

PRBB Intervals Course Proposal

Course Title

Sharpen your reasoning skills: logic and critical thinking for scientists - Online

Proposed date(s)

21st, 23rd, 28th & 30th November 2022

Course Language

English (questions can be answered in Spanish, if required)

Course Leader(s) and very brief summary of relevant qualifications and experience (no more than 2 lines for each trainer)

Kai Hübemeyer has several years of teaching experience with courses on critical reasoning and logic. He studied philosophy and physics in Tübingen, Manchester and Frankfurt.

Rationale for course (why is this course of interest for the PRBB staff?)

Scientists have to give arguments in many different contexts: in their publications, in grant applications, in lab meetings and in conference presentations. Nevertheless, the bases for convincing and strong arguments are not always fully clear to them. Logic provides extremely helpful tools for scientists to develop their arguments in a coherent, well-structured and convincing way. The course introduces the most important concepts of logic: premises and conclusions of arguments, validity and soundness of arguments, deductive vs. inductive reasoning, common types of inferences and fallacies. The idea of the course is to use these concepts as a toolbox which provides useful techniques for everyday scientific work. The participants learn how to reconstruct arguments from scientific texts, how to give well-structured and logically valid arguments, and how to avoid misunderstandings.

Course aim - general

In addition to learning how to give more convincing arguments in their publications and in debates, the course will also help participants to identify gaps or weaknesses in scientific reasoning and to judge more accurately whether their own positions are well justified. The exercises in the course are designed to apply the acquired skills directly to the individual participant's scientific work. Participants can bring their own texts and practice argumentation in contexts which are most relevant to them individually, for example grant applications, research papers, or debates at conferences.

Specific learning outcomes (what new skills, knowledge &/or attitudes will participants take away from the course?)

Your learning development

This course, along with a few other courses in the Intervals programme, offers participants the added benefit of taking an active part in assessing their progress towards their learning goals in a structured way. To this aim we have incorporated a pre- and post-course assessment into the course:

How it works: before the course, we will ask you to complete a short questionnaire identifying your perceived learning needs in line with the course objectives. You will also be asked to do a written

exercise so that the trainer can also make an assessment of where you are now. After the course you will be asked to complete a similar exercise and to reflect on the next steps you wish to take to further your learning in this area. This exercise will take up to 30 minutes, both before and after the course.

Registration on this course implies that you are happy to participate in this initiative and you will ensure that you have set aside time to complete both the pre and post-course exercises.

Course Objectives:

Participants will...

- get to know basic concepts of logic (validity, soundness, standard form, fallacies etc.)
- learn to state their arguments in a precise and logically coherent way
- learn to quickly identify the strengths and weaknesses of arguments in scientific contexts
- learn how to break down arguments into their logical structure
- train analytical-thinking skills

Course contents (outline of topics to be covered)

Session 1:

90 - 120 minutes What is an argument?
Deductive arguments: validity and soundness

30 minutes Individual homework

Session 2:

90 - 120 minutes Background assumptions in arguments
Patterns for deductive arguments
Inductive arguments

30 minutes Individual homework

Session 3:

90 -120 minutes How to structure texts and talks
How to write a good introduction
General tips for written argumentation

30 minutes Individual homework

Session 4:

90 - 120 minutes Fallacies
Oral argumentation

30 minutes Individual homework

After the course...

Individual appointments: Individual discussions with feedback on extended homework

Training methods

The methods are interactive throughout. The course provides extensive exercises that aim at the application of the acquired skills to the participants' individual fields of work. After the course the participants get individual feedback from the trainer on some of the extended exercises.

Target group in PRBB (Senior scientists, postdocs, predocs, management/admin staff, all residents)

All residents

Number of participants (maximum)

15

Total course hours (Please specify: a) direct training with instructor present b) required self-study.

a) 10 + Individual feedback session with the trainer

Distribution of course (hours/days)

Day 1: 2.5 hours

Day 2: 2.5 hours

Day 3: 2.5 hours

Day 4: 2.5 hours

After the course: Individual feedback session with the trainer

Material participants need to bring (laptops, etc...)

Participants need a laptop with audio and video, a strong Internet connection.

Relevant background reading/ audiovisual/websites or other materials

A course script will be uploaded to a moodle-page before the start of the course. Reading it is optional and knowledge of its contents is not a prerequisite for the course.