PRBB Intervals Course Proposal

Course Title

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

Proposed date(s)

14th, 16th, 21st & 23rd March 2023

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 Hüwelmeyer 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?)

In science, thinking clearly and seeing the logical relationships between ideas is as important as are experiments and data. Nevertheless, the logical basics of correct reasoning are not part of the curricula for most university degrees. In this course we introduce basic concepts of logic such as validity and soundness and the distinction between inductive and deductive reasoning. The idea of the course is to use these concepts as a toolbox for various aspects of scientific work. Participants get to know techniques that help them identify strengths and weaknesses in arguments, structure texts optimally, and to state arguments clearly and precisely.

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 to 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.)
- structure scientific texts and presentations optimally
- 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)

12

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.