



KSETA Topical Courses, March 5 – 16, 2018

All courses take place in building 30.23, room 3/1

Registration until February 22, 2018

Scientific writing (better)	William Uber	05.03.2018	9:00 - 16:45 h
For all		06.03.2018	9:00 - 16:45 h

Researchers increasingly need to publish their work in English, but sometimes their level of English leads reviewers to reject the papers or to misunderstand the contents. The seminar comprises two one-day interactive sessions that take participants step-by-step through the writing and revision of one of their papers at the conceptual, organisational and writing levels. Participants learn how to ensure that the paper's content fits to their message and audience. Then, they learn how to organize a paper and structure a logical argument in English. Finally, participants learn how to revise their texts at the section, paragraph and sentence level. At each level we explore the main differences between papers in English and German. Between sessions, participants apply the theory to their own texts. They also receive feedback and suggestions for improvement of their texts from the workshop leader. By the end of the course each participant will have polished one paper and will be able to approach the next one confidently.

General theoretical concepts on particle physics (broader)	Monika Blanke	07.03.2018	13:30 - 16:45 h
For engineers and experimentalists		08.03.2018	9:00 - 12:15 h

This course provides an introduction to theoretical particle physics tailored for people with an experimental background. It includes a (relatively non-mathematical) introduction to quantum field theory and discusses the guiding principles for model building in particle physics. It will focus in particular on the importance of symmetries and the relation between Lagrangians, Feynman diagrams and cross sections. Furthermore, the course provides an overview of the Standard Model of particle physics (SM) and the most popular models beyond the SM (e.g. Supersymmetry and composite Higgs models).

What do I need, if I will leave science towards industry? (better)	Udo Erdmann	08.03.2018	13:30 - 16:45 h
For all	(TIBER)	09.03.2018	9:00 - 12:15 h

As a graduating scientist or engineer, you are planning a next career step within industry. If this is the case, you definitely have to cope with management responsibilities. Therefore, skills in management and leadership will be expected. Planning to open an own business or start up requires knowledge in managing a company as well. In both cases the needed skills can be divided in three classes: corporate management, project management, technology and innovation management. Based on practical, handy examples the three aforementioned classes will be introduced (approximately 2 hours per class). After this one day introduction you will have a good overview of what will be expected of you outside of science. Additionally to that you will be empowered to make a better decision for the next career step based on your existing skills. You will be supplied with a better picture of the industrial and business world, and you will get hints which of your skills should be more sharpened and which skills should be developed from scratch. Additionally to that, fundamental questions concerning the application for an industrial job will be clarified: „How do I apply the right way?, and „How will I increase my chances in the interview?“, are just a few of them.

Classical solutions for elementary particle physics (broader)	Frans Klinkhamer	12.03.2018	10:45 - 12:15 h
For theoreticians		14.03.2018	10:45 - 12:15 h
		16.03.2018	10:45 - 12:15 h

This course aims to introduce certain classical solutions relevant to elementary particle physics. Specifically, we discuss kinks and vortices in lower dimensions and magnetic monopoles and sphalerons in 3+1 spacetime dimensions.

Particle physics for astroparticle physicists (broader)	Roger Wolf	12.03.2018	13:30 - 16:45 h
For astroparticle physicists	Matthias Mozer	13.03.2018	13:30 - 16:45 h

Accelerator based particle physics today is focusing on very few big machines today. The flagship accelerator is of course the LHC covering a very broad range of topics. In the near future, a dedicated high-luminosity B-factory will start up. The course will start with basics on accelerator and detector technology as well as analysis techniques and then cover an overview of recent scientific achievements and remaining open questions in particle physics.

How to write maintainable software (broader)	Martin Heck	13.03.2018	9:00 - 12:15 h
For all		14.03.2018	13:30 - 16:45 h

This lecture is aimed to enable you to produce a longterm maintainable software package by focusing on many aspects, that are needed beyond the pure programming skill. The content draws on various literature and the lecturer's experience as coordinator for the 1/4-million-LOC tracking package inside the Belle II software. The first part of the lecture will focus on organisation, methods, and infrastructure, while the second part will focus on habits during the actual code writing stage.



From the farmers' almanac to exascale computing – the challenge of predicting the weather (broader)

Peter Knippertz

15.3.2018

9:00 - 16:45 h

For all

Advances in numerical weather prediction represent a quiet revolution because they have resulted from a steady accumulation of scientific knowledge and technological advances over many years that, with only a few exceptions, have not been associated with the aura of fundamental physics breakthroughs. Nonetheless, the impact of numerical weather prediction is among the greatest of any area of physical science. As a computational problem, global weather prediction is comparable to the simulation of the human brain and of the evolution of the early Universe, and it is performed every day at major operational centres across the world.

The course will explain the fundamental concepts and challenges of numerical weather prediction including topics such as the structure of weather prediction models, initialisation of forecasts (data assimilation), dealing with forecast uncertainty in a high-dimensional chaotic system (ensemble techniques), measuring forecast quality (verification methods) and the concept of postprocessing.