



SCHOOL OF

RAILWAY ENGINEERING

Iran University of Science and Technology

IUST



Iran Ministry of Science, Research & Technology



Iran University of  
Science and Technology

IUST

# INTRODUCTION



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 the railway industry development plans in Iran. This outstanding achievement was eventuated by the financial support of the Railways of the Islamic Republic of Iran.

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:

- a) Railway Transportation Engineering
  - b) Railway Rolling Stock Engineering
  - c) Railway Track and Structures Engineering
- Electric Railways Engineering was the first MSc program opened to Electrical Engineering BSc graduates in 2001; and since the date other MSc programs have been started including:
- d) Electric Railways Engineering
  - e) Railway Safety Engineering
  - f) Railway Control and Signaling
  - g) Railway Transportation Engineering
  - h) Railway Rolling Stock Engineering
  - i) Railway Track and Structures

Total number of students admitted to the School of Railway Engineering has been about

1825 during 1997 to 2012, out of which 1053 have been graduated.

PhD programs in "Railway Rolling Stock Engineering" and "Track and Structures Engineering" have also been started since 2011, and the following PhD programs are on the prospectus for the future academic years:

- Railway Transportation Engineering
- Electric Railways 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
- Northern Jiaotong University, China
- Dnepropetrovsky, Ukraine
- Dresden Technical University, Germany

Academic staff of the School of Railway Engineering consists of 22 full-time and Part Time professors. The school is also privileged from the cooperation of several part-time professors



and experts from local and international industrial and scientific institutions.

SRE's dedicated library contains about 8024 volumes of technical books within a floor space of about 600 square meters, with additional study areas available to the 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 undergraduate students with a total of about 124 computer sets and provided wireless Internet connections. PhD students also have their own offices and laboratories.

SRE departments are categorized as five following divisions:

- Railway Rolling Stock Engineering
- Railway Track and Structures Engineering
- Railway Transportation Engineering
- Electric Railways Engineering
- Railway Control and Signaling

## SRE EDUCATIONAL PROGRAMS

### Railway Rolling Stock Engineering (BSc, MSc, PhD)

This program is designed to graduate engineers being able to analyze, design and maintain the

railway rolling stock elements such as: locomotives, wagons, bogies, railway machinery and their components.

Rolling stock department is also equipped with the following laboratories and workshops:

- Railway Material Science
- Train Braking System
- Locomotive
- N.D.T (Non Destructive Tests)
- Advanced Mechanical Vibration
- Solid Mechanics
- Bogie Structural Dynamics
- Railway Noise and Vibration
- Railway Structural Dynamics

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

BSc: Wagon & Locomotive Structural Design, Locomotive Engines, Train Brake Design, Bogie Design, Rail Vehicles 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.



# SRE

## Computer Lab & Library



SRE  
Locomotive  
Workshop

## 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, etc.

The following SRE laboratories are employed for education and research by the Railway Track & Structures Department staff and students:

- Track Components. For static and dynamic tests on the track, sleepers and fastenings.
- Track Materials. For tests on various track materials, specially concrete and concrete sleepers.
- Track Substructures. For different tests on mechanical and physical characteristics of the ballast.
- Soil and Rock Mechanics. For standard tests on the physical and mechanical properties of soil and rock.
- Track Maintenance Workshop. Equipped with different machines and devices for rail welding and maintenance of tracks.

Some of the main courses in this program are:

BSc: Route Design, Railway Substructure, Railway Track Mechanics, Tunneling, Track Maintenance, Ballast Mechanics, Railway Substructures, Railway Bridges, etc.

MSc, PhD: Advanced Railway Substructure

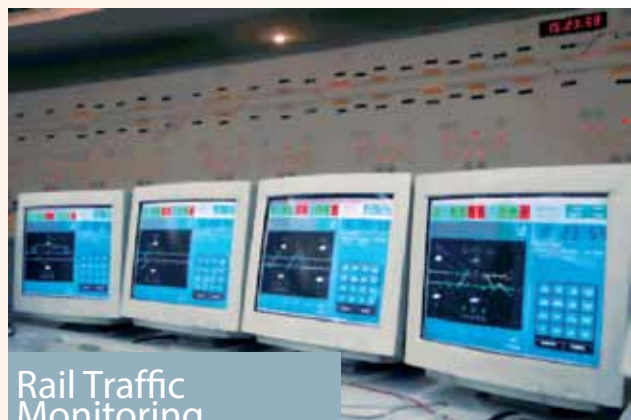
Design, Advanced Track Design, Rail-Wheel Interactions, Test and Inspection of Tracks, Track Dynamics, Maintenance Management of Tracks, Train-Track Interaction, Railway Bridge Dynamics, etc.



## Railway Transportation Engineering (BSc, MSc)

Graduates of this program are qualified for the planning, management and operation of the rail transportation systems, covering areas such as:

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



Rail Traffic  
Monitoring  
Centre



The following SRE laboratories are employed for education and research by the Railway Transportation Engineering Department staff and students:

- Intelligent Computations in Rail Transportation
- Transportation Systems and Logistics (TSL)

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 Economical Aspects of Route Location, 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.

## Electric Railways Engineering (MSc)

This is a two-year program for Electrical Engineering BSc graduates who would like to work on the aspects of electrical railway systems and subsystems, such as traction systems, overhead lines, power distribution posts, and so on.

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 & Design
- Overhead Contact System
- Modern Control Systems
- SCADA
- Neuro-Fuzzy Control

Electric Railways



## Railway Safety Engineering (MSc)

This program 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, on a full time or modular basis:

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



Train Derailment

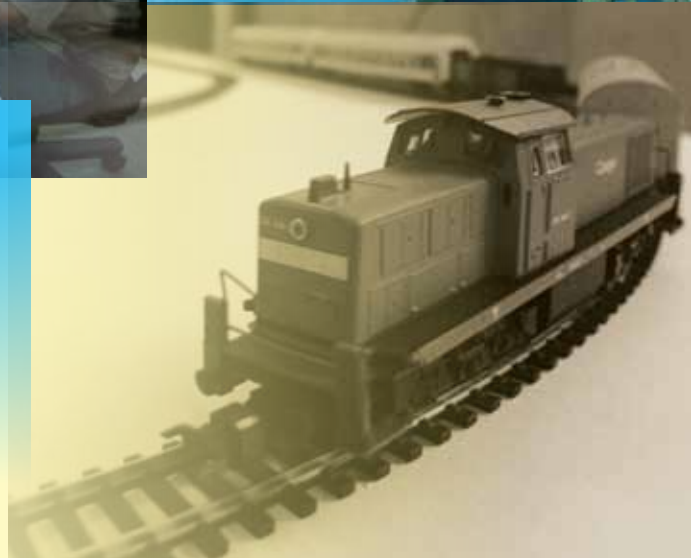
# Railway Control and Signaling(MSc)

The graduates of this program will be qualified for design, development and implementation of different signaling and telecommunication systems in the railway industry. Some of the main courses of this program are listed as:

- Electronic and Relay Interlocking
- Advanced Railway Signaling Systems
- Computer System's Reliability and Safety
- Railway Communication Systems
- Railway Traffic Control
- Railway Operation and Control



**SRE**  
Control &  
Signaling laboratory



## Scientific Achievements

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

- Publication of about 295 journal papers in highly accredited scientific journals at national and international levels (1997-2012).
- Presentation of 420 conference papers in scientific and engineering events (1997-2012).
- Authorship and translation of 34 book titles in different disciplines of railway engineering.
- Acquisition of 26 national patents.
- Accomplishment of about 70 research contracts including research activities directly related to the national railway industries.

## Research Focus

- Dynamics of Railway Track
- Track Construction & Maintenance
- Track Safety
- Train-Track Interaction
- Contact Mechanics
- Railway Electrification
- Railway Signaling Systems
- Train Scheduling & Planning
- Railway Transportation Demand Modelling
- Railway Management System
- Train-Bridge Interaction
- Design of Railway Machineries
- Rail Vehicle Dynamics
- Railway Noise and Vibration
- Railway Risk and Safety Management

## Workshops and Research Laboratories

- Bogie and Wagon (L)
- Locomotive (W)
- Train Brakes (L)
- Railway Machinery Condition Monitoring (L)
- Track Substructure (L)
- Track Maintenance (W)
- Control and Signaling (L)
- Rock & Soil Mechanics (L)
- Traction (L)
- Non-Destructive Testing (L)
- Infrastructure Dynamics (L)
- Railway Structural Dynamics (L)
- Intelligent Computations in Rail Transportation (L)
- Transportation Systems and Logistics (L)
- Railway Noise and Vibration (L)



Iran University of  
Science and Technology  
**IUST**

## Contact Information

School of Railway Engineering,  
Iran University of Science and Technology,  
Farjam St, Tehran 16846-13114, Iran.

Phone: +98-21-77491029

Fax: +98-21-77451568

Website: <http://railway.iust.ac.ir/>

Email: [office\\_info@rail.iust.ac.ir](mailto:office_info@rail.iust.ac.ir)



IUST



GD.PH.ILL

Asghar khoshkholgh

PHOTOS:

Mohammad Taghi Khoshkholgh