus of Mechanical Engineering. Dr. Egelioglu received his B.S degree from Bogazici University and received his M.Sc. and Ph.D. degrees from Eastern Mediterranean University. His research interests include Energy Savings, Renewable Energy and Energy Conversion.
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Ibrahim SEZAİ

Professor Emeritus of Mechanical Engineering. Prof. Sezai received his B.Sc. and M.Sc. degrees from Middle East Technical University, and second M.Sc. from UMIST, University of Manchester, UK. Furthermore, he received his Ph.D. from Eastern Mediterranean University. Prof. Sezai`s current research interests include Computational Heat and Fluid Flow, Solar Energy, Flow through Porous Media and Crystal Growth.
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Hikmet Ş. AYBAR

Distinguished Professor of Mechanical Engineering. Hikmet Ş. Aybar, after completing his BS study at Istanbul University in 1978 and his MS study at Technical University of Istanbul in 1982, received a Turkish government scholarship to study for PhD degree in the USA. After completing his MS study at Ohio State University in 1987, he worked as a research associate in the Department of Chemistry at Ohio State University for one year. He received his PhD degree in 1992 from the Nuclear Engineering Program at the Ohio State University, and he started his career as a senior R&D engineer at the Turkish Atomic Energy Authority in Ankara. In 1995, he joined to the Department of Mechanical Engineering at Eastern Mediterranean University as Assistant Professor, he became Associate Professor in 1996, and he became Professor in 2004. He served as Vice Chair of the department from 1995 to 1997. He served as Vice Dean of Engineering Faculty between 2008-2014. In 2014, he joined Department of Mechanical Engineering at Bozok University. He served as Vice Rector from 2015 till 2018. His research interests are computational heat and fluid flow, nuclear and fossil-fuel fired power generation, and thermal system design, solar heating and solar desalination, magnetic material and applications (e.g., magnetic cooling, magnetic heat engine), nanofluid.
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RESEARCH CENTERS

ENERGY RESEARCH CENTER

EMU Energy Research Centre focus on the exploration, development and efficient use of alternative and environment-friendly energy sources, power generation, development of energy policies, energy planning and energy economics. The activities of the center fall into three areas of expertise, the outcome of which are complementary to each other. these are research, education and application. The center places special emphasis on increasing the energy efficiency awareness and working closely with the industry. The objective is to have a leading role in using the conventional energy sources more efficiently, discovering cleaner and more sustainable energy sources, shedding light on their applications and helping their acknowledgement by the public. The center proposes new legislations concerning the energy issues in order to facilitate the application of the outcomes of the research work to everyday life. Development of the renewable energy systems, diversifying their application areas, reuse of the waste energy, reducing environmental pollution, energy use in water treatment and energy management issues are amongst the research topics of the center.

Director ERC - Prof. Dr. Ugur Atikol

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NANOTECHNOLOGY & MULTIFUNCTIONAL STRUCTURES RESEARCH CENTER

NMSRC is dedicated to research on applied nanotechnology and composite materials with strong emphasis on education and training. The research is focused on the following topics: Design and development of Advanced multifunctional Composites, Natural Fiber Composites (NFC), Nanocomposites (NC) and Nanobiocomposites (NBC); Electro-thermomechanical behavior of piezo electromechanical smart materials and Novel Electrode Materials of next generation Lithium-Ion Batteries.

Director NMSRC - Assoc. Prof. Dr. Babak Safaei

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INDUSTRY 4.0 RESEARCH CENTER

IRC is dedicated to research on applied research in Industry 4.0 and related technologies e.g. Additive Manufacturing, Augmented and Virtual Reality, Big Data, Cloud Computing, Deep Learning, Horizontal-Vertical Systems Integration, Industrial Internet of Things, Intelligent Manufacturing, Machine to Machine Communication, Machine Learning, Cyber Security, Smart Robots, Simulation.

Director IRC - Prof. Dr. Orhan Korhan

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ELECTRIC VEHCILE DEVELOPMENT CENTER

EVDC is focused on the design and development of electric vehicles and related technologies like Battery Management System (BMS), Energy storage systems, Lithium-Ion Batteries, Embedded Recharging systems, Battery Packaging and Vehicle Control Unit (VCU) for EVs as well as other renewable energy systems for EVs.

Director EVDC - Assoc. Prof. Dr. Davut Solyali

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RESEARCH AREAS

Energy

- Solar energy applications in buildings
- Solar air heating
- Solar water heating
- Solar desalination
- Solar energy integrated vehicles
- Energy generation systems (nuclear and fossil fuel power plants)
- Building energy performance simulation
- Thermal Energy Storage

Energy management

- Demand-side management
- Integrated resource planning
- Efficient energy utilization
- Energy demand prediction

Thermodynamics

- Advanced power cycles
- Absorption cycles
- Thermo-elasticity
- Computational heat dynamics

Fluids

- Computational fluid dynamics
- Flow simulation on unstructured grids
- Parallel programming in CFD
- Solution methods of fluid flow equations
- Two phase flows (interface tracking methods, and melting and solidification)
- Simulation of turbulent flows (RANS and LES methods)
- Nanofluids and applications

Aerodynamics

- Flow properties behind bluff bodies
- Flow interactions between different cross sections
- Analysis of aero-engine turbine blades

Automotive

- Vehicle dynamics
- Improving combustion process in I.C. engines
- Metallic and ceramic engines
- Simulation studies of different compound engine schemes
- Computer modeling of general thermodynamic systems
- Electrical Vehicle Design

Biomechanics

- Design and development of diarthrodial joint prosthesis
- 6DOF kinematic analysis of joint prosthesis
- Simulation of wear at contact point of prosthesis
- Modelling of human body joints as 6DOF unconstrained joints
- FE analysis of diarthrodial joints
- Predicting injury mechanisms of joints and tissues
- Dynamics of vehicles

Multidisciplinary Design Optimization

- Design Optimization of complex multidisciplinary systems
- Design under uncertainties
- Robust Design & Meta-Modeling
- Multi-Objective & Hybrid Optimization
- Dealing with nonlinear mechanical problems using high performance computing methods

Vibration, acoustics and vibro-acoustics

- Designing of structures
- Self-excited vibrations
- Energy harvesting by piezoelectric
- Optimum vibro-acoustics design of mechanical structures, e.g, mufflers, wind turbines, human hearing implants.

Dynamical systems and control

- Structures under impacts, e.g., airplane landing gears system
- Robotics
- Control of hybrid electric power-trains

Manufacturing systems

- Industry 4.0
- Manufacturing Systems Engineering
- Distributed control/manufacturing systems (IEC 61499)
- Wireless sensor networks and RFID applications in manufacturing
- Modeling framework for organizational competency
- Collaborative networks
- Intelligent manufacturing systems
- Development of computer aided engineering software
- Process planning and scheduling integration for SMEs

Manufacturing processes

- Incremental sheet forming
- Metal spinning
- Friction stir processing
- Friction stir welding
- Friction stir spot welding
- Hybrid welding
- High speed milling
- Water jet machining
- Laser cladding
- Analytical modelling of manufacturing processes

Material science and engineering

- Mechanical behavior of materials (fatigue, creep, fracture)
- Film formation and its characterization
- Plastic deformation and micro-structural effects
- Prediction of fracture and forming limits
- Heat treatment
- Surface alloying
- Thermo-magnetic materials and applications

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