

Railway Safety and Control Systems

MSc/PGDip/PGCert

Play an important role in the safe management of railway systems

FACT FILE

Start Date: August

Duration: MSc: 55 weeks full-time;
24–36 months part-time

PGDip: 11 months full-time;
24–36 months part-time

PGCert: 4-11 months

Entry requirements: 2:1 Honours degree in a relevant subject (eg, physics, engineering, mathematics or economics); and for most candidates at least 2-3 years' relevant experience in the railway industry

Railway safety and control systems are vitally important worldwide, for not only the ongoing operation of existing railways, but also for the design and the development of new systems. Much work is being done by companies involved in both mainline and urban transport systems to design safe systems, for the public, their passengers and their workforce. The three pathways of this programme focus on risk and safety systems *design*, risk and safety systems *operation*, and *communication and control* systems (including signalling):

Railway risk and safety systems: this pathway emphasises systems engineering and safety in critical systems, for designing new safety systems.

Railway risk and safety operations and organisation: this pathway emphasises management and safety throughout the system's lifecycle, for engineers and managers who will be responsible for the safe operation of a railway system.

Railway communications and control (including signalling): closely aligned with the Institute of Railway Signalling Engineers (IRSE), professional examination content, it includes systems engineering and theory and practice in railway control systems. One module is practice-based, in signalling and control systems.

This programme is unique in the UK and is jointly delivered by the Universities of York and Birmingham. Students will benefit from the expertise of two leading UK universities: the Birmingham Centre for Railway Research and Education and York's High Integrity Systems Engineering group.

Why choose Birmingham?

- You will develop a deep robust understanding of the approaches to designing and managing safety in transport systems and projects.
- The York modules are highly structured around the general topics of risk and safety management.
- Each pathway provides expertise in the context of systems, operations or control
- The Communications and Control pathway is developed to provide full or partial exemption from the IRSE's professional signalling engineering examination.
- The Birmingham part of the programme focuses on railway systems, communication and control systems, and the application of risk management principles in this sector.
- You can choose to take your research project at the University of Birmingham, University of York or in industry (subject to appropriate academic supervision).
- The three-week introductory course in Terminology and Communication for Railways sets the scene and familiarises you with the components and terminology of the railway system if you have limited railway experience.
- Projects aim to include an industrial sponsor, bringing an extra element of relevance and applicability to an in-depth study of a railway system and/or risk and safety topic

World-class teaching and learning

Teaching takes place in week-long blocks of time which allows for deep learning to be achieved from immersion in the subject. The

primary method is classroom-based lectures and these are enriched by industrial speakers, group exercises, assignments, site visits, study excursions and working weekends throughout the year. Travel and accommodation in York are arranged for you and a several day European study tour is also part of the MSc programme.

Course content

This course comprises taught and research elements. You will take the 3-week Terminology and Communication for Railways course from late August (if you have sufficient railway industry experience, attendance at the 3-week introductory course may not be required), followed by 120 credits worth of modules during the Autumn and Spring semesters. Over the summer you carry out your research project to complete the MSc. Detailed module information is given overleaf.

More about the course

This programme is available to study to PGCert, PGDip (all taught modules) and the full MSc, which includes the research project. This project may be taken at the University of Birmingham, University of York, or in industry, subject to appropriate academic co-supervision. Distance-learning students attend Birmingham only for the taught elements. The part-time and distance-learning modes usually take 2-3 years to complete the full MSc. Individual modules may be also taken for continuous professional development.

BCRRE is privileged to work with colleagues from the railway industry who regularly contribute seminars and talks. Not only do these enrich and embed your learning, they provide excellent opportunities for networking with others in the industry. Several lectures are given by industrial speakers. Further learning is achieved through individual literature review, as part of assignments, or in group exercises.

Enhance your professional prospects

This postgraduate programme is intended for those who wish to establish or enhance their career in the safe operation of transport systems and railway communications and control

(including signalling). Companies employing graduates include mainline railways, metros, tram systems and automated people movers. Safety is high on the agenda of transport operators around the world and our graduates are in high demand.

Department of Civil Engineering

The Communications and Control pathway is aimed at providing full or partial exemption from the IRSE* professional examination.

Programme modules

Modules to be taken vary according to the chosen pathway:

Railway Safety and Control Systems (Risk and Safety Pathways)

Compulsory modules	Credits	Taught at
LH Terminology and Communication for Railways	0	Bham
Foundations of System Safety Thinking*	10	York
Hazard and Risk Assessment*	10	York
System Safety Assessment*	10	York
Railway Operations and Control Systems*	10	Bham
Rolling Stock and Infrastructure Interactions*	10	Bham
Strategic Business Management for Railways*	10	Bham
Practical Ergonomics for Railway Systems	10	Bham
Railway Traction and Electrification Systems	10	Bham
Research Skills	20	Bham
Research Project	60	Bham/York

Risk and Safety Systems pathway:

Systems Engineering for Safety	10	York
Computers and Safety in Critical Systems	10	York

Risk and Safety Operations and Organisation pathway:

Safety Management Systems	10	York
Through Life Safety	10	York

Modules marked * comprise the PG Certificate in Railway Safety and Control Systems



Railway Safety and Control Systems (Communications and Control pathway)

Compulsory modules	Credits	Taught at
LH Terminology and Communication for Railways	0	Bham
Foundations of System Safety Thinking*	10	York
Hazard and Risk Assessment*	10	York
Railway Operations and Control Systems*	10	Bham
Strategic Business Management for Railways*	10	Bham
Principles of Railway Control Systems*	20	Bham
Practical Ergonomics for Railway Systems	10	Bham
Rolling Stock and Infrastructure Interactions	10	Bham
Safety Management Systems	10	York
Applications of Railway Control Systems	20	Bham
Systems Engineering and Integration for Dependability	10	Bham
Research Project	60	Bham/York

Modules marked * comprise the PG Certificate in Railway Communication and Control Systems

LEARN MORE

For full module information and an online application form, please visit our dedicated web pages, or contact our programme staff with your questions.

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www.birmingham.ac.uk/msc-rail-risk