Social Sciences, Economics and Management

Communicating across cultures
Olivier Berthod

As societies, in Europe and elsewhere, grow increasingly diverse and multicultural, we also notice a surge in nationalisms and other forms of withdrawals. This diversity can only bloom if each one of us learns how to interact and communicate together, despite cultural differences. From casual interactions to making friends or work somewhere in a team: Failing to navigate cultural differences in communication can lead to misunderstandings at best, and tensions or even conflicts in worst cases. In this workshop, we will discover and train key notions of diversity and cross-cultural communication: What does culture mean, actually? What makes us so alike and yet so different? How do stereotypes and discrimination emerge, and why are they so difficult to keep in check? Can we train our communication skills to become culturally savvy? And can we learn to anticipate cultural issues in communication in the first place? This workshop strikes a balance between insights from science and exercises in communication training.

Living Under a Dictatorship
Julia Timpe

What is it like to live under a dictatorship? How are peoples' everyday activities, attitudes, plans, aspirations, friendships and family relations affected and shaped by the ideologies, politics and practices of dictatorial regimes? How do these regimes manage to stay in power? And what ways to resist dictatorships are possible and effective? This workshop will explore these questions by examining the history of dictatorial regimes of the twentieth century. In particular, we will look at themes such as propaganda, education and youth organizations, policing and resistance, drawing mostly on examples from Nazi Germany and the Soviet Union under Stalin. The workshop aims to familiarize students with the practice of historical research and to enhance their skills in reading and interpreting historical sources. The course will also introduce students to academic approaches to the history of the everyday and scholarship about dictatorships and deal with the question of how studying history can inform our understanding of processes in the present day. (+ picture)

Design for the Future
Klara Happ

This workshop will be offered in collaboration with the German Design Museum Foundation in Frankfurt. For more information about the museum, the foundation and their work, visit their website: https://www.deutschesdesignmuseum.de/en.html .
If you want to design the future, you need a concrete goal. The participants in this workshop will devote themselves to the challenges of our time and will engage in groups with an intense desire
for change. Accompanied by a professional designer, they will develop innovative solutions for real-world challenges and will display their ideas as infographics. This method allows them to exemplify complex information and overall concepts in an inspirational way. The participants will be guided throughout their project both conceptually and in regards to design. The final product will be concise, visually-appealing graphics that arouse interest, offer practical solutions and encourage participation. Visual representations are more memorable and remain longer in people's minds. Nothing makes innovation stronger than a concrete vision of your goals and motivation. Become a designer of the future!

Mathematics and Physics

Logistics Games
Stanislav Milkov Chankov

Have you ever wondered how:
- Amazon manages to send you exactly the items you ordered?
- Airbus organizes the production of the world's largest passenger airliner - A380?
- Daimler can plan and control their assembly line for numerous car variants?
- The United Nations World Food Program can reach 90 million beneficiaries every day wherever they may live?

The answer is Logistics. In the Logistics Games workshop you will be introduced to the world of logistics by playing interactive business games and solving case studies. The PRESTO business game will allow you and your team to run and optimize your own production line, helping you understand how to effectively organize production processes. In the computer-based beer distribution game you will act as a company part of the beer supply chain, gaining insight on how a supply chain operates and how to approach common logistics problems such as the bullwhip effect. Finally, you will be taught important Lean Methodology concepts and advanced Excel tools to expand your technical skills and business knowledge. Thus, the workshop will give you insights on how to plan and control different logistics processes.

Laws of chance: probability in everyday life
Keivan Karai Mallahi

- When does it make sense to insure your bike?
- How does weather forecast work?
- What are the tactics used by political analysts to predict the outcome of elections?
- Why some methods of shuffling cards mix them faster than others?

Although living with uncertainties has always been an essential aspect of human life, a mathematical approach to analyzing these uncertainties has taught us that intuition alone is not the most reliable guide when estimating odds. In fact, we make much better decisions and more accurate predictions when we fortify our intuition with the power of mathematics.

In our one-week journey into the world of probability, we will visit some of its most exciting landmarks, learn a bit of history and discover the role that probability theory plays in today's world. Along the way, we will explore a range of topics from the Law of Large Numbers to the Central Limit Theorem and Markov chains

Energy, Resources and Technology

Renewable Energies and Grid Technologies
Stefan Kettemann, Nnoli Pal

The energy transition towards a high share of Renewable energy is needed to decarbonize the electricity sector. This requires technological developments of the electrical power systems and utilities to ensure their stability. In this workshop we will introduce to renewable energy concepts, starting with physics of the sun, then reviewing the potential renewable energy resources. We introduce to solar thermal and photovoltaic systems, wind power with focus on the horizontal axis wind turbines (HAWT), hydro energy and biofuel conversion processes. We will also give a short introduction to conventional power plants including, nuclear power, coal and gas power plants. We will review the basics of the electric power grid, and the control technologies developed to ensure power stability.

In the afternoon project, the students get hands on experience with simulations of the power grid, using open source python codes to model power systems, as well as the professional Power Factory software. At the end of the program, students will have a good overview of the potential of renewable energy technologies, conventional energy generations, as well as power grid technologies with hands-on-experience on their basic design and utilities.

Earth's Resources and their Sustainable Use
Andrea Koschinsky

The growing world population requires increasing amounts of resources, including water, food, metals, and energy. However, the long-term supply of these resources is challenged by its limited availability, climate change, growing world population, and the unwise use of resources in a non-sustainable manner. The goal of this workshop is to demonstrate the value, availability and limitations of different resources and introduce concepts for a sustainable use of these resources. The workshop participants will have the chance to gain some hands-on experience in the lab and in the field and will be taught to develop ideas and strategies for securing future resource supply with a minimal negative footprint on the environment. Economic aspects and social wellbeing will be discussed in the holistic context of sustainability.

> **Workshop outline:**
> **Day 1:** Introduction to the workshop and the concept of sustainability
> Freshwater – the most precious resource of the 21st century
> Introduction to the topic with some facts and numbers; taking water samples in the field and analyzing them for environmental parameters on site and in the lab
> **Day 2:** Soils – the underestimated ground for our food and constructions
> Introduction to the topic with some facts and numbers; sampling of soils, investigating soil horizons, analyzing soil components and evaluating the soil properties for their functions
> **Day 3:** Minerals as important resources of metals
> Introduction to the topic with some facts and numbers; Analysis of different types of mineral resources; comparison of land mining, marine mining and urban mining/recycling with respect to their future roles in high-tech metal supplies and footprints.
> **Day 4:** Life cycle assessment as an environmental management tool to assess the environmental impact of resource extraction and use; concepts and examples of application (e.g., deep-sea mining, green energy production)
> **Day 5:** Evaluation and interpretation of data produced in the previous days: statistics, graphical presentation, development of conceptual models.

Nanotechnology
Jürgen Fritz, Veit Wagner

Nanotechnology deals with objects (such as small metal beads or large proteins) which are smaller than the wavelength of light and which are typically between 1 - 100 nanometer in size (1 nanometer = one millionth of a millimeter). At these length scales the classical boundaries between physics, chemistry, and biology disappear and novel phenomena can be observed not present at larger systems made out of the same material. The workshop introduces by a series of presentations to nanotechnology and its most prominent examples and applications such as nanomaterials for novel electronics, or DNA origami for creating tiny complex structures. In parallel, participants get hands-on experience on different microscopes to visualize the nanoworld (electron microscope and atomic force microscope), and on physically characterizing and chemically structuring nanometer thin gold layers.