

PRBB Intervals Course Proposal

Course Title

Sharpen your reasoning skills: logic and critical thinking for scientists

Proposed date(s)

20th & 21st March 2019

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)

Dr. Malte Engel has several years of teaching experience with courses on critical reasoning. He studied philosophy, psychology and English literature and obtained his PhD in a neuroscience graduate programme.

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

Scientists have to give arguments all the time – in their publications as well as in conferences and lab meetings. 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, enabling them to better plan experiments to support their hypotheses and to better present their results.

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 inconsistencies 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 quickly identify the strengths and weaknesses of arguments in scientific contexts
- learn how to break down arguments into their logical structure
- practice reasoning (written and orally) in contexts which are most relevant to them individually (e.g. grant applications, publications, conference talks etc.)
- practice analytical-thinking skills

Course contents (outline of topics to be covered)

- General questions about arguments:
 - What are the building-blocks of an argument?
 - What does it mean for an argument to be logically valid?
- Reconstructing arguments from scientific texts:
 - Stating the premises and the conclusion of arguments
 - Spotting hidden premises in arguments
- Application of the acquired methods to scientific texts chosen by the participants.
- Exercises on writing logically valid arguments including individual feedback.
- Difference between inductive and deductive arguments.
- Common types of fallacies and unfair arguments (e.g. *ad hominem* or straw-man arguments).
- Tips for oral reasoning and debating-exercises

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. The participants get individual feedback on the results of their exercises by the group and by the trainer. The theoretical contents of the course are also conveyed through dialogue and exercises. There will be no pure presentations by the trainer.

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) 14

Distribution of course (hours/days)

Day 1: 7 hours

Day 2: 7 hours

Pre-course preparation and/or between sessions?

Participants are asked to bring texts which they find interesting with regard to its argumentation. The texts will be analyzed during the course

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

See previous point...

Relevant background reading/ audiovisual/websites or other materials

None