Module 1
Safety of Railway Signalling and Communications

AIM
The aim of this module is to assess the students’ understanding of the principles and practices associated with the safety of train control and communications systems, and of the factors that are relevant in ensuring the safety of those systems. It also includes the competence of people who work on such systems.

LEARNING OBJECTIVES
To understand and explain:

a) The legal framework, requirements and standards governing railway safety in force in the student’s own country
b) The principles of safety engineering for the whole life-cycle of a train control or communications system (from concept through to decommissioning)
c) Methods of demonstrating and assuring the safety and security of train control and communications systems
d) Safety management techniques, including quantified and qualitative risk assessment
e) Methods for specifying and demonstrating the achievement of appropriate levels of safety
f) Design principles for train control / communications systems to minimise the risk of failure (including “wrongside” failure)
g) The use/design of protection measures within train control / communications systems to guard against human error
h) Managing the risks associated with alterations to existing train control / communications systems
i) The interdependency between operating rules and the design of train control / communications systems to ensure the safe working of the railway
j) How to ensure safe railway operation during periods of failure of train control / communication systems
k) The human, economic, technological and environmental factors that affect the safety of train control / communications through the whole system life-cycle
l) The application of quality control and quality management techniques to train control and communications systems
m) Managing the competence of those involved in the design, construction, operation and maintenance of train control / communications systems
n) The broader obligations of engineers to society in respect of safety, efficient and economical use of resources, environmental management etc
o) Accident investigation processes and the management of measures to prevent recurrence

To be able to:

a) Compile a safety plan for a relevant activity
b) Apply techniques for hazard identification, risk assessment and mitigation
c) Define the processes for ensuring safety in the specification, design (data preparation, circuit design, etc), verification, testing and commissioning (validation) of train control / communications systems
d) Manage staff competence (select/train/resource/authorise/motivate/monitor)

Related content:
• Prescriptive and performance based specifications
• Signalling / Telecommunications Principles
• Interactions and interfaces with rolling stock, other infrastructure etc.