INTRODUCTION

The School of Railway Engineering (SRE) was established in 1997 at Iran University of Science and Technology (IUST) as a positive answer to the public interests and Railway and metro Industrial development plans in Iran. This outstanding achievement was eventuated by the financial support of the Islamic Republic of Iran Railways.

SRE's educational activity was started since its establishment year with about 100 students, admitted through the national university entrance exams, and in three BSc. Programs as:

- Railway Transportation Engineering
- Railway Rolling Stock Engineering
- Railway Track & Structures Engineering

Railway Electrification Engineering was the first MSc program opened to Electrical Engineering BSc graduated in 2001; and since the date other MSc programs have been started including:

- Railway Electrification Engineering
- Railway Safety Engineering
- Railway Control and Signaling Engineering
- Railway Transportation Engineering
- Railway Rolling Stock Engineering
- Railway Track and Structures Engineering

School of Railway Engineering offers three PhD programs:

- Railway Control and Signaling Engineering (since 2015)
- Railway Rolling Stock Engineering (since 2011)
- Railway Track and Structures Engineering (since 2011)

Also, the following PhD programs are on the prospectors for the future academic years:

- Railway Electrification Engineering
- Railway Transportation Engineering

SRE has also been successful in maintaining close scientific collaborations with the world leading railway educational and research departments of many institutions such as:

- University of Illinois at Urbana-Champaign, USA
- McGill University, Canada
- Chalmers University of Technology, Sweden
- Berlin Technical University, Germany
- Sheffield University, UK
- Beijing Jiaotong University, China
- Dnepropetrovsky, Ukraine
- Dresden Technical University, Germany
- Delft university of technology, Netherlands
- KRRRT, South Korea
- Dnipropetrovsk, ukraine
Academic staff of the School of Railway Engineering consists of 26 full-time faculty members. The school is also privileged from the cooperation of several Part-time professors and experts from local and international industrial and scientific institutions.

The following is a brief on the scientific contributions and achievements of SRE staff and students to the various fields of railway engineering since its establishment in 1997:

- Publication of about 300 journal papers in highly accredited scientific journals at national and international levels (1997-2016).
- Presentation of more than 450 conference papers in scientific and engineering events (1997-2016).
- Authorship and translation of 34 book titles in different disciplines of railway engineering.
- Acquisition of 26 national patents.
- Accomplishments of about 270 research contracts including research activities directly related to the national railway industries.

SRE departments are categorized as five following divisions:
- Railway Control and Signaling Engineering
- Railway Electrification Engineering
- Railway Rolling Stock Engineering
- Railway Track and Structures Engineering
- Railway Transportation Engineering

### Programs and Degrees

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SRE EDUCATIONAL PROGRAMS

Railway Rolling Stock Engineering (BSc, MSc, PhD)

This program is designed to graduate engineers whom would be able to analyze, design and maintain the railway rolling stock such as: locomotives, wagons, bogies, railway machinery and their components.

Some of the main courses in this program are as follows:
BSc: Wagon & Locomotive Structural Design, Locomotive Engines, Train Brake Design, Bogie Design, Rail Vehicle Dynamics, Rail Wheel Interaction Analysis, etc.
MSc & PhD: Dynamics of Railway Vehicles, Contact Mechanics, Advanced Bogie and Wagon Design, Modal Analysis of Railway Machinery, Train Aerodynamics, Railway Noise and Vibrations, Fatigue and Fracture, Advanced Finite Element Method, Advanced Optimization, etc.

Railway Track & Structures Engineering (BSc, MSc, PhD)

Graduates of this program are qualified for railway route planning, railway substructures and track design, design of railway technical structures such as bridges, tunnels, cuttings, relating walls and etc.
Some of the main courses in this program are:
BSc: Route Design, Railway Substructure, Railway Track Mechanics, Track Maintenance, Ballast Mechanics, Railway Bridges, Tunneling and etc.
MSc & PhD: Advanced Railway Substructure Design, Advanced railway superstructure Design, train-track Interactions, railway track Test, Track Dynamics, Maintenance Management of Tracks, Train-Track Interaction, Railway Bridge Dynamics and etc.
Graduates of this program are qualified for planning, management and operation of the rail transportation systems, covering fields such as:

- Train scheduling
- Traffic management and control
- Maintenance planning
- Railway projects management
- Railway system analysis

Some of the main courses offered to the students in this program are as follows:

**BSc:** Engineering Economy, Transportation Planning, Transportation Demand Analysis, Operations Research I and II, Application of Computer Software in Rail Transportation, Work and Time Evaluation, Technical and Economic Aspects of Route Planning, Train Scheduling, etc.

**MSc:** Advanced Operation Research, Transportation Network Analysis, System Dynamics Simulation, Transportation Economics, Railway Operations Management, Risk Analysis and Management, Multi Criteria Decision Making Methods, etc.

**Railway Electrification Engineering (MSc)**

This is a two-year program for Electrical Engineering BSc graduates who would like to work on the aspects of electrification systems and subsystems, such as traction systems, overhead lines, power distribution posts, etc. The school has established and equipped its electrical traction laboratories in order to provide the basis for practical training and education of students in this field.

Some of the main courses offered in this program are:

- AC and DC Traction Drive Control
- Traction Substation Analysis and Design
- Overhead Contact System
- Modern Control Systems
- SCADA
Railway Safety Engineering (MSc)

This two-year master program was started in 2005, in collaboration with the Birmingham University and A.D. Little company in England. The graduates would be qualified to work in the railway safety departments as managers, or as safety experts in consultant engineers companies. Students would pass the following courses as a part of the requirements for graduation, in a full-time or modular basis:

- Risk and Safety Management
- Human Factors (Ergonomics)
- Accident Investigation and Reporting
- Railway Safety Standards and Regulations
- Maintenance and Reliability Engineering

Railway Control and Signaling (MSc, PhD)

The graduates of this program will be qualified for design, development and implementation of different control, signaling and telecommunication systems in the railway industry.

Some of the main courses of this program are listed as:

- Electronic and Relay Interlocking systems
- Advanced Railway Signaling Systems
- Automatic Traffic Control
- Safety and Reliability
- Systems Identification
- Real-time Control Systems
- Intelligent Control Systems

Library and Computer Lab

SRE’s dedicated library contains about 8024 technical books within a floor space about 600 square meters, with additional study areas of students. Several related international journals subscriptions, and online access to a number of international journals and publishers’ sites are also provided.

Separate computer sites are equipped for graduate and undergraduates students with a total of about 124 computer sets and provided wired and wireless Internet connections. PhD students also have their own offices and research laboratories.

SRE has a High Performance Computing (HPC) system for running advanced application programs efficiently, reliably and quickly. Common users of HPC systems are MSc and PhD students.
## Workshops and Research Laboratories

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