Isfahan University of Technology

Department of Mechanical Engineering

In The Name of God

Contents

Overview

The Department of Mechanical Engineering was established in 1979. From the beginning, the department mission has been to offer students high-quality mechanical engineering programs. The department education program has been designed to equip graduates with cutting-edge research, critical thinking, and problem-solving skills. The department currently has 38 full-time faculty members, over 700 undergraduates, approximately 400 MSc students, and over 110 Ph.D. students.

The department is committed to provide a supportive learning environment in which talented students are able to obtain professional and teamwork skills by conducting challenging group projects as well as taking part in national and international student competitions. Our past successes in terms of achieving top awards in different student competitions demonstrate the quality of the department education and research training programs.

The current building of the Department of Mechanical Engineering plus two other buildings have 9000 square meters of area for educational and research usage, and the new building – which is under construction and will be ready in near future – has a useful area of 14500 square meters.

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Department of Mechanical Engineering

Degree Programs

B.Sc

136 credits for courses
+ 1 credit for internship
+ 3 credits for BSc project

M.Sc

24 credits for courses
+ 2 credits for seminar
+ 6 credits for MSc thesis

Ph.D

18 credits for courses
+ 18 credits for PhD dissertation


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Reasons to study at this department

- Research in this department covers a broad spectrum of topics, with a strong partnership between computation and experiment
- Appropriate means are provided for our students and scholars to engage in world-class scientific research
- Being involved in finding solutions for the national and global problems
- Freedom in course selection and planning
- Strong links with industry
- One of the two national supercomputing centers is located at IUT and is directed by the Department of Mechanical Engineering.
- The faculty members and students of the department have received many national and international honors and awards.

Program Structure

BSc

The undergraduate students in the Department of Mechanical Engineering have to pass total 140 credits to be graduated. Among them, 136 credits are courses, 1 credit is specified to Internship, and 3 credits are for their final BSc project. The students usually take the final BSc project during the last semester or alternatively the last year of their study. The students are required to orally present their projects in specific dates in each semester.

MSc

The MSc students in the Department of Mechanical Engineering pass 32 credits for graduation. Among these credits, 26 credits are courses (14 credits compulsory and 12 credits optional), and 6 credits for MSc thesis. The MSc students are required to submit their thesis proposal at the beginning of the 3rd semester. A seminar day is held at the end of the third semester at which all of the MSc students present the topic of their research proposals and a description on their progress. MSc students are required to defend their MSc thesis no later than the end of the sixth semester. A committee consisting of the advisor, co-advisor, and at least two evaluators is formed and evaluates each MSc thesis.

PhD

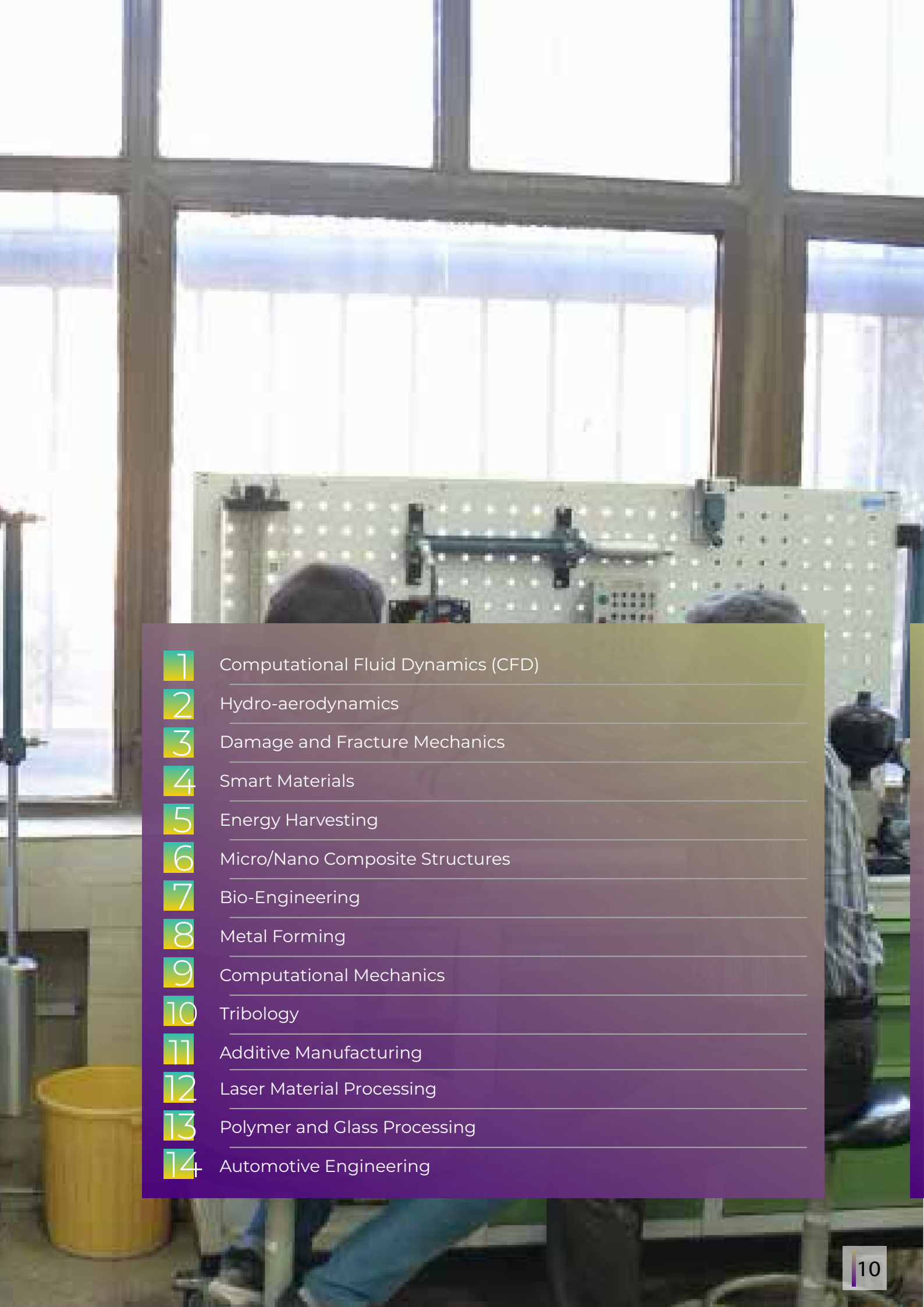
PhD students in this department pass 18 credits for courses and 18 credits for PhD dissertation. PhD candidates have to pass a qualifying exam by the end of the fourth semester. It is required that the PhD students submit their PhD proposals by the end of the 6th semester. A committee consisting of experts in the field from inside and outside of the department is formed which administers the General Exam 1. In this oral exam, the proposal is evaluated and an oral presentation is made by the PhD student. The PhD student is required to take the General Exam 2 no later than the 7th semester in which a progressive report as well as an oral presentation is made by him to ensure that the concerns made by the committee in the General Exam 1 are removed and fulfilled. The final defense from the PhD dissertation should be performed no later than the 9th semester.

Program Objectives

Our undergraduate program is focused on strengthening the academic background of the students as well as giving the students the chance to deeply observe various engineering phenomena and to work with different familiarizing topics with practice by taking several laboratories and workshops. During Internship and their final project, our undergraduate students have the chance to work in a team and enhance their team-work skills. They also learn and practice the various applied software programs related to mechanical engineering.

During the graduate studies (both MSc and PhD), the Department of Mechanical Engineering utilizes the students with a concrete theoretical background, preparing them to tackle a real industrial challenge and solve it as an MSc thesis or a PhD dissertation. The research labs equipped with a variety of up-to-date instruments are widely used by the graduate students in their research.

Research Areas



1. Computational Fluid Dynamics (CFD)
2. Hydro-aerodynamics
3. Damage and Fracture Mechanics
4. Smart Materials
5. Energy Harvesting
6. Micro/Nano Composite Structures
7. Bio-Engineering
8. Metal Forming
9. Computational Mechanics
10. Tribology
11. Additive Manufacturing
12. Laser Material Processing
13. Polymer and Glass Processing
14. Automotive Engineering

Industrial Projects

The Department of Mechanical Engineering has been one of the pioneers in industrial relations at Isfahan University of Technology. In the past 42 years, over 300 projects have been defined with local and national industries. In many of these collaborations, our graduate students have been largely involved, usually making a smooth path toward being recruited by these companies.

Interdisciplinary Approaches

The Department has close research ties with other departments and institutions inside the state and across the country. These collaborations are mainly with other engineering departments such as Materials Engineering, Electrical Engineering, and Textile Engineering, as well as the School of Medicine at Isfahan University of Medical Sciences. It is worthy to note that Steel Research Center and Subsea Research and Development Center are two of the research centers located inside the IUT campus which are in close ties with the Department of Mechanical Engineering.

The faculty members and researchers of the department have been involved in several works regarding COVID-19, which have been discussed in some issues of the IUT E-newsletter.

International Collaborations

Department of Mechanical Engineering has serious international collaborations with several countries including, but not limited to, South Korea, Taiwan, China, Italy, Switzerland, France, Germany, Canada, and the USA. In addition to international research programs for PhD students, the department holds short-term research stays for MSc students and summer internships for BSc students as well.

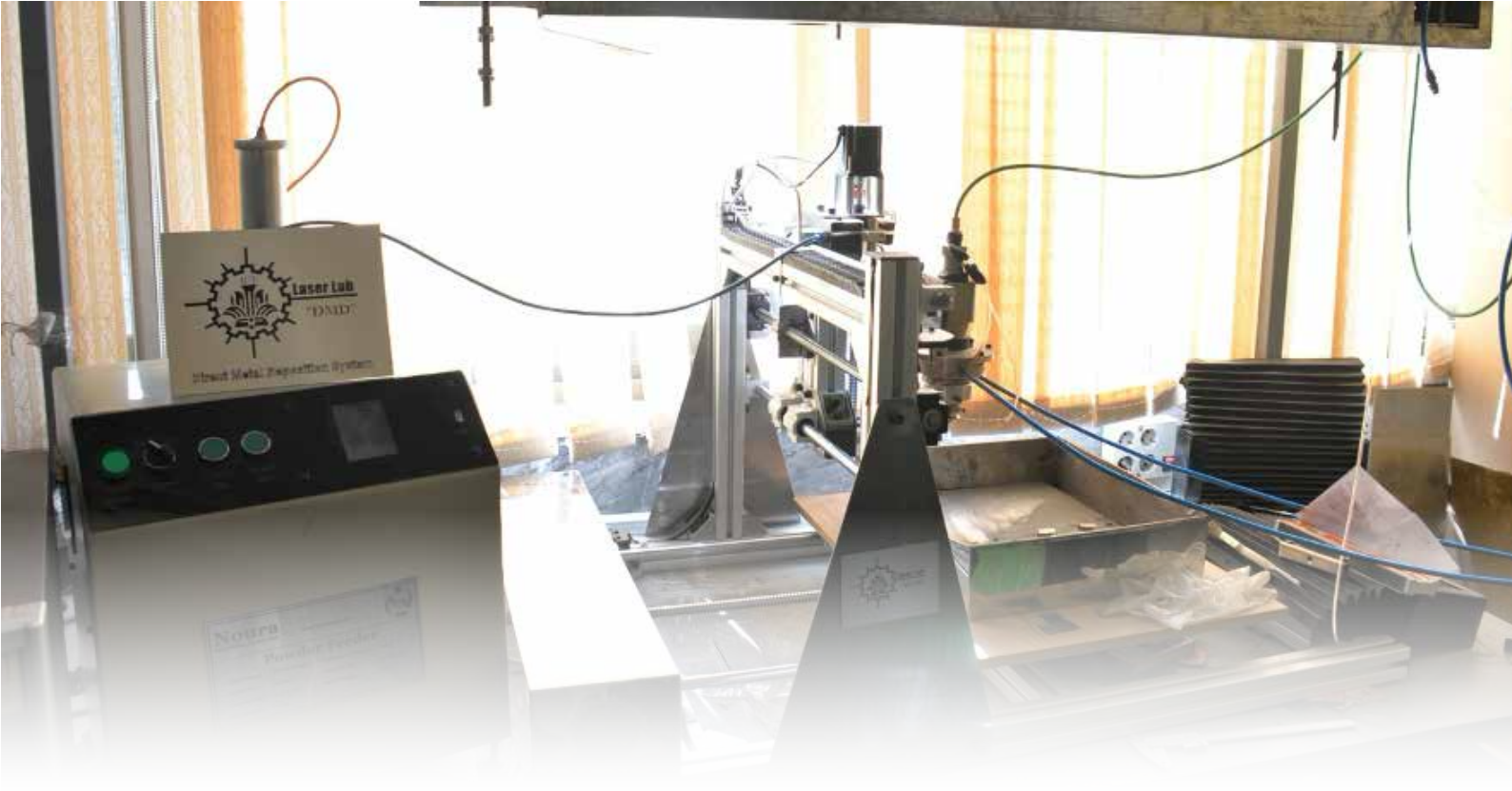
A Profile of the Labs

Thermo-Fluid and CFD Lab

- Super Computer (Sheikh Bahaei)
- High Speed Camera
- 40W Pulsed Green Laser
- Thermal Imager
- Viscometer
- Wind Tunnel
- Vertical wind turbine
- Water Channel
- Viscometer DVT2 -Pro (Brookfield)
- Contact Angle Measurement Device (Sharif Solar)
- Thermal Conductivity measurement Device (KD2 Decagon)
- Surface Tension measurement Device (Nano Toos)
- Ultra-sonic
- PIV Equipment (High speed camera- lenses- laser, ...)
- Electro-Spray Equipment

Additive Manufacturing Lab

- SLM System
- SLS System
- SLA System
- FDM System
- DMD System



Laser and Optics Lab

- 400W Nd:YAG CW Laser
- 150W CO2 CW Laser
- 100W Nd:YAG Pulsed Laser
- Laser Cutting Setup
- Laser Cladding Setup

Polymer and Nano-Composites Lab

- Sonicator 1200W
- Vacuum Oven
- DSC
- Izod Impact
- Ball Miller
- Mechanical Mixer
- Polarized Microscope
- MFI
- FDM
- Densitometer
- Injection Molding
- Electro Spinning
- Melt Spinning Rotor
- Centrifuge
- Parallel plate viscometer
- Modular thermoforming equipment
- Molds for making D 638 ASTM samples

Tribology Lab

- Pin-on-Disk Test Rig
- High-Temp Pin-on-Disk Test Rig

Mechanical Characterization Lab

- Tensile Test Setup
- High-Temperature Tensile Test Setup
- Fatigue Test Setup – Axial Loading
- Fatigue Test Setup – Bending
- Torsion Test Apparatus
- Hardness Test Apparatus
- Creep Testing Apparatus

Vibration and Acoustic Lab

- Data Acquisition System
- Modal Analysis Equipment
- Electromagnetic Shaker
- Function Generator
- Displacement and Accelerator Sensors
- Microphones
- Rotating Machinery Fault Simulator
- Piezoelectric Actuators

Advanced Manufacturing Laboratory, AML

- Ultrasonic generator; Model: MPI, 3000 W, 20-30 KHz,
- Gap sensor; Model: AEC 5505, Measuring rang: 0-2 mm,
- Impedance analyzer; Model: Bandera-PV520 A,
- Video Measuring Machine; Model: KIM-3020 CU-IM, ARCS Company, Taiwan,
- Coordinate Measuring Machine; Model: Prismo 7, Carl Zeiss, Germany,
- Surface roughness meter; Model: Perthometer M2, Mahr, Germany,
- Dynamometer; Type: Kistler 9257B,
- EDM machine; Model: ZNC 404-75A, Iran,
- Wire EDM machine; Model: ARICUT R-250, ONA, Spain,
- Ultrasonic horizontal axis equipment for WEDM Turning,
- Ultrasonic vertical axis equipment for WEDM milling,
- CNC milling machine; Model: MIRAC Denford machine tools
- and FP4ME, Machine Sazi Tabriz, Iran,
- CNC turning machine; Model: MIRAC Denford machine tools,
- TME40 GSK, Machine Sazi Tabriz, Iran.

Metal Forming Lab

- Ring rolling machine
- Deep drawing machine
- 60 Tons press
- 20 Tons press

Bioengineering Center for Cancer, BECC

- Syringe pump /model NE-1000/New Era Pump System
- Micro centrifuge /MIKRO 120/Hettichzentrifugen
- Real Time PCR/ABI
- Vertical Laminar Air Flow/ Jal Tajhiz
- Incubator CO2/Memmert
- Lithpgraphy equipment, Blackhole, France.
- Microscope /Mec 10350/OGAWA SEIKI
- Microscope/0729964/Jenus
- Microscope/Mec 10382/Union
- Digital CCD Camera/model C210C010
- DC power supply /ps-303D/DAZHENG
- Oven/oven 50/Behdad
- Desiccator
- Data show/ HITACHI

Inventions and Innovations

Inventions and patents for the last three years are listed in the following table:

Inventor	Invention	Year
Dr. Ali Maleki	Synthesis of lead free Sn-Cu solder nano-composite	2017
Dr. Ali Maleki	Manufacturing of Al matrix composite through pyrolysis of HTV silicone in melt	2018
Dr.Peiman Mosaddegh	Semi-composite fabricated technology by direct polymer to metal adhesion	2017

Contributions to Sustainable Development and its Impacts on Society

A reach volume of the research conducted in the Department of Mechanical Engineering is related to energy. This could be categorized in different fields such as new methods for manufacturing mechanical elements, recommendations for preventing and reducing the power losses in various mechanical systems, and concentration on clean energies such as wind and solar energies.

We would like to express our sincere thanks to the department members at the Department of Mechanical Engineering, and our colleagues at International Scientific Cooperation Center (ISCC) for sincere assistance in producing this prospectus.

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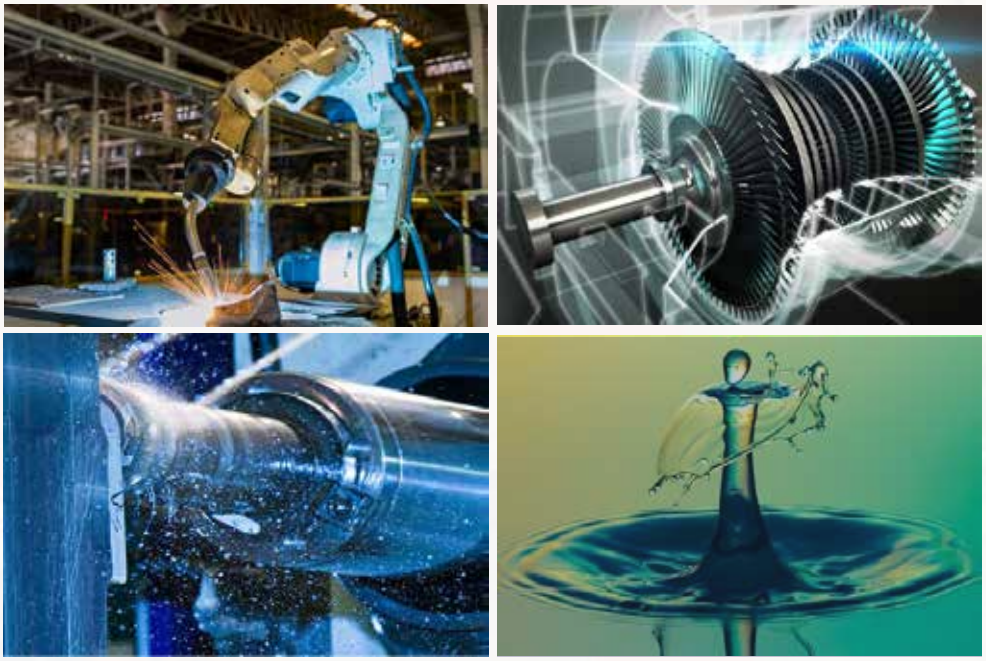

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