



INSTITUTE OF BIOCHEMISTRY AND BIOPHYSICS
POLISH ACADEMY OF SCIENCES

Courses for PhD students
The academic year 2025 / 2026

Warsaw, June 2025

(September 2025, UPDATE)

AUTUMN 2025

MONDAYS

MEDICAL CHEMISTRY

October 6th, 2025 - February 23th, 2026

15 meetings

language: English

WEDNESDAYS

IMAGE ANALYSIS COURSE USING IMAGEJ/FIJI SOFTWARE

optional workshop

October 29th – December 17th, 2025

5 meetings

language: English

FRIDAYS

HOW TO BUILD A GRANT PROPOSAL

October 3rd – November 14th, 2025

3 meetings

language: English

SCIENTIFIC WRITING

October 17th, 2025 - January 16th, 2026

two groups,

4 meetings each

language: English

ETHICS IN RESEARCH

February 6th – 27th, 2026

4 meetings

language: English

SPRING 2026

MONDAYS

RNA

March 2nd – June 22nd, 2026

15 meetings

language: English

FRIDAYS

BIOSTATISTICS

March 6th – May 22nd, 2026

10 meetings

language: English

DESIGN THINKING

optional workshop

May 29th - June 26th, 2026

4 meetings

language: English

LECTURE

structure
schedule

language
room
requirements
software

ASSESSMENT

credit

language
date
room
educational materials

LECTURERS

CONTACT PERSON

COORDINATORS

MEDICAL CHEMISTRY

series of 15 meetings (2 x 45 min each)
Mondays, 09:30 am
October 6th, 2025 - February 23th, 2026

English
Lecture hall E or on-line, depending on the speaker
use your full name while logging in
-

- written exam (for PhD Students in chemical sciences) + min. 60% of attendance; or
- a short (400-500 words) essay on a given topic + min. 60% of attendance (for PhD Students in biological sciences)

English
February 23th, 2026
Lecture hall E
-

full list will be available for registered participants

Adam Mieczkowski, PhD, DSc (amiecz@ibb.waw.pl)

Anna Muszewska, PhD, DSc (musze@ibb.waw.pl)
Adrian Iwaniuk (sbm@ibb.waw.pl)

The course includes:

The lecture concerns modern issues, directions and strategies in the field of medicinal chemistry and presents current chemical and biochemical tools applied in drug discovery. The lecture will be focused on the development of novel therapeutic agents based on nucleoside analogues, metal-based drugs, radiopharmaceuticals, peptide nucleic acids, therapeutic nucleic acids (mRNA, antisense, siRNA, Crispr/Cas, ribozymes, DNA and RNA oligonucleotides) boron-based drugs, peptide and peptidemimetics used as antitumor, antiviral and/or antibacterial agents and also include issues related to drug polymorphism, activity/affinity-based protein profiling in drug discovery and PROTACs as promising new strategy for anticancer therapy.

LECTURE

IMAGE ANALYSIS COURSE USING IMAGEJ/FIJI SOFTWARE

optional workshop - This course is not part of the educational programme. You may participate in it to enhance your knowledge and skills.

structure

series of 5 meetings (2 x 45 min each)

schedule

Wednesdays, 09:30 am

1. 29.10.2025

2. 05.11.2025

3. 19.11.2025

4. 26.11.2025

5. 17.12.2025

language

English

room

Online course

requirements

software

Fiji and its plugins.

ASSESSMENT

credit

min. 60% of attendance + test

language

English

educational materials

-

LECTURERS

CONTACT PERSON

Anna Anielska-Mazur, PhD (aam@ibb.waw.pl)

COORDINATORS

Adrian Iwaniuk (sbm@ibb.waw.pl)

Anna Muszewska, PhD (musze@ibb.waw.pl)

General session format:

- a) 20–30 minutes of theory
- b) One or two example tasks completed together with participants (tool demonstration) (approx. 20 min)
- c) Up to three group exercises (in MS Teams breakout rooms, with live consultations and direct Q&A)
- d) 1–3 additional assignments to complete after the session (with feedback sent via email)

The course includes:

- 1) Block One: Basics, image quality improvement methods, and image preparation for presentation
 - a) Basic information about digital images and the influence of acquisition conditions on image quality
 - b) Introduction to basic image transformations
 - i) Histogram transformations (linear and non-linear)
 - ii) Use of LUTs
 - c) Noise sources, convolution filters, denoising methods, and background normalization:
 - i) Convolution filters (high-pass, low-pass)
 - ii) Frequency-domain filtering (FFT)
 - iii) Other filtering methods and background normalization
 - d) Working with color images
 - i) Color spaces, conversions, hyperstacks

- 2) Block Two: Extracting Quantitative Data from Images
 - a) Measurable object parameters
 - i) Manual measurement tools (intensity profiles, peak finding)
 - b) Object segmentation:
 - i) Thresholding
 - ii) Working with binary images and morphological operations
 - iii) Basic measurement tools
 - iv) Convolution filters – edge detection
 - v) Automatic segmentation tools (MorphoLibJ, Weka Trainable Segmentation, StarDist)

c) Colocalization analysis and colocalization coefficients:

i) Object-based colocalization

ii) Pixel-based colocalization

d) Ratiometric measurements (?)

3) Block Three: Working with 3D Images and Time-Lapse Series

a) Fundamentals and structure of such images

b) 3D object segmentation

c) Tracking structural changes / local concentration changes over time (kymographs, FRAP analysis, protein accumulation)

d) Object tracking over time (based on TrackMate)

e) Tools for working with large files

LECTURE

structure
schedule

language
room
requirements
software

ASSESSMENT

credit
language

room
educational materials

LECTURERS

CONTACT PERSON COORDINATORS

HOW TO BUILD A GRANT PROPOSAL

series of 3 meetings (2 x 45 min each)

Fridays 09:30 am

October 3rd – November 14th, 2025

1. 03.10.2025

2. 07.11.2025

3. 14.11.2025

English

Room 7 / A

-

-

attendance (min. 60%) + written assignment

English

Room 7 / A

-

Szymon Świeżewski, PhD, DSc

Szymon Świeżewski, PhD, DSc (sswiez@ibb.waw.pl)

Anna Muszewska, PhD, DSc (musze@ibb.waw.pl)

Adrian Iwaniuk (sbm@ibb.waw.pl)

The course includes:

- Selecting a proper call.
- Identifying your strengths.
- How to choose the subject of the grant proposal.
- Balancing novelty and feasibility.
- Art of writing a grant proposal.
- Common mistakes in grant proposals.

LECTURE

structure
schedule

SCIENTIFIC WRITING

series of 4 meetings (2 x 45 min each) two groups
Fridays 09:30 am
October 17th, 2025 - January 16th, 2026

Group A	Group B
17.10.2025	05.12.2025
24.10.2025	12.12.2025
21.11.2025	09.01.2026
28.11.2025	16.01.2026

language
room
requirements
software

English
Room 7 / A

-
-

ASSESSMENT

credit

attendance (min. 60%) + 1 assignment

language

English

room
educational materials

Room 7 / A
-

LECTURERS

Marta Hoffman, PhD (martah@ibb.waw.pl)

CONTACT PERSON COORDINATORS

Anna Muszewska, PhD, DSc (musze@ibb.waw.pl)
Adrian Iwaniuk (sbm@ibb.waw.pl)

The course will discuss the topics:

- Why do we write research articles?
- A research paper as a narrative
- Different audiences, different approaches
- Methods section versus experimental protocol – finding the balance
- Presenting data in a paper:
 - figures / supplementary figures / figure source data / underlying datasets
- Shortening down: thesis – paper – presentation – poster – abstract – title

The course will include 2 short exercises (about the size of an abstract).

LECTURE

structure

schedule

language

room

requirements

software

ETHICS IN RESEARCH

series of 4 meetings (2 x 45 min each)

Fridays 09:30 am

February 6th – 27th, 2026

English

on-line

use your full name while logging in

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ASSESSMENT

credit

attendance (min. 60%) + written assessment

language

English

room

on-line or in person (Room 3/D)

educational materials

-

LECTURERS

- Bartłomiej Tomasik, PhD physician and biostatistician
- Wojciech Bober, PhD in Philosophy
- Zuzanna Warso, PhD, Director of Research at the Open Future Foundation
- Błażej Dawidson, supports organizations in improving services and customer experience

CONTACT PERSON COORDINATORS

Anna Muszewska, PhD, DSc (musze@ibb.waw.pl)

Adrian Iwaniuk (sbm@ibb.waw.pl)

The course includes:

- Data integrity and data manipulation
- The role of society and communication
- Ethics in the philosophical context
- Legal frames of research and RRI

LECTURE

structure

schedule

language

room

requirements

software

RNA

series of 15 meetings (2 x 45 min each)

Mondays 09:30 am

March 2nd – June 22nd, 2026

English

Lecture hall E or on-line, depending on the speaker

-

-

ASSESSMENT

credit

- written exam (for PhD Students in biological sciences)

- + min. 60% of attendance; or

- a short (400-500 words) essay on a given topic + min.

- 60% of attendance (for PhD Students in chemical sciences)

English

June 22th, 2026

Lecture hall E

-

language

date

room

educational materials

LECTURERS

full list will be available later

CONTACT PERSON

Piotr Gerlach, PhD (p.gerlach@imol.institute),

Maciej Cieřla, PhD, DSc (m.ciesla@imol.institute)

COORDINATORS

Anna Muszewska, PhD, DSc (musze@ibb.waw.pl)

Adrian Iwaniuk (sbm@ibb.waw.pl)

The course includes:

During the course, participants will explore various facets of RNA function and regulation. The course aims to provide a comprehensive overview of RNA metabolism, offering both foundational knowledge and insights into emerging frontiers in the field. Topics will range from mechanistic aspects to translational applications, covering a broad spectrum of RNA-related processes. Specifically, the course will include discussions on: transcription and RNA polymerases; co-transcriptional processing and export of mRNA; splicing; ribosome biogenesis and function; translation initiation and regulation; epitranscriptomics and RNA modifications; RNA processing and decay; RNA granules; regulatory RNAs; RNA viruses; and therapeutic RNAs.

LECTURE

structure
schedule

BIOSTATISTICS

series of 10 meetings (2 x 45 min each)
Fridays 09:30 am
March 6th – May 22nd, 2026

language
room
requirements
software

English
on-line,
use your full name while logging in
-

ASSESSMENT

credit

attendance (min. 60%) + 1 assignment

language
educational materials

English
-

LECTURERS

Michał Aleksander Ciach, PhD

CONTACT PERSON

Anna Muszewska, PhD, DSc (musze@ibb.waw.pl)
Adrian Iwaniuk (sbm@ibb.waw.pl)

The course includes:

The course will focus on the fundamentals of statistics with a focus on applications in biological research.

Introduction to data analysis and basic data exploration techniques - clustering and principal component analysis

The interpretation of probability and randomness - what "random" means for a statistician

The basics of probability theory - how randomness is modeled mathematically

Application of probability theory to estimation - how to handle uncertainty

Common statistics - the mean, the median, the mode

Confidence intervals - a better way of handling uncertainty

Statistical hypothesis testing - how to gain knowledge from statistics

Odds Ratio - how can we trust if a drug is effective

Linear regression - how the dose influences the outcome

ANOVA - how to check if there is any difference at all between multiple groups

After completion of the course, the students will be able to perform basic statistical analyses using some of the most common statistical techniques used in biological and biomedical research.

LECTURE

DESIGN THINKING

optional workshop - This course is not part of the educational programme. You may participate in it to enhance your knowledge and skills.

structure
schedule

series of 4 meetings (2 x 45 min each)
Fridays 09:30 am
May 29th - June 26th, 2026

language
room
requirements
software

English
Room 7/A
-
-

ASSESSMENT

credit

attendance (min. 60%) + practical assessment

language
educational materials

English
-

LECTURERS

Katerina Makarova, PhD, Eng. (kmakarova@ibb.waw.pl)

CONTACT PERSON

Anna Muszewska, PhD, DSc (musze@ibb.waw.pl)
Adrian Iwaniuk (sbm@ibb.waw.pl)

The course includes:

This course introduces scientists to the Design Thinking methodology, focusing on innovation and problem-solving. Participants will explore the stages of Design Thinking—Empathy, Redefine, Ideate, Prototype, and Test—through practical tools like empathy maps, brainstorming, and rapid prototyping. Hands-on sessions include problem redefinition methods, teamwork strategies, and prototype testing. The course culminates in team-based projects addressing real-world challenges, where students design, prototype, and present innovative solutions. Tailored for researchers, this program fosters creative thinking and equips participants with actionable skills to tackle scientific and industrial problems effectively.