

ESoA COURSE ON

MOBILE RADIO PROPAGATION FOR 5G AND BEYOND

Braunschweig, Germany, September 23 – September 27, 2024



Source: Braunschweig Stadtmarketing GmbH / Steffen und Bach GmbH

The course on *Mobile Radio Propagation for 5G and Beyond* will be held at the Institute for Communication Technologies, Technische Universität Braunschweig, in the framework of the European School of Antennas 2024 and COST Action INTERACT. The course will cover propagation aspects for cellular and vehicular communication. Starting with the basics of propagation, modern methods used in cellular network planning as well as aspects relevant for future 5G networks, e. g. MIMO, multi-link aspects, localisation, car2X and spectrum regulation are taught. The course includes also computer-based exercises. The teachers are from Technische Universität Braunschweig (DE), Dublin City University (IE), Lund University (SE), University of Bologna (IT) and the European Communications Office (DK).

Course fees :	University Student (full time Master or Ph. D. student) :	550 €
	Any other participant	1100 €

A limited number of free registrations are available for members of COST CA 20120 INTERACT (please contact COST CA 20120 INTERACT for applying to the free registration)

Location : Technische Universität Braunschweig, Institut für Nachrichtentechnik
Room, SN 22.2, Schleinitzstr. 22, 38106 Braunschweig, Germany
<https://www.tu-braunschweig.de/en/ifn>

Accommodation : <https://www.braunschweig.de/tourismus/uebernachten/#/unterkuenfte>

Registration : <https://www.euraap.org/esoa-courses> (open from end of July 2024)

Contact : Prof. Dr. Thomas Kürner, E-Mail : t.kuerner@tu-braunschweig.de

Course Schedule

Monday, September 23, 2024

9.00 – 10.00 h	<i>Welcome, Introduction, Overview, Mobile and Wireless Communication Systems</i> Prof. Thomas Kürner, Technische Universität Braunschweig
10.00 – 10.30 h	<i>General Theory of Propagation: Physical Aspects Part I (Path loss, Spreading factor, Fading)</i> Prof. Thomas Kürner, Technische Universität Braunschweig
10.30 – 11.00 h	Coffee Break
11.00 - 12.30h	<i>General Theory of Propagation: Physical Aspects Part II (Reflection, Diffraction, Scattering, Multipaths)</i> Prof. Thomas Kürner, Technische Universität Braunschweig
12.30 – 13.30 h	Lunch Break
13.30 – 15.00 h	<i>GIS Data for Radio network Planning Part I</i> Prof. Thomas Kürner, Technische Universität Braunschweig
15.00 – 15.30 h	Coffee Break
15.30 – 17.00 h	<i>GIS Data for Radio network Planning Part II</i> Prof. Thomas Kürner, Technische Universität Braunschweig
17.00 - 18.00 h	<i>Exercises</i> Prof. Conor Brennan, Dublin City University

Tuesday, September 24, 2024

9.00 – 10.00 h	<i>Path Loss Modeling for Cellular Networks</i> Prof. Thomas Kürner, Technische Universität Braunschweig
10.00 – 10.30 h	Coffee Break
10.30 - 12.30h	<i>Coverage Planning and Planning Tools</i> Prof. Thomas Kürner, Technische Universität Braunschweig
12.30 – 13.30 h	Lunch Break
13.30 – 15.00 h	<i>Stochastic and Multidimensional Aspects Part (Rayleigh and Rice Fading, Channel Transfer Functions, Spreading in Time, Angles, Selectivity in Frequency, Space, Multidimensional Parameters)</i> Prof. Fredrik Tufvesson, Lund University
15.00 – 15.30 h	Coffee Break
15.30 – 17.30 h	<i>MIMO Channels I:(Steering Vectors, Eigenvalues, MIMO models)</i> Prof. Fredrik Tufvesson, Lund University
17.30 - 18.30 h	<i>Exercises</i> Prof. Conor Brennan, Dublin City University

Wednesday, September 25, 2024

9.00 – 10.30 h	<i>MIMO Channels I: (Beamforming, Massive MIMO)</i> Prof. Fredrik Tufvesson, Lund University
10.30 – 11.00 h	Coffee Break
11.00 - 13.00h	<i>5G and Beyond Channel Models</i> Prof. Fredrik Tufvesson, Lund University
13.00 – 14.00 h	Lunch Break
14.00 – 15.30 h	<i>Propagation and Channel Modeling for Car2X Communication:</i> Prof. Fredrik Tufvesson, Lund University
15.30 – 16.00 h	Coffee Break
16.00 – 17.30 h	<i>Deterministic and semi-empirical channel models for urban areas Part I</i> Prof. Conor Brennan, Dublin City University
17.30 - 18.30 h	<i>Exercises</i> Prof. Conor Brennan, Dublin City University
19.00	<i>Dinner</i>

Thursday, September 26, 2024

9.00 – 10.30 h	<i>Deterministic and semi-empirical channel models for urban areas Part II</i> Prof. Conor Brennan, Dublin City University
10.30 – 11.00 h	Coffee Break
11.00 - 12.00h	Spectrum Regulation in 5G+ Part I Doriana Guiducci, European Communications Office
12.00 – 13.00 h	Lunch Break
13.00 – 14.30 h	Spectrum Regulation in 5G+ Part II Doriana Guiducci, European Communications Office
14.30 – 15.00 h	Coffee Break
15.00 – 17.00 h	<i>Fast ray tracing techniques</i> Prof. Vittorio Degli-Esposti, University of Bologna
17.00 - 18.00 h	<i>Exercises</i> Prof. Conor Brennan, Dublin City University

Friday, September 27, 2024

9.00 – 10.30 h	<i>Advanced electromagnetic models</i> Prof. Conor Brennan, Dublin City University
10.30 – 11.00 h	Coffee Break
11.00 - 12.30 h	Macroscopic modeling of scattering from RIS Prof. Vittorio Degli-Esposti, University of Bologna
12.30 – 13.30 h	<i>Final exam</i>
13.30 – 14.30h	Lunch Break
14.30 – 15.00h	<i>Wrap-up and distribution of certificates</i>