# Erasmus Mundus Japan - Master of Science in Imaging and Light in Extended Reality – IMLEX, Joensuu campus

IMLEX programme (120 ECTS credit points) provides a multidisciplinary and innovative approach combining Imaging, Lighting and Information Technology. The objective is to educate students in advanced technologies, methodologies and practical applications. Students will develop professional and social skills useful in both European and Japanese cultural context. Graduates will have competences in: Extended reality (XR): Augmented, Mixed and Virtual Reality (AR, MR, VR); industrial environments with robots and complex elements; Imaging; Rendering; Lighting.

IMLEX study programme is divided in two study tracks: *Lighting* track and *Computational Imaging* Track. All students will be appointed their study track during the admission process.

The IMLEX mobility plan is as follows (each semester equals to 30 ECTS):

Semester 1:    UEF

Semester 2:    University Jean Monnet (France) or KU Leuven (Belgium)

Semester 3:    Toyohashi University of Technology (Japan)

Semester 4:    MSc thesis, in one of the partner universities or in a partner company

## SEMESTER 1, UEF

| Core courses for all students | ECTS |
|---|---|
| Photonics and Optics Fundamentals | 4 |
| Design and Analysis of Algorithms | 4 |
| Robotics and XR | 4 |
| Physical Optics | 4 |
| Eye Tracking | 4 |
| English or Japanese or national language course | 2 |

Track (Lighting or Computational Imaging) specific courses, semester 1:

| Lighting track | ECTS | Computational Imaging track | ECTS |
|---|---|---|---|
| Mathematical Methods for Photonics | 4 | Color Science | 4 |
| Applications of Photonics | 4 | Advanced Spectral Imaging | 4 |

**SEMESTER 2, KU Leuven / University Jean Monnet**

Lighting track, KU Leuven

| Core courses | ECTS |
|---|---|
| Lighting Science | 6 |
| Lighting Technology | 6 |
| Lighting Metrology | 3 |
| Lighting Design | 6 |
| Lighting Business | 6 |
| English or Japanese or national language course | 3 |

Computational Imaging track, University Jean Monnet

| Core courses | ECTS |
|---|---|
| Real-time 3D Visualization | 5 |
| Real-time processing of Conventional/Non-Conventional Image with GPU | 5 |
| Complex Computer Rendering Methods in Real Time | 6 |
| Machine Learning: Fundamentals and Algorithms | 5 |
| Deep Learning and Computer Vision | 6 |
| English or Japanese or national language course | 3 |

**SEMESTER 3, Toyohashi University of Technology**

Track (Lighting or Computational Imaging) specific courses, semester 3:

| Lighting track | ECTS | Computational Imaging track | ECTS |
|---|---|---|---|
| Human Sensation & Perception | 4 | 3D Vision Computation | 4 |
| X Reality and Psychology | 4 | Robotic Perception and Human-robot Interaction | 4 |

| Core courses for all students, semester 3 | ECTS |
|---|---|
| Data Science and Analysis | 4 |
| Advanced Research Methods | 6 |
| Japanese Culture and Society | 4 |
| Case Study in Imaging and Light and XR | 6 |
| Japanese Industrial Technologies and Innovations | 2 |

**SEMESTER 4, Master's Thesis, 30 ECTS**