FREE DORMITORIES
FOR THE FIRST
15 PARTICIPANTS !

We are pleased to announce that while preparing for the BIP Programme, we managed to provide **the first fifteen participants** with **free accommodation** in Wrocław for the duration of the course.

BIP
FATIGUE LIFETIME PREDICTION AND FRACTURE ANALYSIS OF MATERIALS AND STRUCTURES

CONTACT US

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FATIGUE LIFETIME PREDICTION AND FRACTURE ANALYSIS OF MATERIALS AND STRUCTURES

"virtual" part: 20/09/2023–31/10/2023

on-stand Wrocław: 12–17.09.2023

WHY

BLENDED INTENSIVE PROGRAMME?

The aim of the program is to familiarize students with the methods of fatigue life estimation – in particular fatigue cracking of materials and structures.

During the classes, students will have the opportunity to learn about the mechanisms of degradation and damage to materials – at all stages of the product life cycle: from production to operation.

The virtual, numerical part in which students will be able to simulate the cracking process based on the work carried out.

The cycle of classes will include classes in the form of lectures, laboratories and seminars.

DETAILED SCHEDULE

12/09

- 17:00 — Welcome Session (Fatigue and lifetime) and ice breaking cocktail
- 21:00 — Multimedia fountain sunset

13/09

- 09:00–09:30 Opening / registration
- 09:30–11:00 Mechanical behaviour of various materials and their degradation. (Lecture)
- 11:00–11:30 Coffee Break
- 11:30–13:00 Influence of defects on materials properties–from specimen to component (Lab)
- 13:00–15:00 Lunch break
- 15:00–18:00 How to perform failure analysis? (project+lab)

14/09

- 9.30–10.30 Challenge in the design, development and manufacturing of a custom CFRP handlebar for a Paralympic athlete (Paralympic Games 2024, Paris)", 45 minutes,
- 10.30–12.00 Fatigue crack growth — theory and experiment (lecture)
- 12.00–12.30 Coffee Break
- 12.30–14:00 Fatigue of composite materials — challenges and application–LECTURE
- 14.00–15.00 Lunch break
- 15.00–16.30 Case study analysis: fatigue failures and improvements: project/lab
- 17:30–21:00 Cultural activity — Visiting Wroclaw + Odra river

15/09

- 9.30–11.00
- "Bio-based lightweight materials/ sustainable composites", 30 minutes, English, Azmin Hannan,
- "Design and optimization of an adaptive lightweight rotor blade", 30 minutes, English or German, slides in English, Lucas Ost,
- "Automated Fiber Placement at the Chair of Polymer-based Lightweight Design", 15–20 Minutes, English or German, slides in English, Anton Schiefelbein
- 11.00–11.30 Break
- 11.30–13.00. Make it, break it — design of your component and perform the technological process (Lab)
- 13.00–15.00 Lunch break
- 15.00–16.30 Fatigue and fracture testing — tricks and tips from laboratory (Lab)
- 19:00–22:00 Gala Dinner

16/09

- 9:30–11:00 Fatigue of civil engineering material like concrete
- 11.00–17.00 visiting Wroclaw (or ZOO) and discovering dwarfs and bridges (with lunch break)

17/09

- 10.00–14.00 Student Presentations (15 minutes per team)
- 14.00–14.15 Closing ceremony
- 14.15–16.00 Lunch break

VIRTUAL COMPONENT TOPICS

1.Fatigue lifetime predictions — analytical tutorials and examples of modeling
— WUST, prof. Grzegorz Lesiuk

2. *Statistics what percentage of engineering failures happen due to fatigue, which parts of machines fails more often*
— RTU RIGA, prof. Marina Cerpinska

3. *Case studies of engineering failures due to fatigue Aloha airlines, Silver bridge etc.*
— RTU RIGA, prof. Marina Cerpinska

4. *Ultrasonic fatigue testing of materials: Advantages, basic features and current challenges*
— Brno University of Technology, prof. Jan Klusák / prof. Stanislav Seitl

5. *Numerical Analysis in fatigue and fracture — theory and tutorials*
— U. Porto, prof. Abilio M.P. De Jesus

6. *Modeling of composite materials structural integrity*
— WUST, PhD Smolnicki

7. *Examples of fatigue and fracture approach in civil engineering — numerical modeling and analysis of fatigue lifetime — bridge structures*
— U. Porto, prof. Jose Correia

8. *Experimental methods — data analysis and techniques for structural integrity assessment composite materials*
— WUST, PhD Smolnicki/ MSc Eng. Szymon Duda

9. *High-speed phenomena and modeling*
— WUST, MSc Eng. Kayode Olaleye

PARTNERS

- The Brandenburg University of Technology Cottbus-Senftenberg
- Riga Technical University
- Brno University of Technology
- University of Porto
- Wroclaw University of Science and Technology