Erasmus+ Moby Dig - Transnational **mob**ilit**y** & interdisciplinary STEM modules in the **dig**ital era

Intensive Study Programme, 11.01. – 20.01.19

Agenda

Friday, 11.01.19 | Luleå, location: Luleå University of Technology

9:00 am – 12:30 pm	• Welcome to ISP **Study Programme:** • Introduction to the ISP in Luleå including social activities and laboratory week • Introduction to Material selection programme CES Edupack
12:30 – 1:30 pm	Lunch break
1:30 – 5:30 pm	**Study Programme:** • Introduction: Adobe video meeting with the other ISP participant in Karlsruhe and Oulu. Presentation of all students, teachers as well as ISP content • Exercise using the software CES Edupack for material selection criteria. Aim: Identity a lightweight, biobased composite with high mechanical properties
5:30 – 7:30 pm	Dinner
7:30 – 9:00 pm	**Social Programme:** • Prison Island: get to know each other "teambuilding" by working together solving different tasks and "puzzles"

Saturday, 12.01.19 | Luleå location: Luleå town and Gammelstad

9:00 am – 12:30 pm	**Study Programme:** • Self study: continue working with the material selection • Group work: Summarizing and comparing the students selected materials. Discussion on the different material selections
12:30 – 1:30 pm	Lunch break
1:30 – 5:30 pm	**Study Programme** • Information retrieval on the selected materials. What are the suitable applications for the materials? • Daily summary
6:30 – 7:30 pm	Dinner
7:30 – 10:00 pm	**S**ocial (Study) programme • City of Luleå world heritage Gammelstad Kyrkbyn. Learning more about the history of Luleå • Bowling (Team-building)

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Sunday, 13.01.19 | Luleå, location: Ale, and Luleå town

9:00 am – 12:30 pm	**Social (Study) Programme:** • Dogsledding Luleå Adenture: Learning about the nature in Luleå and surrounding villages
12:30 – 1:30 pm	Lunch break
1:30 – 5:30 pm	**Study Programme:** • Summarizing all information from the material selection assignment into a presentation • Daily summary
5:30 – 6:30 pm	Dinner
6:30 – 8:30 pm	**Self-study**: • Working on assignment and preparation of the presentation

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Monday, 14.01.19 | Luleå, location: Luleå University of Technology

09:00 am – 12:30 pm	**Study Programme:** • Introduction to Wood and bionanocomposite lab and introduction on how to give feedback • Student presentations (material selection) • Students prepare written feedback for each presentation
12:30 – 1:30 pm	Lunch break
1:00 – 4:00 pm	**Study Programme:** • Laboratory safety issues • Introduction to polymer: Identification laboratory The students work in groups in the lab, learning how to identify and distinguish the most common polymers (10 samples) by simple techniques such as burning, smelling, density test, etc. • Presentation and discussion about the identified polymers What are the characteristics and differences between them?
4:00 – 5:00 pm	**Self-study:** • Summarizing the experiments. Read through the laboratory instructions for Tuesday

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Tuesday, 15.01.19 | Luleå, Location: Luleå University of Technology

	Study programme
9:00 am – 12:30 am	• The students are divided into 3 groups • Station 1: Mechanical characterization • Station 2: Atomic Force Microscopy (AFM) • Station 3: Optical Microscopy (OM)
12:30 am – 1:30 pm	Lunch break
1:30 – 4:30 pm	**Study programme** • Station 1: Students test both pure polymer and with fiber (composite) and compare their mechanical properties. knowledge on how to use mechanical (tensile) testing for characterization • Station 2: AFM study of biofilms. Compare different films. Learn how to use AFM and how it works, measure tophography and dimensions from AFM • Station 3: OM of biomaterials from different sources. What is important when using OM. Comparison of different materials
4:30 – 5:00 pm	**Self -study:** Work on the exported stress and strain curves from the mechanical testing. Learning objective: what mechanical properties can be extracted/calculated from the testing curves
5:00 – 6:00 pm	Dinner

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Wednesday, 16.01.19 | Piteå / Luleå University of Technology

8:00 am – 9:00 am	Departure to Sunpine in Piteå + preparation during the journey for the com-pany visit **(self-study)**
9:00 am – 11:30 am	**Study Programme: Biorefinery concept** **Sunpine AB** Cisternvägen 53 94143 Piteå Study visit where students will experience how even extractives from wood can be turnerd in to valuble bioresources
11:30 am – 12:30 am	**Study Programme: Composite manufacturing** **Composite Service Europe** Kompositvägen 3 94333 Öjebyn Learn about industrially used composite manufacturing techniques
12:30 am – 13:30 pm	Lunch break
13:30 – 16:30 pm	**Study programme:** • Sample preparation for the microscopy day

Thursday, 17.01.19 | Luleå, location: Luleå Unversity of Technology

8:00 am – 12.30 pm	**Study programme:** • Division into two groups • Introduction to Scanning Electron Microscopy (SEM)
12:30 – 1:30 pm	Lunch break
1:30 – 3:30 pm	**Study programme:** • Experimental: hands on work with the SEM (fracture surface from materials after mechanical testing)
3:30 – 5:00 pm	**Study programme:** • Experimental: hands on work with the SEM (fracture surface from materials after mechanical testing) • Learning: Connecting the processing with the structure of the materials, learn how to use SEM

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Friday, 18.01.19 | Luleå, location: Luleå University of Technology

9:00 am – 10:00 am	**Study programme:** • Presentation and discussion group 1: Summary of SEM, OM, AFM images
10:00 am – 12:30 pm	**Study Programme:** • Presentation and discussion group 2: Summary of SEM, OM, AFM images • Summary and discussion on: differences in interpretation of the materials between the groups
12:30 – 1:30 pm	Lunch break
1:30 – 4:00 pm	**Study Programme:** • Summary of advantages and disadvantages with the different microscopic techniques
4:00 – 6:00 pm	Walk on the ice (social programme)
6:00 – 8:30 pm	**Dinner and bowling (social programme)**

Saturday, 19.01.19 | Luleå

9:00 am – 12:30 pm	**Self-study:**debriefing of ISP , feedback and summary
12:30 – 1:30 pm	Lunch break
1:30 – 3:00 pm	**Self-study:** • Debriefing and evaluation of ISP
5:00 – 6:00 pm	Dinner: in barbecue grill outside in the forest
6:00 – 10:00 pm	**Social programme:** • Snowshoe trek with headlamps in the forest – looking for the northern light

Sunday, 20.01.19 | Luleå / individual departure

9:00 am – 12:30 pm	City of Luleå: walk/skate on the ice / Individual departure
12:30 – 1:30 pm	Lunch break
1:30 – 5:00 pm	City of Luleå walk/skate on the ice, shopping, souvenirs/ Individual departure