



Topical course

# Structural Health Monitoring

February 28<sup>th</sup> – March 1<sup>st</sup>, 2023

## Detailed Program

	Day 1	Day 2
08:45-12:30	Introduction to the course / SHM <ul style="list-style-type: none"> <li>• Dynamics for SHM</li> <li>• Vibration monitoring</li> <li>• Modulated vibration responses</li> <li>• Modal characterization</li> <li>• Nonstationary dynamic response</li> <li>• Higher harmonics</li> <li>• Vibro-Acoustic Modulation</li> <li>• Application 1 Dynamic response of road bridge</li> <li>• Application 2 Dynamic response of a railway bridge</li> <li>• Application 3 Damage in Composite structures</li> </ul>	Guide Waves <ul style="list-style-type: none"> <li>• Theory of guided waves in thin-walled structures</li> <li>• Excitation and measurement of guided waves</li> <li>• Guided waves in isotropic media</li> <li>• Guided waves in anisotropic media</li> <li>• Signal processing for guided waves</li> <li>• Time reversal for guided waves</li> <li>• Application 1 Fatigue crack monitoring in stiffened steel plates</li> <li>• Application 2 Acoustic Emission source localization in composite laminates</li> <li>• Application 3 Practical example</li> </ul>
12:30-13:45	Lunch	
13:45-17:30	Sensors and Data Collection <ul style="list-style-type: none"> <li>• Accelerometers</li> <li>• Laser based methods</li> <li>• Piezo-electric sensors</li> <li>• Fibre optics – Fibre Bragg Grating</li> <li>• Fibre optics – Distributed sensing</li> <li>• Field measurements</li> <li>• Dealing with large datasets</li> <li>• Smart autonomous distributed wireless sensor networks</li> </ul>	Ultrasonics <ul style="list-style-type: none"> <li>• Introduction to ultrasonics</li> <li>• Linear ultrasonics: Pulse-echo and Pitch-catch methods</li> <li>• Nonlinear ultrasonics: Higher Harmonics and Non-collinear Wave Mixing</li> <li>• Application 1 Wall thickness and pipe geometry measurement of water mains</li> <li>• Application 2 Material characterization using ultrasonics</li> </ul>
17:30-18:30	Drinks	Drinks & Closure
18:30	Dinner	