INSTITUTE OF BIOCHEMISTRY AND BIOPHYSICS
POLISH ACADEMY OF SCIENCES

Courses for PhD students

The academic year 2025 / 2026

Warsaw, June 2025

(January 2026, 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 BIOLOGY – IMPLICATIONS FOR HEALTH AND DISEASE
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	**MEDICAL CHEMISTRY**
structure	series of 15 meetings (2 x 45 min each)
schedule	Mondays, 09:30 am October 6th, 2025 - February 23th, 2026
language	English
room	Lecture hall E or on-line, depending on the speaker
requirements	use your full name while logging in
software	-
ASSESSMENT	
credit	• 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)
language	English
date	February 23th, 2026
room	Lecture hall E
educational materials	-
LECTURERS	full list will be available for registered participants
CONTACT PERSON	Adam Mieczkowski, PhD, DSc (amiecz@ibb.waw.pl)
COORDINATORS	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 (3 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	Mirosław Zarębkski, PhD (miroslaw.zarebski@uj.edu.pl)
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

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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 (?)

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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	**HOW TO BUILD A GRANT PROPOSAL**
structure	series of 3 meetings (2 x 45 min each)
schedule	Fridays 09:30 am October 3rd – November 14st, 2025 **1. 03.10.2025** **2. 07.11.2025** **3. 14.11.2025**
language	English
room	Room 7 / A
requirements	-
software	-
ASSESSMENT	
credit	attendance (min. 60%) + written assignment
language	English
room	Room 7 / A
educational materials	-
LECTURERS	Szymon Świeżewski, PhD, DSc
CONTACT PERSON	Szymon Świeżewski, PhD, DSc (sswiez@ibb.waw.pl)
COORDINATORS	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 — SCIENTIFIC WRITING

structure: series of 4 meetings (2 x 45 min each) two groups

schedule: 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: English

room: Room 7 / A

requirements: -

software: -

ASSESSMENT

credit: attendance (min. 60%) + 1 assignment

language: English

room: Room 7 / A

educational materials: -

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	**ETHICS IN RESEARCH**
structure	series of 3 meetings (2 x 45 min each)
schedule	Fridays 09:30 am February 6th – 20th, 2026
language	English
room	06.02.2026 - room A/7 13.02.2026 - room A/7 20.02.2026 - online
requirements	use your full name while logging in
software	-
ASSESSMENT	
credit	attendance (min. 60%) + written assessment
language	English
room	on-line
educational materials	-
LECTURERS	• Bartłomiej Tomasik, PhD physician and biostatistician • Wojciech Bober, PhD in Philosophy • 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	**RNA BIOLOGY – IMPLICATIONS FOR HEALTH AND DISEASE**
structure	series of 15 meetings (2 x 45 min each)
schedule	Mondays 09:30 am March 2nd – June 22nd, 2026
language	English
room	Lecture hall E or on-line, depending on the speaker
requirements	-
software	-
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)
language	English
date	June 22th, 2026
room	Lecture hall E
educational materials	-
LECTURERS	full list will be available later
CONTACT PERSON	Piotr Gerlach, PhD (p.gerlach@imol.institute), Maciej Cieśla, 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	**BIOSTATISTICS**
structure	series of 10 meetings (2 x 45 min each)
schedule	Fridays 09:30 am March 6th – May 22nd, 2026
language	English
room	on-line,
requirements	use your full name while logging in
software	-
ASSESSMENT	
credit	attendance (min. 60%) + 1 assignment
language	English
educational materials	-
LECTURERS	Michał Aleksander Ciach, PhD
CONTACT PERSON	Anna Muszewska, PhD, DSc (musze@ibb.waw.pl) Adrian Iwaniuk (sbm@ibb.waw.pl)

The course includes:

We will cover the following topics (not necessarily in that order, with a focus on applications in biological research):
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	series of 4 meetings (2 x 45 min each)
schedule	Fridays 09:30 am May 29th - June 26th, 2026
language	English
room	Room 7/A
requirements	-
software	-
ASSESSMENT	
credit	attendance (min. 60%) + practical assessment
language	English
educational materials	-
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.