

University of Applied Sciences and Arts
of Southern Switzerland

SUPSI



competence centre
sustainable mobility and railways
innovation

Preliminary

Certificate of Advanced Studies SUPSI in Infrastructure & Controls



An integrated approach for the
next generation of mobility professionals

With the support of



SBB CFF FFS

SWISSRAIL
Industry Association

The Certificate of Advanced Studies SUPSI in Infrastructure & Controls (InCo)

InCo is part of the RSM MAS Program.

The transportation industry, and the related infrastructure, is experiencing a generational change.

Thanks to digitalization, the availability of new algorithms, the connections between systems and equipment, the context of infrastructure control is rapidly changing. Adapting to the new pace and upgrading your skills are the foundations for business success.

Operators and new entrants are bringing the actual infrastructure to his limits. The whole transportation infrastructure is going to play an important role to support the actual and the future mobility needs. Mobility services are continually adjusted to tighter schedules and less maintenance slots. Consequently, to be able to support these new situations, new approaches to transportation infrastructure are needed.

Therefore, preparing the next generation engineering and technical experts on infrastructure and system control is becoming one central aspect for a flourishing economy.

With InCo you advance to the next generation of experts in infrastructure and controls.

Your investment of 7 extended weekends.

RSM, exploring mobility.

CAS Infrastructure & Controls

Code

RSM-IC

Introduction

The mobility related infrastructure (rail, road, air) is undergoing a generational change and it is under pressure every day. The general objective of this CAS is to form highly skilled professionals in the field of infrastructure and controls.

This CAS is included into the MAS Railways and Sustainable Mobility (RSM). It trains both technical and management leaders, seeking a career in the transportation industry or in the public/private sectors of mobility & transportation. The participants acquire the skills needed in departments such as research and development, production, consultancy and public institutions. They will also acquire the knowledge for managing complex interdisciplinary projects.

You are going to study infrastructure projects and engineering in a wide context and learn the most important concepts of infrastructure designs, safety and security control systems and be the first to have used the Gotthard Base Tunnel as educational tool. You will be able to understand and manage technical information and you will comprehend how an infrastructure project is conceived, designed, developed, tested, and put into operation. This course will allow you to be at ease in every situation! It will not matter if the topic is of engineering, commercial, or administrative nature, you will become the knowledgeable and reliable counterpart.

Objectives

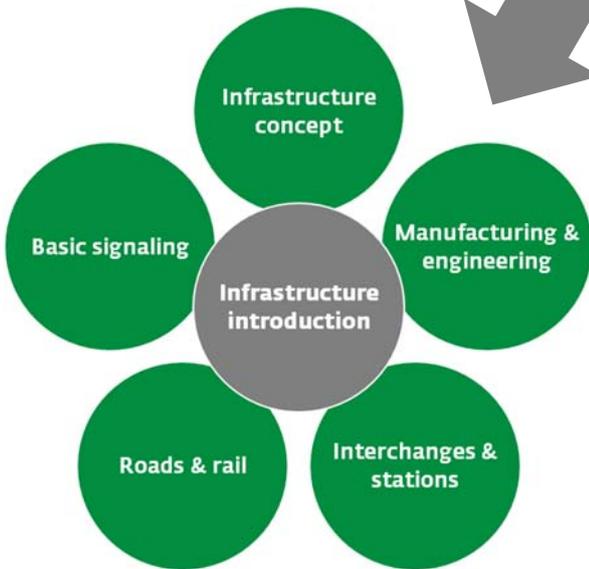
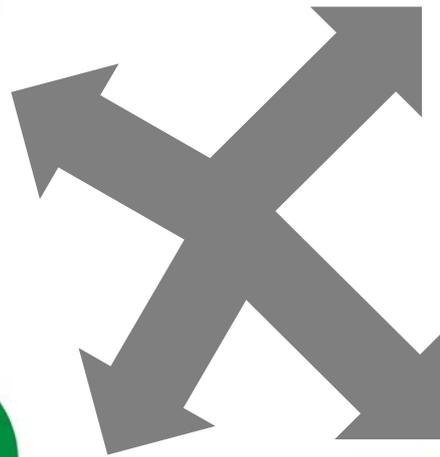
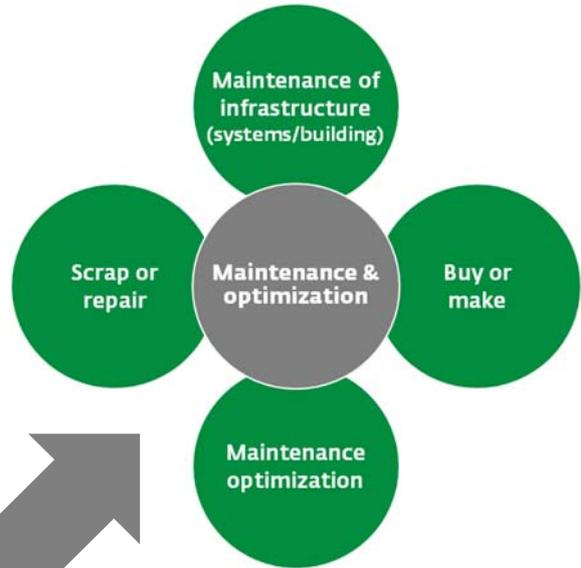
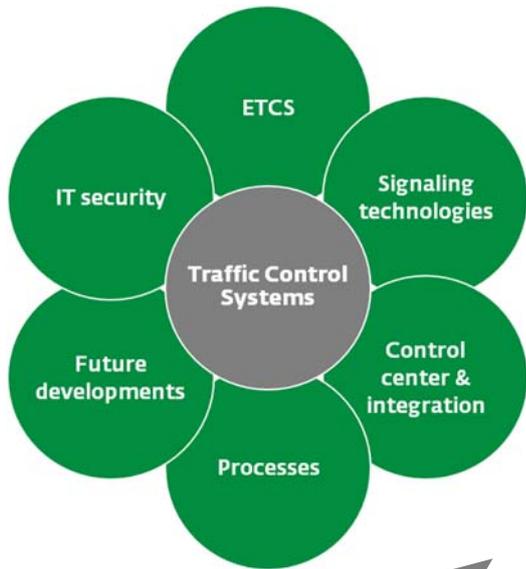
- > Train the future technical coordinators and project managers of the infrastructure sector (with an integrated mobility eye)
- > Know, understand, and evaluate the different types of interacting systems (road, rail, air)
- > Know and understand the organizational and technical aspects of an infrastructure project
- > Be capable of developing innovative approaches to infrastructure problems
- > Be capable of developing and implementing new integrated infrastructure solutions
- > Know how to manage complex infrastructure and maintenance interdisciplinary projects
- > Correctly apply the technical competencies (problem-solving, analysis, implementation)
- > Know, understand, and correctly use the terminology of the field
- > Understand and correctly utilize the regulatory framework

Intended Audience

This CAS is devoted to managers, experienced employees and all persons involved in management in the railways and mobility sector as well as to people interested to work in this sector through the acquisition of the knowhow provided by this course.

Training applications

- > Talent development training program
- > Internal employee re-qualification or certification
- > Introduction program for new hired Staff
- > Experienced employee cross-qualification
- > Independent professional certification



Practical relevance

The InCo CAS has a practical approach. The attendees will be actively involved in aspects of production, processes, maintenance and safety, being encouraged to bring their own examples and ideas to the discussion. The focus will be on innovative solutions and approaches on maintenance and production problems issued from selected manufacturer and national (or international) companies. They will then be able to make a seamless transition to the world of work, familiarized with the challenges stemming from the different industry-based examples.

Skills

Megastructures: the St. Gotthard Base Tunnel

- › From planning to operation: a journey of experiences to help a day-to-day business

Alternatives to infrastructure investments

- › Analyze infrastructure projects for investment optimization

Design and Engineering

- › Get the necessary knowledge to correctly balance design, engineering and maintenance.

Planning³

- › Be able to plan Maintenance/Projects with a wide interdisciplinary approach

Signaling & Digitalization

- › Understand (and apply) digitalization/automation in a strictly regulated environment

Infrastructure integration

- › Be able to develop and manage infrastructure projects with an integrated mobility approach (non-motorized private transport, motorized private, public transport, maritime transport and air transport).

Requirements

Bachelor Graduates from Engineering Programs, Management or other Technical and Scientific faculties. Non-graduates Professionals and Managers from the fields Railways and Mobility with at least 3 years' experience with a presentation of a complete Dossier. The Master is held in English (lessons and documentations) therefore a good command of English is required.

Certificate

Certificate of Advanced Studies SUPSI in Infrastructure & Controls

Credits: 11 ECTS

Mandatory 2-day practical experience

Students shall choose two of the following experiences:

Train conductor - (Chef Kundenbegleiter, chef de train, capo treno)

Train driver - (Lokführer, conducteur de trains, macchinista)

Traffic engineer - (Verkehrsingenieur, ingénieur des transports, ingegnere del traffico)

Train controller - (Zugverkehrsleiter, chef circulation des trains, responsabile circolazione treni)

Client advisor - (Kundenberatung, conseiller clientèle, consulente della clientela)

Transport police - (Transportpolizei, police des transports, polizia dei trasporti)

AD Project Experience - (Autonomous Drive)

Vehicle hand-on - (Unterhalt und Service, entretien et service, manutenzione e servizio)

Credits: no credits

Program

| | | | |
|----------|------------------|--|------------|
| 1 | Module | Introduction to infrastructure | RI1 |
| | Lecturer | Industry Expert | |
| | Lessons | 24 hours (2 ETCS) | |
| | Contents | <ul style="list-style-type: none">> Infrastructure concept: the concepts and designs of infrastructure for mobility.> Manufacturing & engineering: the design, validation, pre-production and execution of building or structures.> Interchanges & stations: transport system interconnection platform, planning, flows, capacity, basics of architecture.> Roads and rail: basics of infrastructure, commonalities, possible synergies.> Basic signaling: basics signaling used for rail and roads. | |
| 2 | Module | Maintenance & optimization | MAO |
| | Lecturer | Industry Expert | |
| | Lessons | 36 hours (3 ETCS) | |
| | Contents | <ul style="list-style-type: none">> Maintenance of infrastructure systems/building: why maintenance? typical activities; special tools; skills required; maintenance plan establishment; safety approach.> Maintenance optimization: cooperation with partners; efficiency improvement; maintenance plan optimization; cost reduction> Buy or make (applies on buildings and equipment): tools for decision making (as a support) which considers the entire life-span and the social implications.> Scrap or repair (applies on buildings and equipment): tools for decision making (as a support) which considers the entire life-span and the social implications. | |
| 3 | Module: | Gotthard basis tunnel case study | GCS |
| | Lecturer: | Industry Expert | |
| | Lessons | 36 hours (3 ETCS) | |
| | Contents: | <ul style="list-style-type: none">> Case study of the Gotthard Base Tunnel: the new tunnel; the access tracks; the economy implications; changes to the original plan; costs; timeline.> From planning to operation: political decision; financing; implication for the local industry; planning & design; build; EIS; operation; maintenance.> Challenges of topology: the Gotthard, due to his unique topology, has posed new challenges to manufacturing: this section discuss how this hurdle has been overcome.> Emergency: security system; evacuations planning; safety concepts.> Technology development: new equipment development; new manufacturing processes; innovation @work. | |
| 4 | Module: | Traffic Control Systems | TRC |
| | Lecturer: | Industry Expert | |
| | Lessons | 36 hours (3 ETCS) | |
| | Contents: | <ul style="list-style-type: none">> ETCS (European Train Control System): system description, understanding of operation; engineering; installation; deployment.> Signaling technologies: definition of actual and new technologies and their applications; limits and advantages; national differences.> Control center, integration: network management; coordination; system integration (infrastructure side); conflict resolution; irregularities; timetable stability.> Processes: in relation to traffic control – economics, safety, management, maintenance, security.> Future developments: what are the next generation of control systems? standardization is possible?> IT security: due to consolidation of control power, a large amount of systems are interconnected and therefore open to IT threats. | |

Duration: 132 hour-lesson

Responsible: a.i. Luca Diviani

Enrolment

Until **January 10, 2020**. Applications/enrolments possible at any time previous agreement with the course responsible.

Place: At the “Officine FFS” in Bellinzona (5 minutes walking from the station).

Lectures

Tuition and documentation will be in English, but we can assist the students in Italian and German. If you wish to attend the course in another language, please mention it during registration and select between Italian and German. The Course could be held in another language if there were at least 8-10 participants.

Cost

CHF 6'100.-

For those who already have attended a CAS of the MAS - RSM, the cost is: 5'700 CHF with a further reduction of 10%. These costs include the exam at the end of the course, the certificate and the documentation. Companies with more than 2 enrolled participants will be granted a special discount.

In cooperation with

Swiss Federal Railways SBB and SWISSRAIL Industry Association

Information

SUPSI, Department of Innovative Technologies
Galleria 2
CH-6928 Manno
T +41 (0)58 666 66 84
F +41 (0)58 666 65 71
dti.fc@supsi.ch
www.supsi.ch/dti
rsm.msfi.ch

Student support direct line: +41 79 500 88 11

Document Version

Vo5P / 07.09.2018
File name: 20180907_CAS_Infra & Controls_Vo5P

M **O** **R**
MoMa **V**
A **a** **InTech**
T **n**
C
O

An integrated approach for the next generation of mobility professionals

With the support of



SBB CFF FFS

SWISSRAIL
Industry Association