

Łukasiewicz

Instytut Mikroelektroniki i Fotoniki

Photon Hub Experience Center Photonic Materials & Speciality Fibers





Photon Hub Experience Center

Course XX

Photonic Materials and Speciality Fibers

Course Provider

Department of Photonic Materials

Łukasiewicz – Institute of Microelectronics and Photonics

Warsaw, Poland















Course overview



and could be made from many amorphous materials.

This 3-day course with hands-on-training will introduce participants to the glass and optical fiber fabrication technology. This will include the whole procedure how from simple compounds in form of powder the optical fibers are fabricated.

The course include condensed knowledge including:

- Synthesis of multicomponent glasses.
- Assembly of the fiber preform.
- Microstructured fiber drawing
- Fiber optical characterization.



Photonic optical fibers found applications in various fields of science and industry





The participants should have basic knowledge about the optical fibers and the course is for everyone who would like to learn or extend the knowledge of the optical fiber fabrication.

Expected outcomes

- Extend the knowledge about available materials from which optical fibers could be fabricated
- Learn the possibilities and limits of the designing the fiber architecture and their properties and specialty application
- Gain knowledge about basic fiber optical characterization





Target audience







		9:00-10:00	10:00-13:00	13:00-14:00	14:00-17:00	17:00-18:0
Part A	A1	Glass synthesis & Hot	Glass synthesis	Break	Hot Embossing	Follow-up 8 Discussion
	A2	embossing introduction	Hot Embossing		Glass synthesis	
Part B	B1	Preform stacking & Fiber	Preform stacking		Fiber draw	
	B2	drawing Introduction	Fiber draw		Preform Stacking	
Part C	C1	Fiber Measurements &	Fiber measurements		Fiber splicing	
	C2	splicing introduction	Fiber splicing		Fiber measurements	

Group	Day 1	Day 2	Day 3
1	A1/A2	B1/B2	C1/C2
2	A2/A1	B2/B1	C2/C1
3	B1/B2	C1/C2	A1/A2
4	B2/B1	C2/C1	A2/A1
5	C1/C2	A1/A2	B1/B2
6	C2/C1	A2/A1	B2/B1

Course Schedule





Course details (Part A) Glass synthesis, characterization & Hot embossing

Selection of the glass type, crucible material, substrates, melting scheme,

Glass synthesis (A1):

- Preparation of the batch
- Glass melting and casting
- Glass thermal characterization

Hot embossing (A2):

- Choosing the glass, molded element (diffractive lens, refractive lens, diffraction grating)
- Preparation of the furnace and selection the mold materials
- Lens molding









Course details (Part B) Preform stacking & Fiber drawing

Selecting the fiber design and material (PCS, step-index, PCF, antiresonant, step index, air gaps or all-solid design etc.)

Preform preparation (Part B1):

- Preparation of the preform elements
- Preform assembly and mount
- Preform assembly

Fiber drawing (Part B2):

- Furnace preparation
- Fiber drawing
- Fiber inspection













Course details (Part C) Fiber optical measurements & splicing

Fiber dispersion, attenuation measurements theoretical basis introduction

Fiber measurements (C1):

- Fiber alignment
- **Dispersion measurements (Mach-Zehnder interferometer)**
- Attenuation measurements
- **Supercontinuum generation**
- FROG

Fiber splicing (C2):

- **Preparation of the fiber**
- **Splicing different types of fibers**
- **Splice attenuation measurement**













Course Director:Dr AliaCourse Manager:Dr JarGlass Synthesis & Hot embossing:Dr JarPreform stacking & Fiber draw:DariusOptical measurements & fiber splicing:Dr Gra



Course Trainers

Dr Alicja Anuszkiewicz

Dr Jarosław Cimek

Dr Jarosław Cimek, Ireneusz Kujawa MSc eng.

Dariusz Pysz MSc eng., Dr Marcin Franczyk

Dr Grzegorz Stępniewski, Dr Adam Filipkowski

Course location, Schedule & Cost



Course Timeline – on demand

Course Cost – 650 EUR

Option: the course can be extended with lectures given by external experts on fiber optics and their applications (based on Photon Hub Europe pool)

Further Information

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Number of People – up to 18 attendees per course (3 persons per activity/group)





Keywords

Glass, multicomponent glass, soft glass, glass synthesis, hot embossing, glass characterization, glass molding, lens, mid-infrared, optical fibers, photonic crystal fiber, stack and draw, fiber draw, fiber splicing, fiber characterization, Mach-Zehnder interferometer, FROG, fiber dispersion.