



ITMO UNIVERSITY

# CAMP IN OPTICAL SYSTEM DESIGN 2020

## JUNE 8 – JUNE 22 & JUNE 29 – JULY 10, 2020

Mode:  
**Online**  
4 ECTS

Hours per day:  
**5**

Fees:  
**€700**

### Optical System Design

### Description:

### Required programs and skills:

English Language B1 and higher  
Zemax Optic Studio (free student license for 1 year; should be requested by students themselves).  
Math.Cad Calculator  
Microsoft Office, Zoom

The Online Camp in Optical System Design 2020 at ITMO University offers fascinating lectures and practical experience in the field of Optics! If you could be easily inspired just by thinking about how to reduce aberrations in optical systems or increase the resolution of the imaging system, this program is exactly the thing for you!

### Outcome:

ITMO Official Certificate

Students will have a chance to extend their knowledge in the sphere, acquire hands-on experience of working in the Zemax Optic Studio and have a chance to conduct their own project upon close supervision of the leading experts in the sphere.

### Theoretical part:

**JUNE 8 – 22, 2020**

### Practical part:

**JUNE 29 – JULY 10, 2020**

During the theoretical part of the program, students will work with theoretical materials and perform tasks and tests on elements of Applied Optics.

### Extracurricular Activities

Complimentary to the core program, the school price includes Russian Language classes, VR tours in the most famous St.Petersburg museums theatres, and a unique Russian cuisine workshop!



## Camp lecturers and coordinators:



**Galina Romanova**  
PhD, ITMO  
Professor



**Aleksei Garshin**  
PhD, ITMO  
Professor



**Aleksei Ostrun**  
PhD, ITMO  
Professor



**Anna Voznesenskaya**  
PhD, ITMO  
Professor



**Dmitriy Zavgorodniy**  
ITMO Professor



**Helen Tsyganok**  
PhD, ITMO  
Professor

# SCHEDULE

## June 29 – July 3, 2020

### June 29, Monday

10:00 am - 11:30 am

Optical Design. Introduction. Designing process.

11:30 am- 13:00

Optical Design Software. Introduction to Zemax.

14:00 – 15:30

Sequential and Non-Sequential Models in Zemax.

15:30 – 17:00

Practical work: Modeling the Multi-Lens System.

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### June 30, Tuesday

10:00 am - 11:30 am

Types of Optical Systems.

11:30 am – 13:00

Layout Design of the Simple Two-Component Systems

Using Paraxial Components.

14:00 – 17:00

Practice: Telescope System, Photo Lens and Microscope

Layout Design (Zemax)

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### July 1, Wednesday

10:00 am - 11:30 am

Aberration Theory Basic Ideas. Aberration Types.

11:30 am – 13:00

Monochromatic Aberrations: Study the Types with Using

Demo-Systems

14:00 – 15:30

Chromatic Aberrations: Study the Types with Using

Demo-Systems

15:30 – 17:00

Practice: Achromatic Doublet

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### July 2, Thursday

10:00 am - 11:30 am

Evaluation of the Image Quality

11:30 – 13:00

Evaluating the Aberration Balance Using Different Functions (Stop Diagrams, Seidel Diagrams, Aberration Plots, MTF, Encircled Energy, etc.)

14:00 – 15:30

Tips and Tricks: Using Macro for Speeding up the Work.

15:30 – 17:00

Unsupervised work: calculating the focal length of the components and choosing the eyepiece for the system.

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### July 3, Friday

10:00 am - 11:30 am

Automated Design and Optimization. Mathematical Basis.

11:30 am -13:00

Practice: Understanding the Relief of MF

14:00 - 17:00

Optimization Using Zemax

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## July 6 – July 10, 2020

### July 6, Monday

10:00 am - 13:00

Synthesis, Analysis and Correction of Two-Mirror System.

14:00 – 17:00

Synthesis, Analysis and Optimization of the Laser Collimating System.

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### July 7, Tuesday

10:00 am- 13:00

Sensitivity Analysis and Tolerancing: Theoretical Basis, Types of Errors.

14:00 – 17:00

Elements of Mechanical Design in Optical Engineering.

16:00 – 18:00

FAQ Session

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### July 8, Wednesday

10:00 am - 13:00

Using Special Optical Elements and Their Modeling in Zemax OS: Prisms.

14:00 – 17:00

Using Special Optical Elements and Their Modeling in Zemax OS: Fibers, and etc.

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### July 9, Thursday

10:00 am - 13:00

Unsupervised work

Designing the Whole Telescope System and Preparing a Presentation

14:00 – 17:00

Unsupervised work

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### July 10, Friday

10:00 am - 13:00

Project Presentation

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All classes are scheduled according to Moscow time (GMT+3)