

Basic MRI Physics

ERASMUS Course on Magnetic Resonance Imaging

15 - 19 September 2025

Universidad Politécnica de Madrid

Course Objectives

This one-week module is part of the [ERASMUS Course on Magnetic Resonance Imaging](#).

It is meant to provide a solid understanding of the basic principles underpinning MRI. Topics related to nuclear magnetic resonance, image encoding, relaxation, spin-echo and gradient-echo imaging, fast imaging, instrumentation, site planning, specialized MRI (perfusion, diffusion, flow, functional MRI).

Formal lectures are intertwined with question&answer and self-teaching sessions.

The course is targeted at diagnostic imaging professionals including fields of Clinical Radiology, Medical Physics, Radiography, Electroradiology and staff/students from clinical and scientific facilities. **No previous knowledge of MR principles is assumed.**

The limit of 30 participants will be followed, in the order of payment.

Organizer

Andres Santos ([Biomedical Imaging Technology Lab](#))
Universidad Politécnica de Madrid & CIBER-BBN

Faculty

Dr. Peter Van Schuerbeek (University Brussels, BE)
Dr. Stephen Nicholas (University Dundee, UK)
Dr. Stephen Gandy (University Dundee, UK)
Dr. Stephen Sawiak (University Cambridge, UK)
Dr. Cristina Santa-Marta (Universidad Nacional Educación a Distancia, ES)
Dr. Maria Jesus Ledesma-Carbayo (Universidad Politécnica de Madrid, ES)

Venue: [ETSI Telecomunicación](#). Avenida Complutense 30. Madrid (Spain). **Building 'C', ground floor.**

[See map](#)

Contact: Eva Rojas
 ETSI Telecomunicación
 E-28040 Madrid (Spain)
 <erojas@die.upm.es>

Language: The official course language is English.

Certificate: A certificate will be awarded to the successful candidates.

Accreditation for [CME](#) credits is in progress.

Program

	Monday 15 Sep.	Tuesday 16 Sep.	Wednesday 17 Sep.	Thursday 18 Sep.	Friday 19 Sep.
9:00	Registration	Basic Spin Echo Imaging <i>Dr. S. Sawiak, Cambridge</i>	Basic Gradient Echo Imaging <i>Dr. P. Van Schuerbeek, Brussels</i>	Functional MRI <i>Dr. S. Sawiak, Cambridge</i>	MR Spectroscopy <i>Dr. C. Santa-Martín, Madrid</i>
10:00	Background physics and mathematics <i>Dr. P. Van Schuerbeek, Brussels</i>	Self Evaluation Self Teaching <i>Coffee</i>	Self Evaluation Self Teaching <i>Coffee</i>	Self Evaluation Self Teaching <i>Coffee</i>	Examination and course evaluation
10:45	Basic NMR <i>Dr. P. Van Schuerbeek, Brussels</i>	Spin Echo Imaging in practice <i>Dr. S. Sawiak, Cambridge</i>	Gradient Echo Imaging in practice <i>Dr. P. Van Schuerbeek, Brussels</i>	Diffusion & perfusion <i>Dr. S. Sawiak, Cambridge</i>	<i>Coffee</i>
11:45	Self Evaluation Self Teaching	Self Evaluation Self Teaching	Self Evaluation Self Teaching	Self Evaluation Self Teaching	Certificates & Farewell
12:15	<i>Lunch Break</i>	<i>Lunch Break</i>	<i>Lunch Break</i>	<i>Lunch Break</i>	
13:15	Imaging encoding <i>Dr. P. Van Schuerbeek, Brussels</i>	Relaxation times and contrast <i>Dr. S. Gandy, Dundee</i>	Fast and ultra-fast imaging <i>Dr. S. Nicholas, Dundee</i>	Flow effects and angiography <i>Dr. S. Gandy, Dundee</i>	
14:15	Self Evaluation Self Teaching	Self Evaluation Self Teaching	Self Evaluation Self Teaching	Self Evaluation Self Teaching	
15:00	Instrumentation and site-planning <i>Dr. S. Nicholas, Dundee</i>	Safety and quality assessment <i>Dr. S. Gandy, Dundee</i>	Artefacts <i>Dr. S. Nicholas, Dundee</i>	Cardiac imaging <i>Dr. S. Gandy, Dundee</i>	
16:00	Self Evaluation	Self Evaluation	Self Evaluation	Self Evaluation	

Monday 15 Sep.	Tuesday 16 Sep.	Wednesday 17 Sep.	Thursday 18 Sep.	Friday 19 Sep.
Self Teaching	Self Teaching	Self Teaching	Self Teaching	
17:00 <i>Welcome drink</i>	Visit to MRI facility <i>Dr. M.J. Ledesma-Carbayo, Madrid</i>			
20:30		<i>Social Dinner</i>		

Registration and fees:

First you should fill the registration form on the [organization web site](#)

Fees including course materials, lunches, coffee breaks and social dinner: **750 € full fee, reduced to 550 € for certified students**. To qualify for the reduced fee a letter signed by the Head of Department has to be sent to Eva Rojas by email <erojas@die.upm.es>.

Special food must also be requested in advance.

Payment in Euros should be made payable to the account:

- Account owner: Fundetel
- Bank: Abanca (Address: Av. Reina Victoria 58. E-28003 Madrid. Spain)
- IBAN: **ES58 2080 5604 6430 4001 1038**
- SWFIT: **CAGLESMMXXX**
- Reference: **EMRI-25 [your name]**

The reservation is not confirmed until the payment is received.

Deadline for payment: 29 August 2025.

Last modified on 31 Jan. 2025 by andres@die.upm.es