University of Tübingen - Faculty of Mathematics and Natural Sciences

Courses taught in English, Summer Semester 2018

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Biochemistry – Bachelor

Course Title: (S3) Wahlpflichtmodul 15d: Experimental Cell Biochemistry and Signalling (4027)  
(Course number: S3WPM15D)  
Link: http://campus.uni-tuebingen.de/20181e164092  
Course type: Block Course  
Contact hours: 6  
Course coordinator: o. Prof. Dr. rer. nat. Thorsten Nürnberger, Prof. Dr. rer. nat. Georg Felix, PD  
Dr. rer. nat. Andrea Gust, Dr. rer. nat. Birgit Kemmerling, Dr. rer. nat. Markus Albert, Dr. rer. nat.  
Target audience  
B.Sc. in Biochemistry or M. Sc. in Biology/Biochemistry  
Course description  
Introduction into modern molecular and cell biochemical methods, using as model the  
plant/pathogen interaction

Course Title: Bioinformatics for Life Scientists  (Course number: BIOINF1910)  
Link: http://campus.uni-tuebingen.de/20181e167837  
Course type: Lecture/Excercises  
Contact hours:  
Course coordinator: Prof. Dr. rer. nat. Nico Pfeifer  
Target audience  
2. Studienjahr

Course Title: S1 Wahlpflichtmodul 15o Science of cooking  (Course number: S1WPM15O)  
Link: http://campus.uni-tuebingen.de/20181e163776  
Course type: Block Course  
Contact hours:  
Course coordinator: Prof. Ph.D. Ana Jesús Garcia-Sáez, Dr. rer. nat. Jakob Suckale  
Target audience  
B. Sc. Biochemistry, 3. year M. Sc. Biochemistry No free places are available.  
Prerequisites  
The participants should have basic knowledge of mathematics, physics and biochemistry.  
Course description  
History of science and cooking, Food components, Basic transformation processes during  
cooking: phase transitions, Energy, temperature and heat transfer; Elasticity and texture;  
Diffusion and spheronization; Viscosity and polymers; Emulsions and foams; Baking and  
Fermentation. Applications in Haute Cuisine and food industry.

Biology – Bachelor of Science

Course Title: Advanced Animal Evolutionary Ecology I (3116)  
Link: http://campus.uni-tuebingen.de/20181e164418  
Course type: Block Course  
Contact hours:  
Course coordinator: Dr. rer. nat. Nils Anthes, Ph.D. Pierre-Paul Bitton, Dr. rer. nat. Ulrike  
Harant, o. Prof. Dr. rer. nat. Nico K. Michiels  
Target audience  
BSc Biologie, LA Biologie
Course description
This 6CP (ECTS) module is available to 3rd year Bachelor students to combine multiple small courses or seminars that by themselves cannot be accepted as individual modules within the current BSc Biology system. These small courses must in total comply to the requirements for 6 credit points. Generally, we can accept courses offered (i) within the Animal Evolutionary Ecology group, (ii) within the Institute for Evolution and Ecology or the Evolution and Ecology Forum Tübingen, (iii) within the university of Tübingen, or (iv) from other national or international universities. Courses should generally be marked, and connected to an explicit work load expressed in credit points (ECTS). Moreover, it is required that the courses show connections to the research or teaching that is usually offered within our group. Hence, if interested in combining several small courses into our Advanced module, please contact any of the indicated supervisors well in time.

Additional information
http://www.evoeco.uni-tuebingen.de

Course Title: Exkursion/Geländepraktikum: Neotropic diversity of adaptations, a glance through plant physiology and plant-animal interactions
Link: http://campus.uni-tuebingen.de/20181e167073
Course type: Practical Field Course
Contact hours:
Course coordinator: Prof. Dr. rer. nat. Jan Benda, o. Prof. Dr. rer. nat. Klaus Harter
Target audience
Bachelor students in Biology and Geoecology in at least the third study year (all basic modules have to be completed successfully); Master students in Biology and Geoecology; PhD students in Biology and Geoecology
Course description
In this course students will learn about the primary motors for biological diversification regarding plant physiology and interactions with animals throughout different ecosystems of Colombia. We aim to observe and discuss the interface of Plant-Animal-Human interactions across different landscapes and ecosystems, highlighting the importance of each player within these relationships. By means of field observations we will also address following phenomena: - How the geospatial location of Colombia and its geological conditions allow a great diversity in species and physiological adaptations that can be observed all across the country. - How this great pool of genetic variation and abundance of physiological adaptations make it a unique batch of resources for food production, livestock, pharmacy, raw material industries and ground research.

Course Title: Exkursion/Geländepraktikum: Tropical Marine Ecology (3066)
Link: http://campus.uni-tuebingen.de/20181e164421
Course type: Block Course
Contact hours:
Course coordinator: o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Ulrike Harant
Target audience
Phd students; Lehramt/Bachelor/Master students in Biology, Geoecology, or related fields.
Course description
INFOVERANSTALTUNG Mon, 05 February 2018., 16 c.t., E-Bau Morgenstelle, E5 A20 (Seminar Room 5th Floor) Information and registration to nico.michiels@uni-tuebingen.de and registration via Campus This 4-week block module (6CP) consists of 3 components: (1) Blockseminar (2 days; some time in Summer 2018): During a 2-day block seminar in Tübingen, students present recent research and study approaches with relevance to the biology and ecology of coral reef organisms. Moreover, on a half-day trip to the Wilhelma Zoo in Stuttgart, we will familiarize with the most relevant coral reef fish families. The detailed schedule for the seminar and Wilhelma excursion will be fixed in agreement with the course participants. (2) 14-day excursion (September 2018) to Mangrove Bay, South of El Qusair, Red Sea (Egypt):
During the first 3-4 days, participants familiarize with the coral reef ecosystem, its inhabitants and functional groups, at the highly diverse Mangrove Bay house reef, which includes the full gradient from exposed reef slopes to shallow Mangrove forests. As the central course component, students then develop - based on their own field observations - small independent research projects. Students first formulate a research hypothesis based on their observations, then develop a convincing (observational or experimental) study design to evaluate their hypothesis, and finally collect a statistically meaningful dataset for quantitative analysis. All projects will be extensively and critically discussed and evaluated during daily progress meetings. All research projects (individually or in small teams) will be briefly presented to the hotel guests. The excursions further excludes short trips into the adjacent desert, a visit to the nearby small Egyptian town of El Quseir, and a full-day boat trip. All projects will be performed on snorkelling. SCUBA diving is possible, but not required. Participants with a diving certificate and insurance can dive (usually, the majority of students does not dive). (3) Post-excursion practical (dates to be agreed upon, some time in October depending on student schedules at the beginning of the winter term): We will jointly analyze the data collected during the field trip. All participants finally develop a short scientific paper to report about their project. The course block will be completely taught in English. All students interested in this excursion must informally register as soon as possible starting 31 January until 31 March 2017 via the Campus website. This registration is initially not binding - but you will then automatically be kept updated about final registration procedures. Given that booking with the travel agent needs to fixed very soon, early registrants have a higher likelihood to be accepted for the course! Costs: For students immatriculated at Tübingen university, we can offer the course at € 900,-pp. This price includes travel & visum, accommodation (twin rooms), extensive half-board catering, on-site snorkeling and a 1-day boat-trip. The price is subsidized by the university and the Animal Evolutionary Ecology group. The price excludes lunches & drinks (expect ~50-90 € in total pp), rental of snorkeling gear if necessary (wetsuits for free rent at our department). We recommend purchasing your own snorkel, mask and open water fins incl. neoprene booties), scuba diving (= expect 20 € per dive) + required gear. For further information, you may also contact the course provider.

**Additional information**
http://www.evoeco.uni-tuebingen.de/

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**Course Title**: Projektmodul Mass Spectrometry-Based Proteomics  
**Link**: http://campus.uni-tuebingen.de/20181e164488  
**Course type**: Block Course  
**Contact hours**:  
**Course coordinator**: Prof. Dr. rer. nat. Boris Macek  
**Target audience**: Bachelor - 3rd year students: Biology, Biochemistry, Bioinformatics  
**Course description**: Practical course in preparation for a Bachelor Thesis. Duration: 8 weeks, by appointment  
**Additional information**
http://www.proteom-centrum.de/index.php?id=9

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**Course Title**: S1 Marine Biology (3169)  
**Link**: http://campus.uni-tuebingen.de/20181e164415  
**Course type**: Block Course  
**Contact hours**: 2  
**Course coordinator**: Dr. rer. nat. Ulrike Harant, o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Nils Anthes  
**Target audience**: Bachelor-, Master-, Diplom-, Lehramt- students in Biology/ Geoecology/ Bioinformatics or related subjects  
**Course description**
The lecture part of this course (2 h / day) gives an introduction to marine ecosystems and is aimed at students interested in marine biology, ecology, and the complexity of marine habitats. The lecture is split into four main blocks: Oceanography General marine ecology Marine habitats Human impact After each lecture there will be a seminar of one hour duration where students present short scientific papers to the class that match the current lecture topics followed by a short discussion (papers will be provided).

Additional information
http://www.evoeco.uni-tuebingen.de/

Course Title: S1 Reef Ecology (3178)
Link: http://campus.uni-tuebingen.de/20181e164414
Course type: Block Course
Contact hours: 2
Course coordinator: Dr. rer. nat. Ulrike Harant, o. Prof. Dr. rer. nat. Nico K. Michiels
Target audience
Bachelor-, Master-, und Lehramtsstudenten der Fächer Biologie, Geoökologie, Bioinformatik und ähnlicher Fächer. All students interested in reef ecology are welcome! This course offers a good way to prepare yourself for upcoming marine excursions such as Tropical Marine Ecology (Egypt, September 2017) and Marine Biodiversity.

Course description
This course gives a broad overview of reef biology, including:
- Coral biology What are corals? Why are corals interesting? Symbiotic interactions etc.
- Coral reef complexity Insight into the complex interactions among different reef organisms and their environment. How are they connected and why?
- Biodiversity of coral reefs Why are coral reefs so divers? Where do you find the highest diversity and why exactly there?
- History of coral reefs When did corals first appear? What did reefs look like 100 My ago? Are corals the only important reef builders in Earth's history?
- Conservation aspects and human impact Threats for this fantastic ecosystem, including global warming, diseases, human foot prints will be discussed. What are coral reefs going to look like in 100 years? In the first 2 weeks of the course 2 h lectures will be given each day addressing the topics mentioned above. After each lecture, we will discuss important new findings in coral reef ecology. This will give the students a solid understanding of the system, allowing them to critically approach a project phase which will be held in the third week of the course. During the third week, the students will form groups and will focus on how to develop a marine protected area within a specific coral reef area. By combining their knowledge acquired during the course and an intensive literature research, students will identify problems of this area, show what has already been done, what still needs to be done and most importantly how it could be done (in a realistic way). The results of this project phase will then be presented in an oral presentation within the last week of the course.

Course Title: S4 Introduction to Next Generation Sequencing (NGS)
Link: http://campus.uni-tuebingen.de/20181e169345
Course type: Block Course
Contact hours:
Course coordinator: Ph.D. Fernanda Ruiz-Fadel
Target audience
BSc, BEd, MSc, MEd Biologie, Geoökologie, Bioinformatik
Course description
Introduction to gene sequencing, NGS (Next Generation Sequencing) and genome analysis. Including theory, practical classes in the lab and computer, and paper discussions.

Course Title: Biotic Interactions: Plant-Animal-Interactions (3132)
Link: http://campus.uni-tuebingen.de/20181e162872
**Course type:** Block Course  
**Contact hours:** 3  
**Course coordinator:** Ph.D. Michal Gruntman  
**Target audience**  
MSc Biologie, MSc Geoökologie, Diplom und Bachelor Biologie, Geoökologie, Geographie  
**Course description**  
The diversity of plants' shapes, sizes, odors and colors is enormous. Many of these characteristics are directly and indirectly related to strategies for increasing fitness by attracting and rejecting animals. Likewise, many animal groups have adapted their behavior and sensory abilities in accordance with the plants characteristics in order to maximize their own fitness. Due to their key role in many ecosystems, understanding of plant-animal interactions at the various organization levels are central to our understanding of the world in which we live. The objective of the course is to introduce the key interactions between plant and animals: herbivory, pollination and seed dispersal and to study how each of them shape both plants and animals from the level of the individual to the ecosystems.

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**Course Title:** Advanced Methods in Molecular Biology (3161)  
**Link:** [http://campus.uni-tuebingen.de/20181e167581](http://campus.uni-tuebingen.de/20181e167581)  
**Course type:** Lecture  
**Contact hours:**  
**Course coordinator:** Dr. rer. nat. Robert Morbitzer, Dr. rer. nat. Edda Roepenack-Lahaye, Dr. rer. nat. Annett Strauß, o. Prof. Dr. rer. nat. Thomas Lahaye  
**Target audience**  
Bachelorstudierende (3. Studienjahr)  
**Course description**  
This module aims at providing an overview of modern methods in Molecular Biology. Advanced methods used e.g. for gene cloning, gene expression analysis, genome editing, protein-DNA as well as protein-protein interaction studies will be presented. In the seminar, selected aspects will be discussed in more detail in the context of a Journal club. The lectures, discussions and presentations will be given in English. At the end of the module an exam will be written covering the content of lectures.

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**Course Title:** Behavioral Ecology II (4060)  
**Link:** [http://campus.uni-tuebingen.de/20181e166358](http://campus.uni-tuebingen.de/20181e166358)  
**Course type:** Block Course  
**Contact hours:**  
**Course coordinator:** Prof. Dr. rer. nat. Katharina Foerster  
**Target audience**  
Zielgruppe: Bachelor Biologie, Master EvE  
**Prerequisites**  
Behavioral Ecology I Verhaltensökologie or any other introduction to behavioural ecology  
**Course description**  
Each week, we read literature to a specific topic in behavioural ecology. Participants prepare questions on the topic and design experiments or correlational studies that might further our knowledge on the discussed topic. Participants present short project proposals which are discussed in the group.
Course Title: Experimental Cell Biochemistry and Signalling (4027)  (Course number: S3WPM15D)
Link: http://campus.uni-tuebingen.de/20181e164092
Course type: Block Course
Contact hours: 6
Course coordinator: o. Prof. Dr. rer. nat. Thorsten Nürnberger, Prof. Dr. rer. nat. Georg Felix, PD Dr. rer. nat. Andrea Gust, Dr. rer. nat. Birgit Kemmerling, Dr. rer. nat. Markus Albert, Dr. rer. nat. habil. Judith Fliegmann, M.Sc. Katja Fröhlich, M.Sc. Max Körner
Target audience
B.Sc. in Biochemistry or M. Sc. in Biology/Biochemistry
Course description
Introduction into modern molecular and cell biochemical methods, using as model the plant/pathogen interaction

Course Title: Advanced Animal Evolutionary Ecology II (4064)
Link: http://campus.uni-tuebingen.de/20181e164417
Course type: Block Course
Contact hours: 
Course coordinator: Dr. rer. nat. Nils Anthes, Ph.D. Pierre-Paul Bitton, Dr. rer. nat. Ulrike Harant, o. Prof. Dr. rer. nat. Nico K. Michiels
Target audience
MSc - Evolution und Ökologie
Course description
This 6CP (ECTS) module is available to Master students in Evolution & Ecology to combine multiple small courses or seminars that by themselves cannot be accepted as individual modules within the current MSc system. These small courses must in total comply to the requirements for 6 credit points. Generally, we can accept courses offered (i) within the Animal Evolutionary Ecology group, (ii) within the Institute for Evolution and Ecology or the Evolution and Ecology Forum Tübingen, (iii) within the university of Tübingen, or (iv) from other national or international universities. Courses should generally be marked, and connected to an explicit work load expressed in credit points (ECTS). Moreover, it is required that the courses show connections to the research or teaching that is usually offered within our group. Hence, if interested in combining several small courses into our Advanced module, please contact any of the indicated supervisors well in time.

Additional information
http://www.evoeco.uni-tuebingen.de

Course Title: Advanced Concepts of Cell Biology [Bio 4076]
Link: http://campus.uni-tuebingen.de/20181e164403
Course type: Lecture
Contact hours: 
Course coordinator: Jun.-Prof. Ph.D. Jennifer Ewald, PD Dr. rer. nat. habil. Bernard Moussian, o. Prof. Dr. rer. nat. Alfred Nordheim, apl. Prof. Dr. rer. nat. Tassula Proikas-Cezanne, o. Prof. Dr. rer. nat. Hans-Georg Rammensee, Prof. Dr. rer. nat. Rolf Reuter, Prof. Dr. rer. nat. Stefan Stevanovic, o. Prof. Ph.D. Alexander Weber, Prof. Dr. rer. nat. Boris Macek
Target audience
Studierende des Masters Curriculum “Biologie” Spezielle Zielgruppe: Studierende des MCs Vertiefungsfaches “Molecular Cell Biology & Immunology”
Prerequisites
Course description
The content of this lecture course builds on the fore-running lecture ‘Concepts in Cell Biology’. Recent progress in essential topics of cell biology will be presented by the lecturers. Topics include: nuclear organisation, cell shape regulation, cell polarity, signal transduction, innate immunity, cancer & immunity, viral infection, cell cycle control, regulatory RNAs, vascular cell biology, stem cell biology and autophagy.

**Additional information**
http://www.pct.uni-tuebingen.de

**Course Title:** Advanced Infection Biology  
**Link:** http://campus.uni-tuebingen.de/20181e164778  
**Course type:** Lecture/Excercises  
**Contact hours:**  
**Course coordinator:** o. Prof. Ph.D. Samuel Wagner  
**Prerequisites**

**Course description**
Kurs mit begleitender Vorlesung findet nur im Sommersemester statt

**Course Title:** Advanced Plant Ecology II (4062)  
**Link:** http://campus.uni-tuebingen.de/20181e162859  
**Course type:** Block Course  
**Contact hours:**  
**Course coordinator:** Prof. Dr. rer. nat. Katja Tielbörger, Ph.D. Michal Gruntman, Dr. rer. nat. Jan Ruppert  
**Target audience**
MSc Bio / Major Evolution and Ecolgy  
**Course description**
This module offers the opportunity to combine several courses, the combined amount of earned credit points should equal 6 ECTS. Only courses with earned credit points (ECTS) can be included. These can be courses (or parts of larger courses) of this group or department, of the EvE (Evolution and Ecology Forum Tübingen), or of other faculties and universities in Germany or abroad. All combinations of course forms are allowed (e.g., lecture, seminar, practical, excursion). As an important prerequisite, all courses that are proposed to be included in this module have to match the general themes of the research and teaching currently done at the Plant Ecology group.

**Course Title:** Advanced Seminar “Meet the Expert” [Bio 4003] (Course number: S00SIMMU04)  
**Link:** http://campus.uni-tuebingen.de/20181e166388  
**Course type:** Seminar  
**Contact hours:** 2  
**Course coordinator:** o. Prof. Dr. rer. nat. Hans-Georg Rammensee, Prof. Dr. rer. nat. Stefan Stevanovic  
**Target audience**
Master students of biochemistry, bioinformatics, biology, molecular medicine, etc.  
**Prerequisites**
BSc Certificate.  
**Course description**
Das Seminar findet begleitend zum Institutseminar des Interfakultären Instituts für Zellbiologie statt (dienstags, 13.00 Uhr ct). Jeweils 1 - 2 Studierende betreuen einen Seminartermin (Vorstellung des Gastredners, Diskussion einer Veröffentlichung des Redners, Teilnahme am Vortrag im Rahmen des “Zellbiologisch-Immunologisches Kolloquiums”, Fragerunde,
Nachsitzung). Die Vorträge finden im Seminarraum 2.033/2.034, Verfügungsgebäude, Auf der Morgenstelle 15, statt. The seminar accompanies the Institute’s seminar series that is organized by the Institute of Cell Biology (Department of Immunology). Students in pairs (or individually) are responsible for presenting the work of the guest speaker in advance. They are expected to participate actively in the discussion of the lecture.

Course Title: Advanced Seminar I: Autoimmunkrankheiten (Autoimmune Diseases) [Bio 4109]
Link: http://campus.uni-tuebingen.de/20181e166990
Course type: Block Course
Contact hours:
Course coordinator: apl. Prof. Dr. med. Reinhold Klein, PD Dr. rer. nat. Cécile Gouttefangeas
Target audience
Medical students from 3. clinical term. Natural scientists (MSc) Students participating in the Master Course Molecular Cell Biology & Immunology (MCBI)
Prerequisites
Course may be attended by medical students from 3 clin. BSc certificate required for natural scientists. Prior knowledge of immunology essential, for example the lecture “Basic Immunology” or participation in the Master course MCB&I, Molecular Cell Biology & Immunology.
Course description
Medical Students please see TüKliF. Natural Scientists: Advanced Seminar I (1.5 CP) can be combined with the Cell Biology-Immunology Colloquium as a component of “Clinical Immunology”, Course No. 4137 (3 CP) (MCBI).

Course Title: Analysing Publications: Literature Seminar of Molecular Cell Biology [Bio 4114]
Link: http://campus.uni-tuebingen.de/20181e163349
Course type: Seminar
Contact hours: 2
Course coordinator: o. Prof. Dr. rer. nat. Alfred Nordheim, apl. Prof. Dr. rer. nat. Tassula Proikas-Cezanne
Target audience
Studierende des MSc Studienganges “Molecular Cell Biology & Immunology”.
Prerequisites
Grundkenntnisse der molekularen Zellbiologie.
Course description
Diese Veranstaltung unterstützt die wissenschaftliche Ausbildung von Bachelor Studierenden, Masters Studierenden, Diplomanden und Doktoranden. Die Veranstaltung ist Teil des Ausbildungsprogrammes im Masters Studiengang “Molekulare Zellbiologie & Immunologie”.

Course Title: Autophagy & Longevity - Vorlesung + Seminar [Bio 4073]
Link: http://campus.uni-tuebingen.de/20181e163355
Course type: Lecture/Excercises
Contact hours:
Course coordinator: apl. Prof. Dr. rer. nat. Tassula Proikas-Cezanne
Target audience
Wahlpflichtmodul - geeignet für Studierende aus folgenden Fächern: Biologie, Biochemie, Molekulare Medizin. Master students (biology, biochemistry, molecular medicine). Master students specializing in cell biology/immunology are encouraged to attend. BSc students with a particular interest in autophagy are also welcome.
Prerequisites
BSc in biology, biochemistry, molecular medicine. Exceptions possible upon request (email tassula.proikas-cezanne@uni-tuebingen.de).
Course description
This lecture and seminar series (6 CP) will provide an in-depth introduction to the process of
autophagy, focusing on the role of autophagy in longevity and age-related human diseases (such as cancer, neurodegeneration).

**Course Title:** Cells on Drugs Inhibitors and Mutants in Cell Biology  
**Link:** [http://campus.uni-tuebingen.de/20181e163444](http://campus.uni-tuebingen.de/20181e163444)  
**Course type:** Block Course  
**Contact hours:**  
**Course coordinator:** Dr. rer. nat. Sandra Richter  
**Target audience:** Master Biologie  
**Course description**  
Vesicle trafficking is important for the viability and development of all organisms. Chemical inhibitors are potent tools in cell biology as they allow the analysis of different trafficking routes and facilitate the localization of proteins. In this module, students will use confocal laser scanning microscopy to learn which trafficking routes exist in plants and which inhibitors can be used to block them. Furthermore, physiological experiments will demonstrate how crucial vesicle trafficking is.

**Course Title:** Comparative innate immunity in animals and plants, Themenmodul 4026  
**Link:** [http://campus.uni-tuebingen.de/20181e164088](http://campus.uni-tuebingen.de/20181e164088)  
**Course type:** Lecture/Excercises  
**Contact hours:** 3  
**Course coordinator:** o. Prof. Dr. rer. nat. Thorsten Nürnberg, Prof. Dr. rer. nat. Georg Felix, PD Dr. rer. nat. Andrea Gust, Dr. rer. nat. Birgit Kemmerling  
**Prerequisites**  
Lecture in the preceding winter semester.  
**Course description**  
Module comprises a lecture, seminar and tutorial. The lecture (winter semester) concerns current topics of innate immunity in animals and plants. The seminar (summer semester) consolidates the topics covered in the lecture by using original publications. Content of the tutorial (summer semester) will be writing of a research proposal based on the original publications covered in the seminar. The seminar and tutorial will take place in the summer semester. Final schedule for the seminar and the discussion of proposals within the tutorial will be according to agreement.

**Course Title:** Compulsary module: Current Topics in Plant Physiology 4018  
**Link:** [http://campus.uni-tuebingen.de/20181e167063](http://campus.uni-tuebingen.de/20181e167063)  
**Course type:** Lecture  
**Contact hours:** 3.5  
**Course coordinator:** Dr. rer. nat. Christina Chaban, Dr. rer. nat. Farid El-Kasmi, o. Prof. Dr. rer. nat. Klaus Harter, Dr. rer. nat. Katharina Markmann, Dr. rer. nat. Virtudes Mira-Rodado, Prof. Dr. rer. nat. Claudia Oecking  
**Target audience**  
1st - 3rd master’s semester  
**Prerequisites**  
None  
**Course description**  
Module content: Lecture on current topics in molecular plant physiology, accompanied by in-depth study of original works on these topics in the literature seminar; insight into current research in the molecular physiology of plants

**Course Title:** Compulsary module: Molecular Plant Physiology I 4019  
**Link:** [http://campus.uni-tuebingen.de/20181e167064](http://campus.uni-tuebingen.de/20181e167064)
Course type: Block Course  
Contact hours: 4

**Course coordinator:** Dr. rer. nat. Farid El-Kasmi, Dr. rer. nat. Katharina Markmann, Prof. Dr. rer. nat. Claudia Oecking, Dr. rer. nat. Virtudes Mira-Rodado

**Target audience**  
1st - 3rd master’s semester

**Prerequisites**  
BSc in Biology, Biochemistry or subjects related to Biology basic knowledge of lab work required

**Course description**  
Introduction to molecular plant physiology encompassing a variety of methods and techniques

**Course Title:** Computational Ecology: Ecological modelling using differential equations (4209)  
**Link:** [http://campus.uni-tuebingen.de/20181e162986](http://campus.uni-tuebingen.de/20181e162986)

Course type: Block Course  
Contact hours: 4

**Course coordinator:** Prof. Dr. rer. nat. Katja Tielbörger, Dr. rer. nat. Korinna Allhoff

**Target audience**  
The course is primarily aimed at students in the Master of Science in Evolution and Ecology or Geoecology, but students of other master programs, as well as PhD students, are also welcome.

**Prerequisites**  
The participation in the course "Systemanalyse" held by Christiane Zarfl as part of the Bachelor of Science in Geoecology is a useful (but not compulsory) preparation. Students with very little experience in programming are explicitly welcome. All mathematical techniques and all programming skills will be explained when needed so that no special prior knowledge is required.

**Course description**  
Models provide a virtual laboratory where different hypotheses can be tested with very little effort. They can help to identify important mechanisms, to inspire targeted experiments, to understand the dynamics within complex ecosystems and to predict their responses to disturbances and environmental change. In some cases, models can even help to answer ecological questions that are otherwise difficult to address, for example because experiments would be too expensive, too complex, or ethically problematic. This course is at the same time an introduction to modeling, an introduction to programming and a repetition of basic ecological principles. Each week, we will start with an ecological question, translate this question into a mathematical model and investigate this model using analytical tools and computer simulations. We will start with simple models describing the growth of single populations (such as exponential or logistic growth), then move on to models of pairwise species interactions (such as predation or competition), and finally investigate more complex systems (including, for example, more than two species, adaptive behavior or spatial dynamics). Each model will be analyzed in an interactive manner, with lots of opportunities for practical hands-on experiences. The simulation results will be discussed in depth, allowing for detailed discussions of the underlying ecological principles. We will use iPython notebooks to run our simulations. Python is an easy to learn, high-level programming language for general-purpose programming. It is freely available and universally applicable, which makes it a powerful tool for various projects both inside and outside academia. The notebooks contain plain text as well as executable code. They run on all commonly used platforms and can be edited in a normal browser, which ensures a quick and uncomplicated start even for total beginners.

**Course Title:** Current Topics in Proteome Research (Schiene Fr) (4156)  
**Link:** [http://campus.uni-tuebingen.de/20181e164404](http://campus.uni-tuebingen.de/20181e164404)

Course type: Seminar  
Contact hours: 

**Course coordinator:** Prof. Dr. rer. nat. Boris Macek, Ph.D. Nicolas Nalpas

**Target audience**
The target group are M.Sc. students (NOT those from Cell Biology/Immunology) and Ph.D. students.

**Course description**
Proteomics investigates global qualitative and quantitative changes of protein expression in cells, tissues or whole organisms and represents one of the youngest fields of molecular biology and medicine. Aim of this course is to acquaint the participants with current, high-impact research literature from the field of proteome research and biology. The participants will take turns with active researchers from the field (PCT group members) and will have to present and discuss a research paper from one of the fields: proteogenomics, phosphoproteomics, global analysis of signal transduction, key technology developments, sample preparation and enrichment protocols, microbial proteomics. The target group are M.Sc. students (NOT those from Cell Biology/Immunology) and Ph.D. students.

**Course Title**: Elective: Advanced-Level Course in Plant Physiology 4031  
**Link**: [http://campus.uni-tuebingen.de/20181e167052](http://campus.uni-tuebingen.de/20181e167052)  
**Course type**: Block Course  
**Contact hours**: 13  
**Course coordinator**: Dr. rer. nat. Christina Chaban, Dr. rer. nat. Farid El-Kasmi, Dr. rer. nat. Katharina Markmann, Dr. rer. nat. Virtudes Mira-Rodado, Prof. Dr. rer. nat. Claudia Oecking, o. Prof. Dr. rer. nat. Klaus Harter  
**Prerequisites**  
A background in molecular plant science is expected  
**Course description**  
Implementation of a small research project involving a wide spectrum of methods

**Course Title**: Evolution and Ecology Seminar  
**Link**: [http://campus.uni-tuebingen.de/20181e162861](http://campus.uni-tuebingen.de/20181e162861)  
**Course type**: AG/Kolloquium  
**Contact hours**: 2  
**Course coordinator**: Dr. rer. nat. Korinna Allhoff, Prof. Dr. rer. nat. Katja Tielbörger  
**Target audience**  
This seminar specifically targets all Tübingen students (undergrad, postgrad) interested in Ecology and Evolution - this is your direct access to learn more about ongoing local research and establish contacts.  
**Course description**  
This is the scientific colloquium of the Institute for Evolution and Ecology. Speakers are early career researchers as well as senior scientists in the broad fields of Ecology, Biodiversity and Evolution. On the one hand, this is the platform where scientists from within Tübingen (University, Max Planck Institutes) disseminate and share their research topics with a broader audience. On the other hand, we frequently invite external guest speakers to present novel findings and research perspectives. Moreover, it is the place where scientists working in the fields of ecology and evolution meet and discuss their most recent findings.

**Course Title**: Excursion: Neotropic diversity of adaptations, a glance through plant physiology and plant-animal interactions  
**Link**: [http://campus.uni-tuebingen.de/20181e167073](http://campus.uni-tuebingen.de/20181e167073)  
**Course type**: Practical Field Course  
**Contact hours**:  
**Course coordinator**: Prof. Dr. rer. nat. Jan Benda, o. Prof. Dr. rer. nat. Klaus Harter  
**Target audience**  
Bachelor students in Biology and Geoecology in at least the third study year (all basic modules have to be completed successfully); Master students in Biology and Geoecology; PhD students in Biology and Geoecology
Course description
In this course students will learn about the primary motors for biological diversification regarding plant physiology and interactions with animals throughout different ecosystems of Colombia. We aim to observe and discuss the interface of Plant-Animal-Human interactions across different landscapes and ecosystems, highlighting the importance of each player within these relationships. By means of field observations we will also address following phenomena: - How the geospatial location of Colombia and its geological conditions allow a great diversity in species and physiological adaptations that can be observed all across the country. - How this great pool of genetic variation and abundance of physiological adaptations make it a unique batch of resources for food production, livestock, pharmacy, raw material industries and ground research.

Course Title: Excursion: Tropical Marine Ecology (3066)
Link: http://campus.uni-tuebingen.de/20181e164421
Course type: Block Course
Contact hours:
Course coordinator: o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Ulrike Harant
Target audience
Phd students; Lehramt/Bachelor/Master students in Biology, Geoeckology, or related fields.

Course description
INFOVERANSTALTUNG Mon, 05 February 2018., 16 c.t., E-Bau Morgenstelle, E5 A20 (Seminar Room 5th Floor) Information and registration to nico.michiels@uni-tuebingen.de and registration via Campus This 4-week block module (6CP) consists of 3 components: (1) Blockseminar (2 days; some time in Summer 2018): During a 2-day block seminar in Tübingen, students present recent research and study approaches with relevance to the biology and ecology of coral reef organisms. Moreover, on a half-day trip to the Wilhelma Zoo in Stuttgart, we will familiarize with the most relevant coral reef fish families. The detailed schedule for the seminar and Wilhelma excursion will be fixed in agreement with the course participants. (2) 14-day excursion (September 2018) to Mangrove Bay, South of El Qusair, Red Sea (Egypt): During the first 3-4 days, participants familiarize with the coral reef ecosystem, its inhabitants and functional groups, at the highly diverse Mangrove Bay house reef, which includes the full gradient from exposed reef slopes to shallow Mangrove forests. As the central course component, students then develop - based on their own field observations - small independent research projects. Students first formulate a research hypothesis based on their observations, then develop a convincing (observational or experimental) study design to evaluate their hypothesis, and finally collect a statistically meaningful dataset for quantitative analysis. All projects will be extensively and critically discussed and evaluated during daily progress meetings. All research projects (individually or in small teams) will be briefly presented to the hotel guests. The excursions further excludes short trips into the adjacent desert, a visit to the nearby small Egyptian town of El Quseir, and a full-day boat trip. All projects will be performed on snorkelling. SCUBA diving is possible, but not required. Participants with a diving certificate and insurance can dive (usually, the majority of students does not dive). (3) Post-excursion practical (dates to be agreed upon, some time in October depending on student schedules at the beginning of the winter term): We will jointly analyze the data collected during the field trip. All participants finally develop a short scientific paper to report about their project. The course block will be completely taught in English. All students interested in this excursion must informally register as soon as possible starting 31 January until 31 March 2017 via the Campus website. This registration is initially not binding - but you will then automatically be kept updated about final registration procedures. Given that booking with the travel agent needs to fixed very soon, early registrants have a higher likelihood to be accepted for the course! Costs: For students immatriculated at Tübingen university, we can offer the course at € 900,-pp.This price includes travel & visum, accommodation (twin rooms), extensive half-board catering, on-site snorkeling and a 1-day boat-trip. The price is subsidized by the university and the Animal Evolutionary Ecology group. The price excludes lunches & drinks (expect ~50-90 € in total pp), rental of snorkeling gear if
necessary (wetsuits for free rent at our department). We recommend purchasing your own snorkel, mask and open water fins incl. neoprene booties), scuba diving (= expect 20 € per dive) + required gear. For further information, you may also contact the course provider.

Additional information
http://www.evoeco.uni-tuebingen.de/

Course Title: Excursion: Sensory Systems in Natural Environments (3150)
Link: http://campus.uni-tuebingen.de/20181e166853
Course type: Exkursion
Contact hours: 6
Course coordinator: Prof. Dr. rer. nat. Jan Benda
Target audience
Master Neurobiologie oder Oekologie oder aehnliches Biologie Bachelor auch moeglich

Course description
Sensory systems and communication behaviors show a large diversity even in closely related species. This diversity results among other things from adaptation to highly specific natural habitats and from evolution of intraspecific communication. Despite that, studies of sensory systems are usually limited to a small number of established model systems in a few model species, done in well controlled laboratory conditions with standard stimuli. In our field course we want to analyze the richness and variability of natural stimuli and interfering noise signals in the natural habitats. At the same time we want to study behavior and sensory physiology in different species to see how they use their sensory systems in these environments. Through this comparative approach we want to send sensory systems from the lab back into their natural context. The dry meadows of Slovenian Karst boost with high density of different insect species. There we will focus on the songs and the auditory system of grasshoppers and bush-crickets. Both behavioral observations and experiments as well as electrophysiological recordings in the lab and in the field are the focus of the field trip. In addition we will have little projects on vibrational communication in Cicadinae, insect vision, and filiform sensilla in bugs (Heteroptera). Organizers: Prof. Jan Benda, University Tübingen, Germany, and Ales Skorjanc, University Ljubljana, Slovenia.

Course Title: Frontiers in Plant Ecology
Link: http://campus.uni-tuebingen.de/20181e162867
Course type: Seminar
Contact hours: 2
Course coordinator: Prof. Dr. sc. nat. Oliver Bossdorf
Target audience
MSc in Evolution & Ecology, MSc Geocology, PhD in ecology or evolutionary biology (e.g. EVEREST at University of Tübingen or EDGE Track at PhD program of MPI). The course is particularly suitable for MSc and PhD students interested in plant ecology who already have some background in ecology and some experience with doing science.

Course description
In this course we discuss current research frontiers in plant ecology, based on a cluster of recent papers for each. Before each semester, the topics are determined bottom-up (suggestions by all, then voting) by the interested members of the Plant Ecology and Plant Evolutionary group. In the last year, the frontier topics included e.g. the ecology and evolution of plants in cities, ecological genomics and epigenomics, the ecology of allelopathic interactions, and big data in plant invasion biology. In addition to the topic clusters selected a priori, there are also a few “wildcard” dates where other current papers are discussed in a classic journal-club style.

Course Title: Fundamentals of Sensorimotor Integration (Mo) (4085)
Link: http://campus.uni-tuebingen.de/20181e167360
Course type: Lecture
Contact hours: 2
Course coordinator: apl. Prof. Dr. rer. nat. Uwe Ilg
Course description
The lecture provides an overview of sensorimotor integration in the animal kingdom, including man. One of the hallmarks of sensorimotor integration is the modification of sensory processing by ongoing executed motor actions. Since many motor actions are consequences of sensory stimuli, sensorimotor integration can be explained as a closed-loop feedback system. The examples presented in the lecture extend from simple reactions and its learning-related modifications in the marine snail Aplysia to the complex eye movement pattern reflecting cognitive abilities in humans. The use of sub-human primates in this research is explained and justified in detail by different examples. On several occasions, basic principles of learning are addressed; the neuronal substrate of motor learning and adaptation is explained in detail. Tool use and tool fabrication observed by the Caledonian crows are introduced. The lecture places special emphasis on the visual system. Nevertheless, examples from other modalities such as the electric sense, the mechanism of echolocation and the importance of whiskers for prey detection in blindfolded seals are presented as well.

Course Title: Gastrointestinal (GI) Mucosal Pathophysiology  (Course number: S01SMOLOMED04)
Link: http://campus.uni-tuebingen.de/20181e165938
Course type: Seminar
Contact hours:
Course coordinator: Ph.D. Tamia K. Lapointe
Prerequisites
Stud. Mol.Med M.Sc., der Mikrobiologie und der Biochemie
Course description
Total workload: 120 h Class time: 45 h (Friday 9:30-12:30, Konferenzraum Virologie, 3. OG, E.-Aulhorn-Str. 6) Self-study: 75 h (5-6 h per week)

Course Title: Introduction into Scientific Communication (4057)
Link: http://campus.uni-tuebingen.de/20181e164126
Course type: Seminar
Contact hours: 4
Course coordinator: Dr. rer. nat. Simon Heilbronner
Prerequisites
1st year Msc in Biology
Course description
During this module, participants are acquainted with techniques on how to deal with scientific data. Participants will regularly attend lectures of external speakers taking place on Thursdays 5:15 - 6:30 pm, alternating at seminar rooms in the Biology department (E-building, 3rd floor, N12) and the Medical Microbiology (Elfriede-Aulhorn Str.). At the end of the module, participants are expected to compose a one-page report (including an abstract) for every attended lecture. Therein, the topic of the respective lecture and key results are to be presented and discussed in the light of related literature. Participants are guided in detailing scientific problems, pointing out data and results in a logical and comprehensive way. Lectures are usually announced one or two days in advance. Finally, participants are expected to attend an (inter)national conference and actively participate by presenting a poster as a co-author.

Course Title: Lab Internship Innate & Adaptive Immunity [Bio 4042]  (Course number: S07PIMMU01)
Link: http://campus.uni-tuebingen.de/20181e166986
Course type: Block Course
Contact hours: 16
**Course coordinator:** Prof. Dr. rer. nat. Stefan Stevanovic, Dr. rer. nat. Ralf Amann, PD Dr. rer. nat. Stella E. Autenrieth, PD Kevin, Ph.D. Dennehy, PD Dr. rer. nat. Cécile Gouttefangeas, apl. Prof. Dr. med. Dominik Hartl, apl. Prof. Dr. med. Reinhild Klein, apl. Prof. Dr. rer. nat. Oliver Planz

**Target audience**

**Prerequisites**
Abgeschlossenes Bachelorstudium

**Course description**
Laborpraktikum Immunologie als Arbeitsgruppenpraktikum mit begleitenden Mitarbeiterseminaren

**Course Title:** Lab Internship: Molecular Immunology [Bio 4051]  (Course number: S07PIMMU02)
**Link:** http://campus.uni-tuebingen.de/20181e166988

**Course type:** Block Course

**Contact hours:** 8

**Course coordinator:** Prof. Dr. rer. nat. Stefan Stevanovic, apl. Prof. Dr. rer. nat. Karin Schilbach-Stückle, apl. Prof. Dr. rer. nat. Hans-Peter Wendel, Dr. rer. nat. Ralf Amann, PD Dr. rer. nat. Stella E. Autenrieth, PD Dr. rer. nat. Meltem Avci-Adali, PD Kevin, Ph.D. Dennehy, Prof. Dr. med. Julia-Stefanie Frick, PD Dr. rer. nat. Cécile Gouttefangeas, apl. Prof. Dr. med. Dominik Hartl, Prof. Dr. med., Dipl.-Phys. Gundram Jung, apl. Prof. Dr. med. Reinhild Klein, Prof. Dr. rer. nat. Andreas Peschel, apl. Prof. Dr. rer. nat. Oliver Planz, Prof. Dr. med., Ph.D. Julia Skokowa, o. Prof. Dr. med. Lars Zender

**Target audience**
Studierende der Masterstudiengänge Biologie, Biochemie, Bioinformatik und Molekulare Medizin (1. oder 2. Studienjahr)

**Prerequisites**
Abgeschlossenes Bachelorstudium

**Course description**
Frei vereinbarte 3-wöchige Laborpraktika in den einzelnen Arbeitsgruppen. Eine Liste der entsprechenden Gruppenleiter/innen kann gern angefordert werden (lynne.yakes@uni-tuebingen.de).

**Course Title:** Methodological Frontiers in the Cognitive Neurosciences  (Course number: NB04C)
**Link:** http://campus.uni-tuebingen.de/20181e168032

**Course type:** Seminar

**Contact hours:** 2

**Course coordinator:** Prof. Dr. rer. nat. Andreas Bartels, apl. Prof. Dr. rer. nat. Christoph Braun, Dr. Marc Himmelbach, apl. Prof. Dr. rer. soc. habil. Hans-Gerhard Klinzing, PD Dr. rer. nat. Axel Lindner, Maren Prass

**Target audience**
Students Graduate School of Neural and Behavioural Sciences (MSc) Students Cognitive Science - Cognitive Neuroscience (MSc) Students Biology - Neurobiology (MSc) [Modul “Einführung in die Neurobiologie”, Anrechnung erfolgt durch Prof. J. Ostwald” (joachim.ostwald@uni-tuebingen.de)]

**Additional information**

**Course Title:** Modern Methodology in Flow Cytometry
**Link:** http://campus.uni-tuebingen.de/20181e167201
Course type: Block Course
Contact hours:
Course coordinator: Dr. Kenneth Berendzen
Target audience
MSc. 1. - 3. Semester
Course description
Content: Introduction to flow cytometry The following topics will be subject of this course: Set-up and methodologies for FACS and Flow Cytometry Typical Applications for FACS and Cytometry Quantification of DNA content for cell cycle analysis, endoreduplication Dye Spillover and compensation Sorting (FACS) Own evaluation of own data generated over the course

Course Title: Modul Project Conceptualization (4012) (MEEMS)
Link: http://campus.uni-tuebingen.de/20181e164420
Course type: Block Course
Contact hours:
Course coordinator: o. Prof. Dr. rer. nat. Nico K. Michiels
Target audience
MSc students in Biology, with specialisation in Evolution and Ecology (compulsory).
Course description
This module is compulsory to all MSc students in Evolution and Ecology. Each student has to present two talks in the context of the “Meeting of the Evolution and Ecology Master Students (MEEMS)” which takes place 4 times per year, usually the last Friday before the start of a term and the first Monday after the end of a term. Meetings are always announced to all members of the institute - including all MSc students. Both talks are in English, 20 min max, and should be of a high, international standard. Presentation style, the optimal use of media (powerpoint, video, material, blackboard) or the interaction with the public, are all important. Evaluation is by scientists from all groups within the Institute for Evolution and Ecology. It is a public event to which all are invited, including PhD students etc. MSc students in particular are recommended to attend, even if they are not presenting a talk themselves. During the first talk, students present what they intend to do during their MSc thesis. It can be seen as a kind of grant application, where a project is proposed and defended before data have actually been collected. Hence, the emphasis is on (1) why the subject is interesting and important - in the light of the scientific literature on this subject, (2) what working hypothesis is being tested, (3) how the student intends to collect data (experimental or sampling design) and (4) what the expected outcome is - including alternative results and explanations. Students are NOT expected to present data or results. Pilot studies are NOT necessary. It is also NOT necessary that they present the final ideas about their study - it is perfectly possible that the subject is adjusted after this talk. The feedback of the audience will help to improve the quality of the work. The second talk is presented after the data have been collected and analysed, and preferably after the MSc thesis is finished (but this is not a requirement). Usually this talk will be 6-9 months after the first. Here, introduction and methods are a brief reminder of what you did, but the emphasis is on the data, data analysis, and interpretation of the results - and how this study contributes to the field (relation to other publications).

Course Title: Current Topics in General Genetics (4014)
Link: http://campus.uni-tuebingen.de/20181e167573
Course type: Lecture/Excercises
Contact hours:
Course coordinator: Dr. rer. nat. Chang Liu, Dr. rer. nat. Annett Strauß, Dr. rer. nat. Andreas Wachter, apl. Prof. Dr. rer. nat. Ulrike Zentgraf, o. Prof. Dr. rer. nat. Thomas Lahaye
Target audience
Masterstudierende im 1.-3. Fachsemester
Course description
Dieses Modul ist ein Pflichtmodul im Masterstudiengang des ZMBPs und wird für das 2. Semester

Course Title: S1 Experimental Design
Link: http://campus.uni-tuebingen.de/20181e164422
Course type: Block Course
Contact hours:
Course coordinator: Ph.D. Pierre-Paul Bitton, o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Nils Anthes
Target audience
Master’s degree programs of the Department of Biology, if applicable related degree courses of sciences or medicine
Prerequisites
Competent knowledge of Biology
Course description
Through the presentation of pre-existing examples and ideas developed by the students, this module will emphasize the central importance of formulating strong hypotheses which are to be addressed by conducting well planned and executed experimental/sampling designs. The module is taught entirely in English.

Course Title: S1 Marine Biology (3169)
Link: http://campus.uni-tuebingen.de/20181e164415
Course type: Block Course
Contact hours: 2
Course coordinator: Dr. rer. nat. Ulrike Harant, o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Nils Anthes
Target audience
Bachelor-, Master-, Diplom-, Lehramt- students in Biology/ Geoecology/ Bioinformatics or related subjects
Course description
The lecture part of this course (2 h / day) gives an introduction to marine ecosystems and is aimed at students interested in marine biology, ecology, and the complexity of marine habitats. The lecture is split into four main blocks: Oceanography General marine ecology Marine habitats Human impact After each lecture there will be a seminar of one hour duration where students present short scientific papers to the class that match the current lecture topics followed by a short discussion (papers will be provided).
Additional information
http://www.evoeco.uni-tuebingen.de/

Course Title: S1- Molecular Mouse Genetics for MSc students [Bio 4132]
Link: http://campus.uni-tuebingen.de/20181e163348
Course type: Block Course
Contact hours:
Course coordinator: o. Prof. Dr. rer. nat. Alfred Nordheim, Dr. rer. nat. Siegfried Alberti, PD Dr. rer. nat. Thomas Ott
Target audience
Studierende im Master Stuudiengang “Molecular Cell Biology & Immunology”
Prerequisites
Prior qualification: BSc degree in Life Sciences (Biology, Biochemistry, Molecular Medicine).
Course Title: S1 Reef Ecology (3178)
Link: http://campus.uni-tuebingen.de/20181e164414
Course type: Block Course
Contact hours: 2
Course coordinator: Dr. rer. nat. Ulrike Harant, o. Prof. Dr. rer. nat. Nico K. Michiels
Target audience
Bachelor-, Master-, und Lehramtsstudenten der Fächer Biologie, Geöökologie, Bioinformatik und ähnlicher Fächer. All students interested in reef ecology are welcome! This course offers a good way to prepare yourself for upcoming marine excursions such as Tropical Marine Ecology (Egypt, September 2017) and Marine Biodiversity.
Course description
This course gives a broad overview of reef biology, including:
- Coral biology What are corals? Why are corals interesting? Symbiotic interactions etc.
- Coral reef complexity Insight into the complex interactions among different reef organisms and their environment. How are they connected and why?
- Biodiversity of coral reefs Why are coral reefs so divers? Where do you find the highest diversity and why exactly there?
- History of coral reefs When did corals first appear? What did reefs look like 100 My ago? Are corals the only important reef builders in Earths history?
- Conservation aspects and human impact Threats for this fantastic ecosystem, including global warming, deseases, human foot prints will be discusses. What are coral reefs going to look like in 100 years? In the first 2 weeks of the course 2 h lectures will be given each day adressing the topics mentioned above. After each lecture, we will discuss important new findings in coral reef ecology. This will give the students a solid understanding of the system, allowing them to critically approach a project phase which will be held in the third week of the course. During the third week, the students will form groups and will focus on how to develop a marine protected area within a specific coral reef area. By combining their knowledge acquired during the course and an intensive literature research, students will identify problems of this area, show what has already be done, what still needs to be done and most importantly how it could be done (in a realistic way). The results of this project phase will then be presented in an oral presentation within the last week of the course.

Course Title: S2 Cell Differentiation [Bio 4140]
Link: http://campus.uni-tuebingen.de/20181e164361
Course type: Block Course
Contact hours:
Course coordinator: PD Dr. rer. nat. habil. Bernard Moussian
Course description
In diesem Modul sollen verschiedene Differenzierungsmechanismen unter anderem beim Modelorganismus Drosophila melanogaster studiert werden. Entsprechende Themen werden dabei historisch anhand von Publikationen abgegrenzt. Dabei ist es wichtig die Fragestellungen zu erkennen und zu formulieren, die zugrundeliegenden Daten zu verstehen und einzuordnen und die Schlussfolgerungen zu ziehen. Über die einzelnen Schritte werden die Student/innen täglich in Form von kurzen Zusammenfassungen (300 Wörter) berichten. Gemeinsam mit einem Abschlussbericht wird die Note ermittelt.

Course Title: S2 Praxismodul: Molekulare Methoden der Allgemeinen Genetik (4015)
Link: http://campus.uni-tuebingen.de/20181e167575
Course type: Block Course
Contact hours:
Course coordinator: Dr. rer. nat. Robert Morbitzer, Dr. rer. nat. Annett Strauß, o. Prof. Dr. rer.
nat. Thomas Lahaye

**Target audience**
Praxismodul im Master Biologie

**Prerequisites**
keine

**Course description**

**Course Title:** S3 Proteomics of Cell Signaling [Bio 4077]
**Link:** http://campus.uni-tuebingen.de/20181e164402
**Course type:** Block Course
**Contact hours:** 6
**Course coordinator:** Prof. Dr. rer. nat. Boris Macek, Ph.D. Nicolas Nalpas

**Target audience**
The module is offered to the M.Sc. students specializing in Molecular Cell Biology/Immunology (MCB/I).

**Prerequisites**

**Course description**
This Module covers the basic principles of biological signal transduction and methodology used to analyze it at the protein level. Special emphasis will be given to the biosynthesis, biology and analysis of posttranslational modifications of proteins as the main mediators of signal transduction. The seminar will cover the key literature from the field of biological signal transduction and proteomics. The practical course will provide a hands-on-experience in acquiring and analyzing large quantitative phosphoproteome datasets.

**Additional information**
http://www.pct.uni-tuebingen.de/

**Course Title:** S4 Introduction to Next Generation Sequencing (NGS)
**Link:** http://campus.uni-tuebingen.de/20181e169345
**Course type:** Block Course
**Contact hours:**
**Course coordinator:** Ph.D. Fernanda Ruiz-Fadel

**Target audience**
BSc, BEd, MSc, MEd Biologie, Geöökologie, Bioinformatik

**Course description**
Introduction to gene sequencing, NGS (Next Generation Sequencing) and genome analysis. Including theory, practical classes in the lab and computer, and paper discussions.

**Course Title:** S4 Molecular Mechanisms of Mechanosensing [Bio 4190]
**Link:** http://campus.uni-tuebingen.de/20181e170278
**Course type:** Block Course
**Contact hours:**
**Course coordinator:** Dr. rer. nat. Sven Hülsmann
Target audience
This course targets master students (semester 1 and 3) with an interest in developmental cell biology.

Course description
In this course students will learn and apply principle cell biological and genetic techniques to elucidate general molecular mechanisms that regulate the behaviour of cells during Drosophila development. In particular, we are investigating how an actin-binding protein might function as a cellular mechanosensor. The learning approach is problem-based, i.e. students develop small projects and scientific questions they plan to address. The course comprises lectures and seminars, in which students acquire the theoretical background, and practical classes, in which students test their hypotheses experimentally. The results will be analysed and presented in a short report (with the format of a scientific paper).

Course Title: S4 Yeast Cell Biology and Imaging [Bio 4203]
Link: http://campus.uni-tuebingen.de/20181e169215
Course type: Lecture/Excercises
Contact hours:
Course coordinator: Jun.-Prof. Ph.D. Jennifer Ewald
Target audience
Master or advanced Bachelor students in Biology or related fields with interest in yeast cell biology and microscopy.

Course description
This course will be comprised of lab work and literature seminars to learn about yeast as a model in cell biology. We will work on small projects related to current research topics in the lab using yeast genetics and live cell imaging including computational and statistical analysis. Please bring a laptop if possible.

Course Title: Scientific Writing (in englischer Sprache)
Link: http://campus.uni-tuebingen.de/20181e163445
Course type: Seminar
Contact hours: 2
Course coordinator: Dr. rer. nat. Laura Ragni, Dr. rer. nat. Sandra Richter, o. Prof. Dr. rer. nat. Gerd Jürgens
Target audience
Master- and PhD students
Prerequisites
Requirement: scientific laboratory experience (Minimum 2 month lab experience). Knowlege of plant biology.

Course description
How to write scientific manuscripts, grant proposals and reports Lectures + exercises

Course Title: Sensory flow processing across modalities and species
Link: http://campus.uni-tuebingen.de/20181e171688
Course type: Seminar
Contact hours:
Course coordinator: Jun.-Prof. Dr. rer. nat. Aristides Arrenberg, Prof. Dr. rer. nat. Jan Benda, Akad. Rat/Rätin Dr. rer. nat. Annette Denzinger, Dr. rer. nat. Jan Grewe, o. Prof. Dr. rer. nat. Hanspeter Mallot
Target audience
Projektbeteiligte des Mini-Graduiertenkollegs Sensory Flow sowie interessierte Studierende und Wissenschaftler im Bereich (Neuro-)biologie.
Prerequisites
Vertiefte Kenntnisse der Biologie
**Course description**

**Course Title:** Biotic Interactions: Plant-Animal-Interactions (3132)
**Link:** [http://campus.uni-tuebingen.de/20181e162872](http://campus.uni-tuebingen.de/20181e162872)
**Course type:** Block Course
**Contact hours:** 3
**Course coordinator:** Ph.D. Michal Gruntman

**Target audience**
MSc Biologie, MSc Geoökologie, Diplom und Bachelor Biologie, Geoökologie, Geographie

**Course description**
The diversity of plants’ shapes, sizes, odors and colors is enormous. Many of these characteristics are directly and indirectly related to strategies for increasing fitness by attracting and rejecting animals. Likewise, many animal groups have adapted their behavior and sensory abilities in accordance with the plants characteristics in order to maximize their own fitness. Due to their key role in many ecosystems, understanding of plant-animal interactions at the various organization levels are central to our understanding of the world in which we live. The objective of the course is to introduce the key interactions between plant and animals: herbivory, pollination and seed dispersal and to study how each of them shape both plants and animals from the level of the individual to the ecosystems.

**Course Title:** “A journey through the RNA world: from ribozymes to riboswitches” (4021)
**Link:** [http://campus.uni-tuebingen.de/20181e167578](http://campus.uni-tuebingen.de/20181e167578)
**Course type:** Block Course
**Contact hours:**
**Course coordinator:** Dr. rer. nat. Andreas Wachter

**Target audience**
Themenmodul im Master

**Prerequisites**
Teilnahme an den Grundmodulen “Biomoleküle der Zelle” (BMZ), “Molekulare Biologie I und II” (MBI, MBII) oder vergleichbaren Veranstaltungen

**Course description**
This module aims at providing an overview of the functional capacity of RNA elements in viruses, bacteria and eukaryotes. Besides catalytically active RNAs, mainly aspects of RNA-based gene regulatory mechanisms will be discussed. In the wide field of RNA-mediated gene control, topics will be primarily focused on structured mRNA elements including thermosensors and riboswitches. The lecture section will provide an introduction into the various aspects of RNA functions in different cellular processes. In the tutorial and the seminar, selected aspects will be discussed in more detail and general principles will be worked out. The lectures will be given in English, whereas discussions and presentations can be held in German as well. A final written examination will take place on July 27th, 2018, at 10 c.t. at ZMBP, room 4U09.

**Course Title:** Behavioral Ecology II (4060)
**Link:** [http://campus.uni-tuebingen.de/20181e166358](http://campus.uni-tuebingen.de/20181e166358)
**Course type:** Block Course
**Contact hours:**
Course coordinator: Prof. Dr. rer. nat. Katharina Foerster

Target audience
Zielgruppe: Bachelor Biologie, Master EvE

Prerequisites
Behavioral Ecology I Verhaltensökologie or any other introduction to behavioural ecology

Course description
Each week, we read literature to a specific topic in behavioural ecology. Participants prepare questions on the topic and design experiments or correlational studies that might further our knowledge on the discussed topic. Participants present short project proposals which are discussed in the group.

Course Title: Essentials of Ecology (4151)
Link: http://campus.uni-tuebingen.de/20181e168019
Course type: Block Course
Contact hours: 4
Course coordinator: Prof. Dr. sc. nat. Oliver Bossdorf

Target audience
The course is primarily aimed at MSc students in Evolution & Ecology. It is, however, also a good module for students in other MSc programs in biology, MSc students in Geoecology, PhD students who would like to update their knowledge in ecology, or an other interested student in biology.

Course description
The course will introduce students to some of the big fundamental questions in ecology, and to some current frontier research topics. It consists of a regular theoretical course on Tuesday 16-18, and a seminar on Wednesdays 17-19. The seminar part requires the regular attendance of the EvE Seminar or Hilgendorf lecture on Wednesdays, where scientists from Tübingen or elsewhere, including scientists from abroad, present their current research. The students are expected to summarize several of the seminars through concept maps, which will be graded. The theoretical course part consists of a mix of lectures and more active group work and covers a range of different ecological concepts, the history of some ecological ideas, and some of the most important current topics in ecological science.

Course Title: Evolutionary Cognitive Neuroscience (4108)
Link: http://campus.uni-tuebingen.de/20181e167372
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: Ph.D. Katharina Brecht

Target audience
Students of biology, cognitive science, psychology, and related areas

Prerequisites
Knowledge about fundamental neuroscience, behavior and physiology is required.

Course description
This 6CP-Module consists of the lecture “Evolutionary Cognitive Neuroscience” (Mo, 4-6 pm) and the seminar “Physiology of Cognition and Behaviour” (Mo, 2-4 pm; see Campus): With a strong emphasis on evolutionary and comparative aspects, the lecture “Evolutionary Cognitive Neuroscience” addresses the behavioural and neural foundations of cognition in the animal kingdom (from insects to humans) from a comparative perspective. Topics comprise: Theory of evolution; evolutionary neuroscience; phylogeny and ontogeny of communication & social cognition; neuroethological model systems of cognition, core knowledge of objects, actions, number, and space. The topic of the seminar “Physiology of Cognition and Behaviour” in the summer term 2016 is “Numerical competence: from behaviour to neurons”. Recent findings from the current literature will be presented and discussed. This seminar aims at elucidating behavioural and neuronal mechanisms and principles giving rise to cognition and complex
behaviour.

**Course Title:** Physiology of Cognition and Behaviour  
**Link:** [http://campus.uni-tuebingen.de/20181e167373](http://campus.uni-tuebingen.de/20181e167373)  
**Course type:** Seminar  
**Contact hours:** 2  
**Course coordinator:** Ph.D. Katharina Brecht  
**Target audience**  
Participants of the Module “Evolutionary Cognitive Neuroscience 4108”. Students of Biology and related areas Master students of Cognitive Science  
**Prerequisites**  
basic knowledge of animal behavior, psychophysics, and neurophysiology  
**Course description**  
Topic of summer term 2018: Social cognition from an evolutionary perspective. Recent findings from the literature will be presented and discussed, ranging from face perception to theory of mind and cooperation.

**Course Title:** Molecular Cell Biology (4024)  
**Link:** [http://campus.uni-tuebingen.de/20181e163446](http://campus.uni-tuebingen.de/20181e163446)  
**Course type:** Lecture  
**Contact hours:** 2  
**Course coordinator:** Dr. rer. nat. Christopher Grefen, Dr. rer. nat. Sabine Müller, Dr. rer. nat. Laura Ragni, Dr. rer. nat. Sandra Richter, o. Prof. Dr. rer. nat. Gerd Jürgens  
**Target audience**  
**Course description**  
Überblick über den Stand der Forschung und aktuelle Forschungsthemen in der molekularen Zellbiologie.

**Course Title:** The Hilgendorf Lecture  
**Link:** [http://campus.uni-tuebingen.de/20181e164423](http://campus.uni-tuebingen.de/20181e164423)  
**Course type:** Colloquium  
**Contact hours:** 2  
**Course coordinator:** Dr. sc. nat. Ingmar Werneburg, o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Nils Anthes  
**Target audience**  
Die EvE Hilgendorf Lecture is open for all interested persons.  
**Course description**  
Internationally acclaimed external guests present their latest work in the field of Evolutionary Biology and Ecology.  
**Additional information**  

**Course Title:** Lecture Series on Immunological/Molecular Biological Topics  
**Link:** [http://campus.uni-tuebingen.de/20181e166987](http://campus.uni-tuebingen.de/20181e166987)  
**Course type:** AG/Kolloquium  
**Contact hours:** 1  
**Course coordinator:** Jun.-Prof. Ph.D. Jennifer Ewald, PD Dr. rer. nat. Cécile Gouttefangeas, Prof. Dr. rer. nat. Boris Macek, o. Prof. Dr. rer. nat. Alfred Nordheim, apl. Prof. Dr. rer. nat. Tassula
**Target audience**
MSc/PhD students (natural scientists, medical students, etc.), research scientists, guests

**Prerequisites**
Basic immunological knowledge required (at least BSc-level).

**Course description**
Lecture series in English (guest speakers) on current immunological/molecular biological topics. Guest speakers, both national and international, are invited by the group leaders of the Institute of Cell Biology to present their work in the Institute’s main seminar room (2.033/2.034). The lectures do not take place regularly on a weekly basis but according to the timetables of the guests. The current overview of the series can be found on the homepage of the Department of Immunology:  
http://www.immunology-tuebingen.de/courses-seminars.html  
Contact: carmen.hoener@uni-tuebingen.de

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**Applied Environmental Geoscience AEG – Master**

**Course Title:** Advanced Topics in Flow and Transport (VÜ)  
**Link:** http://campus.uni-tuebingen.de/20181e162851  
**Course type:** Lecture/Excercises  
**Contact hours:** 4  
**Course coordinator:** Prof. Dr.-Ing. Olaf A. Cirpka

**Course Title:** Applied Hydrogeology (Hydrogeological Field Course)  
**Link:** http://campus.uni-tuebingen.de/20181e162854  
**Course type:** Practical Field Course  
**Contact hours:** 3  
**Course coordinator:** Dr. rer. nat. Carsten Leven-Pfister

**Course Title:** Applied Hydrogeology (Hydrogeological Investigation Techniques)  
**Link:** http://campus.uni-tuebingen.de/20181e162853  
**Course type:** Lecture/Excercises  
**Contact hours:** 3  
**Course coordinator:** Dr. rer. nat. Carsten Leven-Pfister

**Course Title:** Contaminant Hydrogeology (VU)  
**Link:** http://campus.uni-tuebingen.de/20181e162883  
**Course type:** Lecture/Excercises  
**Contact hours:** 3  
**Course coordinator:** Dr. rer. nat. Michael Finkel, Prof. Dr. rer. nat. Peter Grathwohl

**Course Title:** Environmental Isotope Chemistry (Inorganic Isotope Chemistry) / Sedimentgeochemie (Umweltgeochemie) (VÜ)  
**Link:** http://campus.uni-tuebingen.de/20181e162891  
**Course type:** Lecture/Excercises  
**Contact hours:** 3  
**Course coordinator:** Dr. rer. nat. Heinrich Taubald
**Course Title**: Environmental Isotope Chemistry (Organic Isotope Chemistry) (VÜ)
**Link**: http://campus.uni-tuebingen.de/20181e167789
**Course type**: Lecture/Excercises
**Contact hours**: 3
**Course coordinator**: Dr. rer. nat. Daniel Buchner, Dr. rer. nat. Heinrich Taubald

**Course Title**: Environmental Microbiology and Geomicrobiology (Environmental Microbiology)
**Link**: http://campus.uni-tuebingen.de/20181e162898
**Course type**: Lecture/Excercises
**Contact hours**: 2
**Course coordinator**: Dr. rer. nat. Sara Kleindienst

**Course Title**: Environmental Microbiology and Geomicrobiology (Geomicrobiology)
**Link**: http://campus.uni-tuebingen.de/20181e162899
**Course type**: Lecture
**Contact hours**: 2
**Course coordinator**: Prof. Dr. rer. nat. Andreas Kappler

**Course Title**: Environmental Modeling II (VÜ)
**Link**: http://campus.uni-tuebingen.de/20181e162901
**Course type**: Lecture/Excercises
**Contact hours**: 6
**Course coordinator**: Ph.D. Chuanhe Lu

**Course Title**: Field Seminar in Applied Geosciences (Leipzig)
**Link**: http://campus.uni-tuebingen.de/20181e162905
**Course type**: Practical Field Course
**Contact hours:**
**Course coordinator**: Dr. rer. nat. Carsten Leven-Pfister, Dr. rer. nat. Holger Weiß

**Course Title**: GeoEnviron Seminar
**Link**: http://campus.uni-tuebingen.de/20181e163061
**Course type**: Forschungsseminar
**Contact hours**: 2
**Course coordinator**: Prof. Dr.-Ing. Olaf A. Cirpka
**Additional information**
http://www.geo.uni-tuebingen.de/aktuelles/forschungskolloquien-und-seminare.html

**Course Title**: Geostatistics
**Link**: http://campus.uni-tuebingen.de/20181e162925
**Course type**: Lecture/Excercises
**Contact hours**: 2
**Course coordinator**: Dr.-Ing. Claus Haslauer

**Course Title**: Hydrogeochemical Modeling
**Link**: http://campus.uni-tuebingen.de/20181e169515
**Course type**: Lecture/Excercises
**Contact hours:**
**Course coordinator**: Dr. sci. Caroline Schmidt

**Course Title**: Lab Course Geomicrobiology
**Link**: http://campus.uni-tuebingen.de/20181e162930
Course type: Practical Course
Contact hours: 6
Course coordinator: Dr. Casey Bryce, Prof. Dr. rer. nat. Andreas Kappler, Dr. sci. Caroline Schmidt

Course Title: Physics of the Atmospheric Boundary Layer
Link: http://campus.uni-tuebingen.de/20181e162939
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: Dr.-Ing. Uwe Putze

Course Title: Wissenschaftliches Präsentieren / Scientific Presentation
Link: http://campus.uni-tuebingen.de/20181e162974
Course type: Seminar
Contact hours: 2
Course coordinator: PD Dr. rer. nat. Dorothee Drucker-Bocherens

Geoecology – Bachelor

Course Title: Excursion: Tropical Marine Ecology (3066)
Link: http://campus.uni-tuebingen.de/20181e164421
Course type: Block Course
Contact hours:
Course coordinator: o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Ulrike Harant
Target audience
Phd students; Lehramt/Bachelor/Master students in Biology, Geoecology, or related fields.
Course description
INFOVERANSTALTUNG Mon, 05 February 2018., 16 c.t., E-Bau Morgenstelle, E5 A20 (Seminar Room 5th Floor) Information and registration to nico.michiels@uni-tuebingen.de and registration via Campus
This 4-week block module (6CP) consists of 3 components: (1) Blockseminar (2 days; some time in Summer 2018): During a 2-day block seminar in Tübingen, students present recent research and study approaches with relevance to the biology and ecology of coral reef organisms. Moreover, on a half-day trip to the Wilhelma Zoo in Stuttgart, we will familiarize with the most relevant coral reef fish families. The detailed schedule for the seminar and Wilhelma excursion will be fixed in agreement with the course participants. (2) 14-day excursion (September 2018) to Mangrove Bay, South of El Qusair, Red Sea (Egypt): During the first 3-4 days, participants familiarize with the coral reef ecosystem, its inhabitants and functional groups, at the highly diverse Mangrove Bay house reef, which includes the full gradient from exposed reef slopes to shallow Mangrove forests. As the central course component, students then develop - based on their own field observations - small independent research projects. Students first formulate a research hypothesis based on their observations, then develop a convincing (observational or experimental) study design to evaluate their hypothesis, and finally collect a statistically meaningful dataset for quantitative analysis. All projects will be extensively and critically discussed and evaluated during daily progress meetings. All research projects (individually or in small teams) will be briefly presented to the hotel guests. The excursions further excludes short trips into the adjacent desert, a visit to the nearby small egyptian town of El Quseir, and a full-day boat trip. All projects will be performed on snorkelling. SCUBA diving is possible, but not required. Partipants with a diving certificate and insurance can dive (usually, the majority of students does not dive). (3) Post-excursion practical (dates to be agreed upon, some time in October depending on student schedules at the beginning of the winter term): We will jointly analyze the data collected during the field trip. All participants finally
develop a short scientific paper to report about their project. The course block will be completely taught in English. All students interested in this excursion must informally register as soon as possible starting 31 January until 31 March 2017 via the Campus website. This registration is initially not binding - but you will then automatically be kept updated about final registration procedures. Given that booking with the travel agent needs to be fixed very soon, early registrants have a higher likelihood to be accepted for the course! Costs: For students immatriculated at Tübingen university, we can offer the course at € 900,-pp. This price include travel & visum, accommodation (twin rooms), extensive half-board catering, on-site snorkeling and a 1-day boat-trip. The price is subsidized by the university and the Animal Evolutionary Ecology group. The price excludes lunches & drinks (expect ~50-90 € in total pp), rental of snorkeling gear if necessary (wetsuits for free rent at our department). We recommend purchasing your own snorkel, mask and open water fins incl. neoprene booties), scuba diving (= expect 20 € per dive) + required gear. For further information, you may also contact the course provider.

**Additional information**
http://www.evoeco.uni-tuebingen.de/

**Course Title:** S1 Marine Biology (3169)  
**Link:** [http://campus.uni-tuebingen.de/20181e164415](http://campus.uni-tuebingen.de/20181e164415)  
**Course type:** Block Course  
**Contact hours:** 2  
**Course coordinator:** Dr. rer. nat. Ulrike Harant, o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Nils Anthes  
**Target audience**  
Bachelor-, Master-, Diplom-, Lehramt- students in Biology/ Geoecology/ Bioinformatics or related subjects  
**Course description**  
The lecture part of this course (2 h / day) gives an introduction to marine ecosystems and is aimed at students interested in marine biology, ecology, and the complexity of marine habitats. The lecture is split into four main blocks: Oceanography General marine ecology Marine habitats Human impact After each lecture there will be a seminar of one hour duration where students present short scientific papers to the class that match the current lecture topics followed by a short discussion (papers will be provided).  

**Additional information**
http://www.evoeco.uni-tuebingen.de/

**Course Title:** S1 Reef Ecology (3178)  
**Link:** [http://campus.uni-tuebingen.de/20181e164414](http://campus.uni-tuebingen.de/20181e164414)  
**Course type:** Block Course  
**Contact hours:** 2  
**Course coordinator:** Dr. rer. nat. Ulrike Harant, o. Prof. Dr. rer. nat. Nico K. Michiels  
**Target audience**  
Bachelor-, Master-, und Lehramtsstudenten der Fächer Biologie, Geoökologie, Bioinformatik und ähnlicher Fächer. All students interested in reef ecology are welcome! This course offers a good way to prepare yourself for upcoming marine excursions such as Tropical Marine Ecology (Egypt, September 2017) and Marine Biodiversity.  
**Course description**  
This course gives a broad overview of reef biology, including: - Coral biology What are corals? Why are corals interesting? Symbiotic interactions etc. - Coral reef complexity Insight into the complex interactions among different reef organisms and their environment. How are they connected and why? - Biodiversity of coral reefs Why are coral reefs so diverse? Where do you find the highest diversity and why exactly there? - History of coral reefs When did corals first appear? What did reefs look like 100 My ago? Are corals the only important reef builders in Earths history? - Conservation aspects and human impact Threats for this fantastic ecosystem, including global
warming, deseases, human foot prints will be discusses. What are coral reefs going to look like in 100 years? In the first 2 weeks of the course 2 h lectures will be given each day addressing the topics mentioned above. After each lecture, we will discuss important new findings in coral reef ecology. This will give the students a solid understanding of the system, allowing them to critically approach a project phase which will be held in the third week of the course. During the third week, the students will form groups and will focus on how to develop a marine protected area within a specific coral reef area. By combining their knowledge acquired during the course and an intensive literature research, students will identify problems of this area, show what has already been done, what still needs to be done and most importantly how it could be done (in a realistic way). The results of this project phase will then be presented in an oral presentation within the last week of the course.

Course Title: The Hilgendorf Lecture
Link: http://campus.uni-tuebingen.de/20181e164423
Course type: Colloquium
Contact hours: 2
Course coordinator: Dr. sc. nat. Ingmar Werneburg, o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Nils Anthes
Target audience
Die EvE Hilgendorf Lecture is open for all interested persons.
Course description
Internationally acclaimed external guests present their latest work in the field of Evolutionary Biology and Ecology.
Additional information

Geoecology – Master

Course Title: Applied Hydrogeology (Hydrogeological Field Course)
Link: http://campus.uni-tuebingen.de/20181e162854
Course type: Practical Field Course
Contact hours: 3
Course coordinator: Dr. rer. nat. Carsten Leven-Pfister

Course Title: Evolution and Ecology Seminar
Link: http://campus.uni-tuebingen.de/20181e162861
Course type: AG/Kolloquium
Contact hours: 2
Course coordinator: Dr. rer. nat. Korinna Theresa Allhoff, Prof. Dr. rer. nat. Katja Tielbörger
Target audience
This seminar specifically targets all Tübingen students (undergrad, postgrad) interested in Ecology and Evolution - this is your direct access to learn more about ongoing local research and establish contacts.
Course description
This is the scientific colloquium of the Institute for Evolution and Ecology. Speakers are early career researchers as well as senior scientists in the broad fields of Ecology, Biodiversity and Evolution. On the one hand, this is the platform where scientists from within Tübingen (University, Max Planck Institutes) disseminate and share their research topics with a broader audience. On
the other hand, we frequently invite external guest speakers to present novel findings and research perspectives. Moreover, it is the place where scientists working in the fields of ecology and evolution meet and discuss their most recent findings.

**Course Title**: GeoEnviron Seminar  
**Link**: http://campus.uni-tuebingen.de/20181e163061  
**Course type**: Forschungsseminar  
**Contact hours**: 2  
**Course coordinator**: Prof. Dr.-Ing. Olaf A. Cirpka  
**Additional information**  
http://www.geo.uni-tuebingen.de/aktuelles/forschungskolloquien-und-seminare.html

**Course Title**: Paleobiology Seminar  
**Link**: http://campus.uni-tuebingen.de/20181e162941  
**Course type**: Forschungsseminar  
**Contact hours**: 1  
**Course coordinator**: Prof. Dr. Hervé Bocherens

**Course Title**: Wissenschaftliches Präsentieren / Scientific Presentation  
**Link**: http://campus.uni-tuebingen.de/20181e162974  
**Course type**: Seminar  
**Contact hours**: 2  
**Course coordinator**: PD Dr. rer. nat. Dorothee Drucker-Bocherens

**Geosciences – Bachelor**

**Course Title**: Earth System Dynamics (ESD) Research Seminar  
**Link**: http://campus.uni-tuebingen.de/20181e162879  
**Course Title**: Paleobiology Seminar  
**Link**: http://campus.uni-tuebingen.de/20181e162941  
**Course type**: Forschungsseminar  
**Contact hours**: 1  
**Course coordinator**: Prof. Dr. Hervé Bocherens

**Course Title**: The Hilgendorf Lecture  
**Link**: http://campus.uni-tuebingen.de/20181e164423  
**Course type**: Colloquium  
**Contact hours**: 2  
**Course coordinator**: Dr. sc. nat. Ingmar Werneburg, o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Nils Anthes  
**Target audience**  
Die EvE Hilgendorf Lecture is open for all interested persons.  
**Course description**  
Internationally acclaimed external guests present their latest work in the field of Evolutionary Biology and Ecology.  
**Additional information**  
Geosciences – Master

Course Title: Applied Hydrogeology (Hydrogeological Field Course)
Link: http://campus.uni-tuebingen.de/20181e162854
Course type: Practical Field Course
Contact hours: 3
Course coordinator: Dr. rer. nat. Carsten Leven-Pfister

Course Title: Earth System Dynamics (ESD) Research Seminar
Link: http://campus.uni-tuebingen.de/20181e162879
Course type: Forschungsseminar
Contact hours: 2
Course coordinator: Dr. rer. nat. Reinhard Drews, Prof. Dr. phil. Todd Ehlers, Dr. rer. nat. Christoph Glotzbach, Dr. rer. nat. Sebastian Mutz

Course Title: Field Seminar in Applied Geosciences (Leipzig)
Link: http://campus.uni-tuebingen.de/20181e162905
Course type: Practical Field Course
Contact hours:
Course coordinator: Dr. rer. nat. Carsten Leven-Pfister, Dr. rer. nat. Holger Weiß

Course Title: GeoEnviron Seminar
Link: http://campus.uni-tuebingen.de/20181e163061
Course type: Forschungsseminar
Contact hours: 2
Course coordinator: Prof. Dr.-Ing. Olaf A. Cirpka
Additional information
http://www.geo.uni-tuebingen.de/aktuelles/forschungskolloquien-und-seminare.html

Course Title: Paleobiology Seminar
Link: http://campus.uni-tuebingen.de/20181e162941
Course type: Forschungsseminar
Contact hours: 1
Course coordinator: Prof. Dr. Hervé Bocherens

Course Title: The Hilgendorf Lecture
Link: http://campus.uni-tuebingen.de/20181e164423
Course type: Colloquium
Contact hours: 2
Course coordinator: Dr. sc. nat. Ingmar Werneburg, o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Nils Anthes
Target audience
Die EvE Hilgendorf Lecture is open for all interested persons.
Course description
Internationally acclaimed external guests present their latest work in the field of Evolutionary Biology and Ecology.
Additional information

Course Title: Wissenschaftliches Präsentieren / Scientific Presentation
Link: http://campus.uni-tuebingen.de/20181e162974
Course type: Seminar  
Contact hours: 2  
Course coordinator: PD Dr. rer. nat. Dorothee Drucker-Bocherens

Scientific Archaeology – Bachelor

Course Title: Excursion to important Magdalenian sites in Southwest Germany and Switzerland/"Exkursion zu bedeutenden Magdalénien-Fundstellen in Südwestdeutschland und der Schweiz  
Link: http://campus.uni-tuebingen.de/20181e169494  
Course type: Exkursion  
Contact hours: 2  
Course coordinator: M.A. Ilona Gold, M.Sc. Gillian Wong

Course Title: Experimental Archaeology - Working with Molly  
Link: http://campus.uni-tuebingen.de/20181e168490  
Course type: Seminar  
Contact hours: 2  
Course coordinator: M.A. Keiko Kitagawa, Dr. rer. nat. Susanne Münzel, Dr. phil. Britt Starkovich

Course Title: Geophysik (V)  
Link: http://campus.uni-tuebingen.de/20181e162916  
Course type: Lecture  
Contact hours: 4  
Course coordinator: Prof. Dr. rer. nat. Erwin Appel

Course Title: How cultures evolve  
Link: http://campus.uni-tuebingen.de/20181e169098  
Course type: Seminar  
Contact hours: 2  
Course coordinator: Dr. rer. nat. Claudio Tennie

Course description:  
The aim of this seminar is to delve deep into the evolution of culture ("from stone tools to space rockets"), with special focus on the role of copying / social transmission. In order to allow a detailed exploration of these topics, the seminar will be discussion-heavy, and will involve careful reading of papers/chapters on each subject matter. The reading will be drawing from different fields (mostly from archaeology, psychology and biology/ethology). There will be in-depth debates about the cognition of non-human great apes, such as chimpanzees (the main research focus of Dr. Tennie). In order to gain credits, participants will be required to prepare and present a "Referat" (a talk, based on the literature that is to be discussed). These student talks may be given either in English (which is encouraged) or in German (the language of the student talks will be each student’s choice). All interested students welcome. Please note that this seminar might be mostly in English, including at least some (if not all) of the Referate (talks) presented by the participating students. Early on in the seminar, there will be a lecture (in English) by Dr. Tennie about how to actually do a Referat/talk (and how to find relevant literature) to help you prepare for your own talk.

Course Title: Laboratory practices in Geoarchaeology and Micromorphology  
Link: http://campus.uni-tuebingen.de/20181e168552  
Course type: Internship
Contact hours: 2
Course coordinator: Prof. Dr. rer. nat. Christopher Miller, Dipl.-Ing. Panagiotis Kritikakis
Prerequisites
Voraussetzung an der Teilnahme ist eine gültige allgemeine Sicherheitsbelehrung. Z.B. am 24.04.2018 bei Dr. Peter Kühn (deutsch) oder jederzeit online im Ilias-System unter dem Titel: "Sicherheitsbelehrung Labor für Bodenkunde und Geoökologie". Required is the attendance to a general safety briefing, e.g. with Dr. Kühn (in German) on April 24 or online by using the Ilias-system with the title: “Sicherheitsbelehrung Labor für Bodenkunde und Geoökologie" (available in German and English).

Scientific Archaeology – Master

Course Title: Craniofacial Identification
Link: http://campus.uni-tuebingen.de/20181e169239
Course type: Lecture
Contact hours: 2

Course Title: Dietary Reconstruction of Fossil Hominins
Link: http://campus.uni-tuebingen.de/20181e168283
Course type: Seminar
Contact hours: 2
Course coordinator: Ph.D. Sireen El Zaatari

Course Title: Excursion to important Magdalenian sites in Southwest Germany and Switzerland
Link: http://campus.uni-tuebingen.de/20181e169494
Course type: Excursion
Contact hours:
Course coordinator: M.A. Ilona Gold, M.Sc. Gillian Wong

Course Title: How cultures evolve
Link: http://campus.uni-tuebingen.de/20181e169098
Course type: Seminar
Contact hours: 2
Course coordinator: Dr. rer. nat. Claudio Tennie
Course description
The aim of this seminar is to delve deep into the evolution of culture ("from stone tools to space rockets"), with special focus on the role of copying / social transmission. In order to allow a detailed exploration of these topics, the seminar will be discussion-heavy, and will involve careful reading of papers/chapters on each subject matter. The reading will be drawing from different fields (mostly from archaeology, psychology and biology/ethology). There will be in-depth debates about the cognition of non-human great apes, such as chimpanzees (the main research focus of Dr. Tennie). In order to gain credits, participants will be required to prepare and present a "Referat" (a talk, based on the literature that is to be discussed). These student talks may be given either in English (which is encouraged) or in German (the language of the student talks will be each student’s choice). All interested students welcome. Please note that this seminar might be mostly in English, including at least some (if not all) of the Referate (talks) presented by the
participating students. Early on in the seminar, there will be a lecture (in English) by Dr. Tennie about how to actually do a Referat/talk (and how to find relevant literature) to help you prepare for your own talk.

Course Title: Human Anatomy - Soft tissues.
Link: http://campus.uni-tuebingen.de/20181e168335
Course type: Seminar
Contact hours: 2
Course coordinator: Ph.D. Sireen El Zaatari

Course Title: Laboratory practices in Geoarchaeology and Micromorphology
Link: http://campus.uni-tuebingen.de/20181e168552
Course type: Internship
Contact hours: 2
Course coordinator: Prof. Dr. rer. nat. Christopher Miller, Dipl.-Ing. Panagiotis Kritikakis
Prerequisites
<p>Voraussetzung an der Teilnahme ist eine gültige allgemeine Sicherheitsbelehrung. Z.B. am 24.04.2018 bei Dr. Peter Kühn (deutsch) oder jederzeit online im Ilias-System unter dem Title: <a id="il_mhead_t_focus" class="ilAccAnchor" name="il_mhead_t_focus"></a><span style="font-size: 8pt;">"Z -Sicherheitsbelehrung Labor für Bodenkunde und Geoökologie"</span>. Required is the attendance to a general safety briefing, e.g. with Dr. Kühn (in German) on April 24. or online by using the Ilias-system with the title: “<span style="font-size: 8pt;">Z -Sicherheitsbelehrung Labor für Bodenkunde und Geoökologie” (available in German and English)</span>.

Course Title: Material Science and Archaeological Ceramics: Ancient Pottery and its Pigments
Link: http://campus.uni-tuebingen.de/20181e168249
Course type: Lecture/Exercises
Contact hours: 4
Course coordinator: Dr. Silvia Amicone

Course Title: Materials Science and Archaeological Ceramics: Manufacturing and Material Properties of Ancient and Modern Ceramics
Link: http://campus.uni-tuebingen.de/20181e169608
Course type: Lecture
Contact hours: 3
Course coordinator: Dr. Silvia Amicone, Akad. Rat/Rätin Dr. rer. nat. Christoph Berthold, Prof. Ph.D. Klaus Georg Nickel

Course Title: Methods of reconstructing physical activity based on human bone remains.
Link: http://campus.uni-tuebingen.de/20181e168333
Course type: Seminar
Contact hours: 1
Course coordinator: M.Sc. Alexandros Karakostis

Course Title: Microwear analysis
Link: http://campus.uni-tuebingen.de/20181e169582
Course type: Workshop
Contact hours:
Course coordinator: Ph.D. Sireen El Zaatari

Course Title: NWA-01-2 = NWA-06-2: INA Kolloquium
Course Title: INA Kolloquium
Course type: Colloquium
Contact hours: 2
Course coordinator: Prof. Dr. Hervé Bocherens, Prof. Dr. phil. Aikaterini Charvati, Prof. Ph.D. Nicholas John Conard, PD Dr. rer. nat. Dorothee Drucker-Bocherens, Prof. Dr. rer. nat. Christopher Miller, Dr. rer. nat. Simone Riehl, M.Sc. Flora Schilt, Dr. phil. Britt Starkovich
Course description
Das INA Kolloquium entspricht Modul ZNA-6b: Umweltarchäologie - Forschungskolloquium

Course Title: NWA-05c-2: Basics in Palynology
Link: http://campus.uni-tuebingen.de/20181e168580
Course type: Lecture/Excercises
Contact hours: 2
Course coordinator: Dr. Lionello Morandi

Course Title: NWA-05d-1: FTIR in Archaeology and Geosciences
Link: http://campus.uni-tuebingen.de/20181e168551
Course type: Seminar
Contact hours: 2
Course description
Course will likely take place at the end of May/beginning of June over the course of two weekends.

Course Title: NWA-05d-2: Case studies in archaeological micromorphology
Link: http://campus.uni-tuebingen.de/20181e168550
Course type: Exercises
Contact hours: 2
Course coordinator: Prof. Dr. rer. nat. Christopher Miller, M.Sc. Flora Schilt

Course Title: NWA-06-1: Environmental archaeology: a global perspective
Link: http://campus.uni-tuebingen.de/20181e168090
Course type: Seminar
Contact hours: 2
Course coordinator: Dr. rer. nat. Konstantin Pustovoytov

Course Title: Diet and subsistence in prehistoric context
Link: http://campus.uni-tuebingen.de/20181e168097
Course type: Lecture/Excercises
Contact hours: 3
Course coordinator: PD Dr. rer. nat. Dorothee Drucker-Bocherens, Dr. phil. Britt Starkovich
Course description
The course consists of a lecture and a seminar. The course elements can be visited separately.

Course Title: NWA-09b: Imaging and Morphometrics (V mit Ü)
Link: http://campus.uni-tuebingen.de/20181e168096
Course type: Exercises
Contact hours: 2
Course coordinator: M.Sc. Alexandros Karakostis, Dr. rer. nat. Hugo Reyes-Centeno

Course Title: Analysis of NGS data from ancient DNA.
Link: http://campus.uni-tuebingen.de/20181e170249
Course type: Exercises
Contact hours: 2
Course coordinator: M.Sc. Maria Spyrou

Course Title: NWA-10e-1 Organic Materials
Link: http://campus.uni-tuebingen.de/20181e168094
Course type: Lecture
Contact hours: 2
Course coordinator: Dr. rer. nat. Özgür Cizer, Jun.-Prof. Dr. phil. Cynthianne Debono Spiteri, Dr. Maxime Rageot

Course Title: NWA-10e-2 Organic Materials
Link: http://campus.uni-tuebingen.de/20181e168093
Course type: Exercises
Contact hours: 2
Course coordinator: Jun.-Prof. Dr. phil. Cynthianne Debono Spiteri

Course Title: Paleoecology of Terrestrial Ecosystems
Link: http://campus.uni-tuebingen.de/20181e162940
Course type: Lecture/Exercises
Contact hours: 6
Course coordinator: Prof. Dr. Hervé Bocherens, PD Dr. rer. nat. Dorothee Drucker-Bocherens, Dr. rer. nat. Christoph Wißing

Course Title: Terrestrische Ökosysteme - Grabungs- und Laborpraktikum (Isotopenpraktikum)
Link: http://campus.uni-tuebingen.de/20181e162965
Course type: Practical Course
Contact hours:
Course coordinator: Prof. Dr. Hervé Bocherens, PD Dr. rer. nat. Dorothee Drucker-Bocherens, Dr. rer. nat. Christoph Wißing

Palaeoanthropology – Bachelor

Course Title: Craniofacial Identification
Link: http://campus.uni-tuebingen.de/20181e169239
Course type: Lecture
Contact hours: 2

Course Title: How cultures evolve
Link: http://campus.uni-tuebingen.de/20181e169098
Course type: Seminar
Contact hours: 2
Course coordinator: Dr. rer. nat. Claudio Tennie
Course description
The aim of this seminar is to delve deep into the evolution of culture ("from stone tools to space rockets"), with special focus on the role of copying / social transmission. In order to allow a detailed exploration of these topics, the seminar will be discussion-heavy, and will involve careful reading of papers/chapters on each subject matter. The reading will be drawing from different fields (mostly from archaeology, psychology and biology/ethology). There will be in-depth debates about the cognition of non-human great apes, such as chimpanzees (the main research focus of
Dr. Tennie). In order to gain credits, participants will be required to prepare and present a "Referat" (a talk, based on the literature that is to be discussed). These student talks may be given either in English (which is encouraged) or in German (the language of the student talks will be each student's choice). All interested students welcome. Please note that this seminar might be mostly in English, including at least some (if not all) of the Referate (talks) presented by the participating students. Early on in the seminar, there will be a lecture (in English) by Dr. Tennie about how to actually do a Referat/talk (and how to find relevant literature) to help you prepare for your own talk.

**Course Title**: Methods of reconstructing physical activity based on human bone remains.  
**Link**: http://campus.uni-tuebingen.de/20181e168333  
**Course type**: Seminar  
**Contact hours**: 1  
**Course coordinator**: M.Sc. Alexandros Karakostis

**Course Title**: NWA-09b: Imaging and Morphometrics (V mit Ü)  
**Link**: http://campus.uni-tuebingen.de/20181e168096  
**Course type**: Exercises  
**Contact hours**: 2  
**Course coordinator**: M.Sc. Alexandros Karakostis, Dr. rer. nat. Hugo Reyes-Centeno

**Course Title**: PAL-04-2b: Osteologie II - Alters- und Geschlechtsbestimmung am menschlichen Skelett (Ü) - Gruppe B  
**Link**: http://campus.uni-tuebingen.de/20181e168108  
**Course type**: Exercises  
**Contact hours**: 2  
**Course coordinator**: Ph.D. Sireen El Zaatari

**Environmental Sciences – Bachelor (major)**

**Course Title**: The Hilgendorf Lecture  
**Link**: http://campus.uni-tuebingen.de/20181e164423  
**Course type**: Colloquium  
**Contact hours**: 2  
**Course coordinator**: Dr. sc. nat. Ingmar Werneburg, o. Prof. Dr. rer. nat. Nico K. Michiels, Dr. rer. nat. Nils Anthes  
**Target audience**: Die EvE Hilgendorf Lecture is open for all interested persons.  
**Course description**: Internationally acclaimed external guests present their latest work in the field of Evolutionary Biology and Ecology.  
**Additional information**: http://www.mnf.uni-tuebingen.de/fachbereiche/biologie/institute/evolutionecology/lehrbereiche/evolutionsoekologie-der-tiere/everest/events/hilgendorf-lecture.html

**Bioinformatics – Bachelor**

**Course Title**: Grundlagen der Bioinformatik (Course number: BIOINF2110)  
**Link**: http://campus.uni-tuebingen.de/20181e167842
Course type: Lecture/Excercises
Contact hours: 6
Course coordinator: o. Prof. Dr. math. Daniel Huson
Additional information
http://ab.inf.uni-tuebingen.de/teaching/sose2018/gbi

Course Title: Structure-based Drug Design  (Course number: BIOINF4371)
Link: http://campus.uni-tuebingen.de/20181e167851
Course type: Lecture/Excercises
Contact hours: 2
Course coordinator: Dr. rer. nat. Philipp Thiel
Target audience
3. Studienjahr (BSc), 1. Studienjahr (MSc) Geeignet auch für Bachelorstudierende. / This course is suitable for BSc students.

Course Title: Systems Biology I - Properties of Reconstructed Networks  (Course number: BIOINF3371)
Link: http://campus.uni-tuebingen.de/20181e167844
Course type: Lecture/Excercises
Contact hours:
Course coordinator: Dr. rer. nat. Andreas Dräger, Dr. rer. nat. Reihaneh Mostolizadeh
Prerequisites
The prerequisite is some knowledge of linear algebra and biochemistry. Through the links between mathematical ideas and biological processes are made clear, the lecture reflects the irreversible trend of increasing mathematical content in biology education. Grundlegende Kenntnisse linearer Algebra und der Biochemie.

Course description
Genome sequences are now available that enable us to determine the biological components that make up a cell or an organism. Systems biology examines how these components interact and form networks and how the networks generate whole cell functions corresponding to observable phenotypes. This lecture is an introduction to basic concepts of systems biology devoted to undergraduate students. It describes how to model networks, how to determine their properties, and how to relate these to phenotypic functions.

Bioinformatik – Master

Course Title: Advanced Transcriptomics  (Course number: BIOINF4331)
Link: http://campus.uni-tuebingen.de/20181e168892
Course type: Lecture/Excercises
Contact hours:
Course coordinator: apl. Prof. Dr. math. Katja Nieselt

Course Title: Algorithms of Bioinformatics  (Course number: BIOINF4362)
Link: http://campus.uni-tuebingen.de/20181e167854
Course type: Seminar
Contact hours: 2
Course coordinator: Mitarbeiter, apl. Prof. Dr. math. Katja Nieselt
Course description
Topic of the seminar is “The future of next-generation sequencing”. Recommended only for students who have at least visited the lecture “Bioinformatics 1” / “Sequence Bioinformatics”. If you are interested in enrolling, please first send an email to Prof. Nieselt (We will soon invite to an
ILIAS repository which will list possible topics (and accompanying papers). Registered students then can choose or rank their favorite topic.

**Course Title:** Bioinformatics Tools  (Course number: BIOINF4240)  
**Link:** [http://campus.uni-tuebingen.de/20181e170150](http://campus.uni-tuebingen.de/20181e170150)  
**Course type:** Internship  
**Contact hours:**  
**Course coordinator:** o. Prof. Dr. math. Daniel Huson, Mitarbeiter  
**Additional information**  
[http://ab.inf.uni-tuebingen.de/teaching/sose2018/tools](http://ab.inf.uni-tuebingen.de/teaching/sose2018/tools)

**Course Title:** Biorobotics - Lecture  
**Link:** [http://campus.uni-tuebingen.de/20181e170050](http://campus.uni-tuebingen.de/20181e170050)  
**Course type:** Lecture  
**Contact hours:**  
**Course description**  
In this lecture, we will discuss technical tools to investigate and support biological motor control. This lecture is organised in collaboration with Syn Schmitt, Biomechanics and Biorobotics, University of Stuttgart. We will have at least three joint dates where we will meet with Students from Stuttgart and discuss the topics.  
* Lecture * Title: Biorobotics Main topics: 1) Concepts of classical robotics (rigid bodies, PID controller ...) 2) Soft robotics (series elastic actuation, artificial muscles, soft material systems ...) 3) Rehabilitation robotics (prosthetics, exoskeletons, brain computer interfaces ...)

**Course Title:** Biorobotics - Seminar  
**Link:** [http://campus.uni-tuebingen.de/20181e170052](http://campus.uni-tuebingen.de/20181e170052)  
**Course type:** Seminar  
**Contact hours:**  
**Course description**  
Title: Motion in Man and Machine Block Seminar in May + Seminar project and presentation Exact Dates to be announced in February

**Course Title:** Computational Photography  (Course number: INFO4176)  
**Link:** [http://campus.uni-tuebingen.de/20181e167889](http://campus.uni-tuebingen.de/20181e167889)  
**Course type:** Lecture/Excercises  
**Contact hours:** 4  
**Course coordinator:** o. Prof. Dr.-Ing. Hendrik Lensch, M.Sc. Jieen Chen

**Course Title:** Current Advances in Deep and Recurrent Neural Networks  
**Link:** [http://campus.uni-tuebingen.de/20181e169561](http://campus.uni-tuebingen.de/20181e169561)  
**Course type:** Seminar  
**Contact hours:**  
**Course coordinator:** M.Sc. Sebastian Otte  
**Course description**  
This lecture focusses on current advancements in deep and recurrent ANNs. Each participant will need to prepare a presentation on one of the covered papers, write a summary on the talk and paper, and review several of the other summaries.

**Course Title:** Datenmanagement für die Quantitative Biologie  (Course number: BIOINF4399C)  
**Link:** [http://campus.uni-tuebingen.de/20181e167846](http://campus.uni-tuebingen.de/20181e167846)
Course type: Lecture/Excercises
Contact hours:
Course coordinator: Mitarbeiter, Dr. rer. nat. Sven Nahnsen

Course Title: Discrete Optimization for Image Analysis  
Link: http://campus.uni-tuebingen.de/20181e169547
Course type: Lecture  
Contact hours: 2  

Course description
This lecture introduces fundamental tasks in the field of image analysis through their mathematical abstraction in the form of discrete optimization problems. The tasks include image classification, image and video segmentation, multiple object recognition and multiple object tracking. The problems include the unconstrained binary quadratic program, graph decomposition and node labeling problems. The course establishes the computational complexity of these problems by reduction techniques. It introduces algorithms for computing feasible solutions, partial solutions and bounds. An emphasis is on efficient algorithms that are practical for image analysis, including local search, bounded reverse search and network flow. The last part of the course introduces the simplex algorithm and branch-and-bound search.

Course Title: Flying Robots  (Course number: INF4364)  
Link: http://campus.uni-tuebingen.de/20181e167877
Course type: Internship  
Contact hours: 4  

Course Title: Machine Learning: Algorithms and Theory  (Course number: INFO4491)  
Link: http://campus.uni-tuebingen.de/20181e167914
Course type: Lecture/Excercises  
Contact hours:
Course coordinator: Prof. Dr. rer. nat. Ulrike Luxburg

Course description
In many applications and domains, massive amounts of data are collected and processed every day. To be able to make efficient use of such data, there is an urgent need for tools to extract important pieces of information from the flood of unimportant details. Machine learning is a relatively young discipline that tries to deal with this problem, by designing algorithms to analyze large amounts of complex data in a principled way. Machine learning is the core technique in many applications such as spam filtering, object recognition, analyzing user preferences, recommender systems, and so on. Scientific disciplines such as biology, neuroscience, physics, or medicine discover the potential of machine learning methods for analyzing their empirical data. And, last but not least, many large companies like google, Amazon, facebook heavily rely on machine learning techniques. The field of machine learning combines ingredients from several fields: we need to design efficient algorithms to process the amount of data, and we need to ensure that predictions made by machine learning algorithms are statistically sound. The focus of the lecture is on algorithmic and theoretical aspects of machine learning. We will cover many of the standard algorithms, learn about the general principles for building good machine learning algorithms, and analyze their theoretical properties. - Supervised learning problems:  Linear methods; regularization;  SVMS; kernel methods - Unsupervised learning problems:  Dimension reduction (kernel PCA, multi-dimensional scaling, manifold methods); spectral clustering and spectral graph theory - How to model machine learning problems:  Bayesian decision theory, loss functions, feature selection, evaluation and comparison of algorithms. Common pitfalls - Online algorithms - Learning theory (no free lunch theorem; generalization bounds;  VC dimension; universal consistency; Theorem of Stone) - Low rank
matrix methods (collaborative filtering, low rank matrix completion, compressed sensing) The
following topics are NOT going to be covered: decision trees, neural networks / deep networks,
graphical models, Bayesian approaches to machine learning, reinforcement learning.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Machine Learning and Artificial Neural Networks in Biomedical Applications
(Course number: INFO4192)
Link: http://campus.uni-tuebingen.de/20181e167895
Course type: Seminar
Contact hours:
Course coordinator: Dr. rer. nat. Martin Spüler
Course description
The Seminar “Machine Learning and Artificial Neural Networks in Biomedical Applications” covers
current topics of signal processing on neural signals (e.g. fMRI, EEG or MEG) for their use in
biomedical applications (e.g. neuroprosthetics or brain-computer interfaces, BCIs) and related
topics; as well as methods and algorithms applied in those fields.

Course Title: Machine Learning II  (Course number: NIP02B)
Link: http://campus.uni-tuebingen.de/20181e168042
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: Ph.D. Tjeerd Dijkstra, Prof. Dr.-Ing. Martin Giese
Prerequisites
Machine learning I
Course description
After the course, the participants will have a solid understanding of probability logic, Bayesian
networks, inference and learning in Bayesian networks and Markov random fields with exact,
(variational) EM and sampling methods. Moreover, the course covers modern stochastic process
approaches in Machine learning, such as the Gaussian process and dynamical extensions.
Additional information
http://www.neuroschool-tuebingen.de/courses/summer-term/master-neural-inf-process/?tx_neuro
science_pi1[course]=11&tx_neuroscience_pi1[action]=show&tx_neuroscience_pi1[controller]=Course&cHash=d034a785b55f3873c9b9533f32b3c764

Course Title: Machine Learning in Graphics and Vision
Link: http://campus.uni-tuebingen.de/20181e168446
Course type: Lecture/Excercises
Contact hours:
Course coordinator: Prof. Dr.-Ing. Andreas Geiger, o. Prof. Dr.-Ing. Hendrik Lensch, M.Sc. Arijit
Mallick, M.Sc. Patrick Wieschollek

Course Title: Machine Learning Theory: Statistical Inference on Networks  (Course number:
INFO4493)
Link: http://campus.uni-tuebingen.de/20181e168523
Course type: Seminar
Contact hours:
Course coordinator: Ph.D. Debarghya Ghoshdastidar

Course description
Modelling and learning from networks is an important research topic in many scientific disciplines. Statistical analysis of social networks reveals the reasons for making new connections, or how information spreads among people. On the other hand, study of brain and genetic networks helps in understanding different biological processes. In this seminar, we learn different applications, algorithms and theory related to networks. In particular, we look at how machine learning can be used to solve various network analysis problems. Prior knowledge of machine learning is not needed. The course will be held as a block seminar.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Massively Parallel Computing (Course number: INFO4173)
Link: http://campus.uni-tuebingen.de/20181e167890
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: o. Prof. Dr.-Ing. Hendrik Lensch, Dipl.-Inf. Benjamin Resch, M.Sc. Patrick Wieschollek

Course description
Blockveranstaltung vor Vorlesungsbeginn Vorlesung mit Übungen

Course Title: Medical Data Science  (Course number: MEDZ4991)
Link: http://campus.uni-tuebingen.de/20181e167916
Course type: Lecture
Contact hours:
Course coordinator: Prof. Dr. rer. nat. Nico Pfeifer

Course Title: Microbiome Analysis  (Course number: BIOINF4322)
Link: http://campus.uni-tuebingen.de/20181e167835
Course type: Seminar
Contact hours:
Course coordinator: o. Prof. Dr. math. Daniel Huson
Additional information
http://ab.inf.uni-tuebingen.de/teaching/sose2018/seminar

Course Title: Philosophy of Mathematics
Link: http://campus.uni-tuebingen.de/20181e169990
Course type: Lecture
Contact hours:
Course coordinator: o. Prof. Dr. phil. Peter Schroeder-Heister

Course description
This course is announced both for the winter semester 2017-18 and the summer semester 2018. It is assigned to winter or summer semester depending on whether it is attended by a student of computer science or of philosophy. This compact course is announced under my name (Schroeder-Heister) in order to have an entry in the course list. I stay responsible for it and will issue the certificates. The course will actually be given by a visiting professor (Prof. Adzic, Belgrade). It is a sequel to the course “Advanced Mathematical Logic” (March 5-16, 2018). It is a 3 ECTS points course, which addresses both computer scientists and philosophers. Computer scientists can only attend it as an extension of “Advanced mathematical logic”, giving them 3 additional ECTS points, resulting in 9 ECTS points in total. Correspondingly, for computer
scientists it is a course in the winter semester 2017-18. Philosophers can attend it independently as a Vorlesung, giving them 3 ECTS points. For philosophers, it is a course in the summer semester 2018. Its intended audience are students with a solid knowledge in Mathematical Logic, for example from the introductory course on Mathematical Logic in the winter semester 2017-28. To avoid misunderstandings If you just want to come and listen, please do so! The above regulations are only for students who want to acquire credit points and need a certificate.

**Course Title:** Practical Transcriptomics  (Course number: BIOINF4210)
**Link:** http://campus.uni-tuebingen.de/20181e168893
**Course type:** Internship
**Contact hours:**
**Course coordinator:** Mitarbeiter, apl. Prof. Dr. math. Katja Nieselt
**Course description**
Students who would like to register for the practical course, are asked to send an email to Prof. Nieselt (kay.nieselt@uni-tuebingen.de). Though we will use the “first come, first serve” rule, we also will consider students who also enroll into the class “Advanced Transcriptomics” with higher priority.

**Course Title:** Probabilistic Methods for Assessing Information Quality
**Link:** http://campus.uni-tuebingen.de/20181e171941
**Course type:** Seminar
**Contact hours:**
**Course description**
Assessing the correctness of claims coming from different sources is of tremendous importance for many information integration and reconciliation tasks. Such tasks encompass the aggregation and sharing of news, social editing, the description of e-Commerce products, the consolidation of database entries (e.g., after the merger of companies), etc. In the absence of a ground truth, one of the main challenges is the reconciliation of contradicting claims from sources that may deliver noisy, outdated, erroneous, or incomplete information. For example, for the same flight, different flight booking web sites may report different arrival times. The task of estimating the correctness of claims by aggregating the information from the available sources is commonly referred to as latent truth discovery (LTD). This seminar focuses on state-of-the-art approaches to the LTD problem, which go well beyond majority voting schemes, and instead jointly infer source reliabilities and the correctness of claims through probabilistic inference schemes.

**Course Title:** Sensory Psychology (Lecture Psychophysical Methods and Seminar Colour Vision and Material Perception)
**Link:** http://campus.uni-tuebingen.de/20181e167960
**Course type:** Lecture
**Contact hours:** 4
**Course coordinator:** Ph.D. Tom Wallis
**Additional information**
http://www.nip.uni-tuebingen.de/teaching/lectures-seminars

**Course Title:** Structure and Systems Bioinformatics  (Course number: BIOINF4120)
**Link:** http://campus.uni-tuebingen.de/20181e167838
**Course type:** Lecture/Excercises
**Contact hours:**
**Course coordinator:** Mitarbeiter, o. Prof. Dr.-Ing. Oliver Kohlbacher
**Target audience**
1. Studienjahr Nicht geeignet für Bachelorstudierende. / This course is not suitable for BSc
students.

Course Title: Structure-based Drug Design  (Course number: BIOINF4371)
Link: http://campus.uni-tuebingen.de/20181e167851
Course type: Lecture/Excercises
Contact hours: 2
Course coordinator: Dr. rer. nat. Philipp Thiel
Target audience: 3. Studienjahr (BSc), 1. Studienjahr (MSc) Geeignet auch für Bachelorstudierende. / This course is suitable for BSc students.

Course Title: Theoretical Foundations of Logic Programming  (Course number: INF4468)
Link: http://campus.uni-tuebingen.de/20181e168568
Course type: Lecture/Excercises
Course coordinator: Dr. rer. nat. Thomas Piecha

Computer Science – Bachelor

Course Title: Systems Biology I - Properties of Reconstructed Networks  (Course number: BIOINF3371)
Link: http://campus.uni-tuebingen.de/20181e167844
Course type: Lecture/Excercises
Course coordinator: Dr. rer. nat. Andreas Dräger, Dr. rer. nat. Reihaneh Mostolizadeh
Prerequisites: Grundlegende Kenntnisse linearer Algebra und der Biochemie.
Course description: Genome sequences are now available that enable us to determine the biological components that make up a cell or an organism. Systems biology examines how these components interact and form networks and how the networks generate whole cell functionscorresponding to observable phenotypes. This lecture is an introduction to basic concepts of systems biology devoted to undergraduate students. It describes how to model networks, how to determine their properties, and how to relate these to phenotypic functions. Genomische Sequenzen sind nun für zahlreiche Organismen verfügbar. Ausgehend von diesen Bauplänen des Lebens sind wir nun in der Lage, alle Komponenten biologischer Systeme in ihrer Gesamtheit zu erfassen, deren Wechselwirkungen zu beschreiben und in Netzwerke abzubilden, um das Wirkungsgefüge aller zellulären Prozesse beschreiben zu können. Diese Netzwerke bilden die Grundlage für Computermodelle, deren Simulation Vorhersagen über beobachtbare Phänomene ermöglicht. Diese Vorlesung bietet eine Einführung in die grundlegenden Konzepte der Systembiologie und richtet sich gleichermaßen an Bachelorstudenten der Mathematik, Informatik, Bioinformatik und Biologie. Es wird beschrieben, wie biologische Netzwerke aufgebaut und modelliert werden können. Es wird behandelt, wie die charakteristischen Eigenschaften dieser Modelle bestimmt und daraus wesentliche Aussagen zum Systemverhalten bis hin zum Phänotyp abgeleitet werden können. Durch die Anwendung mathematischer Konzepte auf biologische Fragestellungbereitet diese Veranstaltung auf den unumkehrbaren Trend eines stetig steigenden Anteils mathematischer und rechnergestützter Inhalte in der biologischen Ausbildung vor.
Computer Science – Master

Course Title: Advanced Transcriptomics  (Course number: BIOINF4331)
Link: http://campus.uni-tuebingen.de/20181e168892
Course type: Lecture/Excercises
Contact hours:
Course coordinator: apl. Prof. Dr. math. Katja Nieselt

Course Title: Biorobotics - Lecture
Link: http://campus.uni-tuebingen.de/20181e170050
Course type: Lecture
Contact hours:

Course description
In this lecture, we will discuss technical tools to investigate und support biological motor control. This lecture is organised in collaboration with Syn Schmitt, Biomechanics and Biorobotics, University of Stuttgart. We will have at least three joint dates where we will meet with Students from Stuttgart and discuss the topics.

* Lecture * Title: Biorobotics Main topics:
1. Concepts of classical robotics (rigid bodies, PID controller ...)
2. Soft robotics (series elastic actuation, artificial muscles, soft material systems ...)
3. Rehabilitation robotics (prosthetics, exoskeletons, brain computer interfaces ...)

Course Title: Biorobotics - Seminar
Link: http://campus.uni-tuebingen.de/20181e170052
Course type: Seminar
Contact hours:

Course description
Title: Motion in Man and Machine Block Seminar in May + Seminar project and presentation Exact Dates to be announced in February

Course Title: Computational Photography  (Course number: INFO4176)
Link: http://campus.uni-tuebingen.de/20181e167889
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: o. Prof. Dr.-Ing. Hendrik Lensch, M.Sc. Jieen Chen

Course Title: Current Advances in Deep and Recurrent Neural Networks
Link: http://campus.uni-tuebingen.de/20181e169561
Course type: Seminar
Contact hours:
Course coordinator: M.Sc. Sebastian Otte
Course description
This lecture focusses on current advancements in deep and recurrent ANNs. Each participant will need to prepare a presentation on one of the covered papers, write a summary on the talk and paper, and review several of the other summaries.

Course Title: Discrete Optimization for Image Analysis
Link: http://campus.uni-tuebingen.de/20181e169547
Course type: Lecture
Contact hours: 2
Course description
This lecture introduces fundamental tasks in the field of image analysis through their mathematical abstraction in the form of discrete optimization problems. The tasks include image classification, image and video segmentation, multiple object recognition and multiple object tracking. The problems include the unconstrained binary quadratic program, graph decomposition and node labeling problems. The course establishes the computational complexity of these problems by reduction techniques. It introduces algorithms for computing feasible solutions, partial solutions and bounds. An emphasis is on efficient algorithms that are practical for image analysis, including local search, bounded reverse search and network flow. The last part of the course introduces the simplex algorithm and branch-and-bound search.

Course Title: Flying Robots  (Course number: INF4364)
Link: http://campus.uni-tuebingen.de/20181e167877
Course type: Internship
Contact hours: 4

Course Title: Fortgeschrittene Themen aus Computer Graphik und Computer Vision  (Course number: INF4168)
Link: http://campus.uni-tuebingen.de/20181e167866
Course type: Seminar
Contact hours:
Course coordinator: o. Prof. Dr.-Ing. Hendrik Lensch, M.Sc. Sebastian Herholz

Course Title: Machine Learning: Algorithms and Theory  (Course number: INFO4491)
Link: http://campus.uni-tuebingen.de/20181e167914
Course type: Lecture/Excercises
Contact hours:
Course coordinator: Prof. Dr. rer. nat. Ulrike Luxburg

Course description
In many applications and domains, massive amounts of data are collected and processed every day. To be able to make efficient use of such data, there is an urgent need for tools to extract important pieces of information from the flood of unimportant details. Machine learning is a relatively young discipline that tries to deal with this problem, by designing algorithms to analyze large amounts of complex data in a principled way. Machine learning is the core technique in many applications such as spam filtering, object recognition, analyzing user preferences, recommender systems, and so on. Scientific disciplines such as biology, neuroscience, physics, or medicine discover the potential of machine learning methods for analyzing their empirical data. And, last but not least, many large companies like google, Amazon, facebook heavily rely on machine learning techniques. The field of machine learning combines ingredients from several fields: we need to design efficient algorithms to process the amount of data, and we need to ensure that predictions made by machine learning algorithms are statistically sound. The focus of the lecture is on algorithmic and theoretical aspects of machine learning. We will cover many of the standard algorithms, learn about the general principles for building good machine learning algorithms, and analyze their theoretical properties. - Supervised learning problems: Linear methods; regularization; SVMS; kernel methods - Unsupervised learning problems: Dimension reduction (kernel PCA, multi-dimensional scaling, manifold methods); spectral clustering and spectral graph theory - How to model machine learning problems: Bayesian decision theory, loss functions, feature selection, evaluation and comparison of algorithms. Common pitfalls - Online algorithms - Learning theory (no free lunch theorem; generalization bounds; VC dimension; universal consistency; Theorem of Stone) - Low rank matrix methods (collaborative filtering, low rank matrix completion, compressed sensing) The following topics are NOT going to be covered: decision trees, neural networks / deep networks,
graphical models, Bayesian approaches to machine learning, reinforcement learning.

**Additional information**
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

**Course Title**: Machine Learning and Artificial Neural Networks in Biomedical Applications  
(Course number: INFO4192)  
**Link**: http://campus.uni-tuebingen.de/20181e167895  
**Course type**: Seminar  
**Contact hours**:  
**Course coordinator**: Dr. rer. nat. Martin Spüler  

**Course description**
The Seminar “Machine Learning and Artificial Neural Networks in Biomedical Applications” covers current topics of signal processing on neural signals (e.g. fMRI, EEG or MEG) for their use in biomedical applications (e.g. neuroprosthetics or brain-computer interfaces, BCIs) and related topics; as well as methods and algorithms applied in those fields.

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**Course Title**: Machine Learning II  
(Course number: NIP02B)  
**Link**: http://campus.uni-tuebingen.de/20181e168042  
**Course type**: Lecture/Excercises  
**Contact hours**: 4  
**Course coordinator**: Ph.D. Tjeerd Dijkstra, Prof. Dr.-Ing. Martin Giese  
**Prerequisites**  
Machine learning I  

**Course description**
After the course, the participants will have a solid understanding of probability logic, Bayesian networks, inference and learning in Bayesian networks and Markov random fields with exact, (variational) EM and sampling methods. Moreover, the course covers modern stochastic process approaches in Machine learning, such as the Gaussian process and dynamical extensions.

**Additional information**

**Course Title**: Machine Learning in Graphics and Vision  
**Link**: http://campus.uni-tuebingen.de/20181e168446  
**Course type**: Lecture/Excercises  
**Contact hours**:  
**Course coordinator**: Prof. Dr.-Ing. Andreas Geiger, o. Prof. Dr.-Ing. Hendrik Lensch, M.Sc. Arijit Mallick, M.Sc. Patrick Wieschollek  

**Course Title**: Machine Learning Theory: Statistical Inference on Networks  
(Course number: INFO4493)  
**Link**: http://campus.uni-tuebingen.de/20181e168523  
**Course type**: Seminar  
**Contact hours**:  
**Course coordinator**: Ph.D. Debarghya Ghoshdastidar
Course description
Modelling and learning from networks is an important research topic in many scientific disciplines. Statistical analysis of social networks reveals the reasons for making new connections, or how information spreads among people. On the other hand, study of brain and genetic networks helps in understanding different biological processes. In this seminar, we learn different applications, algorithms and theory related to networks. In particular, we look at how machine learning can be used to solve various network analysis problems. Prior knowledge of machine learning is not needed. The course will be held as a block seminar.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Massively Parallel Computing  (Course number: INFO4173)
Link: http://campus.uni-tuebingen.de/20181e167890
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: o. Prof. Dr.-Ing. Hendrik Lensch, Dipl.-Inf. Benjamin Resch, M.Sc. Patrick Wieschollek

Course description
Blockveranstaltung vor Vorlesungsbeginn Vorlesung mit Übungen

Course Title: Philosophy of Mathematics
Link: http://campus.uni-tuebingen.de/20181e169990
Course type: Lecture
Contact hours:
Course coordinator: o. Prof. Dr. phil. Peter Schroeder-Heister

Course description
This course is announced both for the winter semester 2017-18 and the summer semester 2018. It is assigned to winter or summer semester depending on whether it is attended by a student of computer science or of philosophy. This compact course is announced under my name (Schroeder-Heister) in order to have an entry in the course list. I stay responsible for it and will issue the certificates. The course will actually be given by a visiting professor (Prof. Adzic, Belgrade). It is a sequel to the course “Advanced Mathematical Logic” (March 5-16, 2018). It is a 3 ECTS points course, which addresses both computer scientists and philosophers. Computer scientists can only attend it as an extension of “Advanced mathematical logic”, giving them 3 additional ECTS points, resulting in 9 ECTS points in total. Correspondingly, for computer scientists it is a course in the winter semester 2017-18. Philosophers can attend it independently as a Vorlesung, giving them 3 ECTS points. For philosophers, it is a course in the summer semester 2018. Its intended audience are students with a solid knowledge in Mathematical Logic, for example from the introductory course on Mathematical Logic in the winter semester 2017-28. To avoid misunderstandings If you just want to come and listen, please do so! The above regulations are only for students who want to acquire credit points and need a certificate.

Course Title: Probabilistic Methods for Assessing Information Quality
Link: http://campus.uni-tuebingen.de/20181e171941
Course type: Seminar
Contact hours:

Course description
Assessing the correctness of claims coming from different sources is of tremendous importance for many information integration and reconciliation tasks. Such tasks encompass the aggregation and sharing of news, social editing, the description of e-Commerce products, the consolidation of database entries (e.g., after the merger of companies), etc. In the absence of a ground truth, one of the main challenges is the reconciliation of contradicting claims from sources that may deliver
noisy, outdated, erroneous, or incomplete information. For example, for the same flight, different flight booking web sites may report different arrival times. The task of estimating the correctness of claims by aggregating the information from the available sources is commonly referred to as latent truth discovery (LTD). This seminar focuses on state-of-the-art approaches to the LTD problem, which go well beyond majority voting schemes, and instead jointly infer source reliabilities and the correctness of claims through probabilistic inference schemes.

**Course Title**: Sensory Psychology (Lecture Psychophysical Methods and Seminar Colour Vision and Material Perception)
**Link**: http://campus.uni-tuebingen.de/20181e167960
**Course type**: Lecture
**Contact hours**: 4
**Course coordinator**: Ph.D. Tom Wallis
**Additional information**
http://www.nip.uni-tuebingen.de/teaching/lectures-seminars

**Course Title**: Structure and Systems Bioinformatics  (Course number: BIOINF4120)
**Link**: http://campus.uni-tuebingen.de/20181e167838
**Course type**: Lecture/Excercises
**Contact hours**: 2
**Course coordinator**: Mitarbeiter, o. Prof. Dr.-Ing. Oliver Kohlbacher
**Target audience**
This course is not suitable for BSc students.

**Course Title**: Structure-based Drug Design  (Course number: BIOINF4371)
**Link**: http://campus.uni-tuebingen.de/20181e167851
**Course type**: Lecture/Excercises
**Contact hours**: 2
**Course coordinator**: Dr. rer. nat. Philipp Thiel
**Target audience**
3. Studienjahr (BSc), 1. Studienjahr (MSc) Geeignet auch für Bachelorstudierende. / This course is suitable for BSc students.

**Course Title**: Theoretical Foundations of Logic Programming  (Course number: INF4468)
**Link**: http://campus.uni-tuebingen.de/20181e168568
**Course type**: Lecture/Excercises
**Contact hours**: 2
**Course coordinator**: Dr. rer. nat. Thomas Piecha

**Information and Media Technologies – Bachelor**

**Course Title**: Systems Biology I - Properties of Reconstructed Networks  (Course number: BIOINF3371)
**Link**: http://campus.uni-tuebingen.de/20181e167844
**Course type**: Lecture/Excercises
**Contact hours**: 4
**Course coordinator**: Dr. rer. nat. Andreas Dräger, Dr. rer. nat. Reihaneh Mostolizadeh
**Prerequisites**
The prerequisite is some knowledge of linear algebra and biochemistry. Through the links between mathematical ideas and biological processes are made clear, the lecture reflects the irreversible trend of increasing mathematical content in biology education. Grundlegende
Kenntnisse linearer Algebra und der Biochemie.

Course description
Genome sequences are now available that enable us to determine the biological components that make up a cell or an organism. Systems biology examines how these components interact and form networks and how the networks generate whole cell functions corresponding to observable phenotypes. This lecture is an introduction to basic concepts of systems biology devoted to undergraduate students. It describes how to model networks, how to determine their properties, and how to relate these to phenotypic functions. Genomische Sequenzen sind nun für zahlreiche Organismen verfügbar. Ausgehend von diesen Bauplänen des Lebens sind wir nun in der Lage, alle Komponenten biologischer Systeme in ihrer Gesamtheit zu erfassen, deren Wechselwirkungen zu beschreiben und in Netzwerke abzubilden, um das Wirkungsgefüge aller zellulären Prozesse beschreiben zu können. Diese Netzwerke bilden die Grundlage für Computermodelle, deren Simulation Vorhersagen über beobachtbare Phänomene ermöglicht. Diese Vorlesung bietet eine Einführung in die grundlegenden Konzepte der Systembiologie und richtet sich gleichermaßen an Bachelorstudenten der Mathematik, Informatik, Bioinformatik und Biologie. Es wird beschrieben, wie biologische Netzwerke aufgebaut und modelliert werden können. Es wird behandelt, wie die charakteristischen Eigenschaften dieser Modelle bestimmt und daraus wesentliche Aussagen zum Systemverhalten bis hin zum Phänotyp abgeleitet werden können. Durch die Anwendung mathematischer Konzepte auf biologische Fragestellungbereitet diese Veranstaltung auf den unumkehrbaren Trend eines stetig steigenden Anteils mathematischer und rechnergestützter Inhalte in der biologischen Ausbildung vor.

Information and Media Technologies – Master

Course Title: Advanced Transcriptomics  (Course number: BIOINF4331)
Link: http://campus.uni-tuebingen.de/20181e168892
Course type: Lecture/Excercises
Contact hours:
Course coordinator: apl. Prof. Dr. math. Katja Nieselt

Course Title: Biorobotics - Lecture
Link: http://campus.uni-tuebingen.de/20181e170050
Course type: Lecture
Contact hours:

Course description
In this lecture, we will discuss technical tools to investigate und support biological motor control. This lecture is organised in collaboration with Syn Schmitt, Biomechanics and Biorobotics, University of Stuttgart. We will have at least three joint dates where we will meet with Students from Stuttgart and discuss the topics. * Lecture * Title: Biorobotics Main topics: 1) Concepts of classical robotics (rigid bodies, PID controller ...) 2) Soft robotics (series elastic actuation, artificial muscles, soft material systems ...) 3) Rehabilitation robotics (prosthetics, exoskeletons, brain computer interfaces ...)

Course Title: Biorobotics - Seminar
Link: http://campus.uni-tuebingen.de/20181e170052
Course type: Seminar
Contact hours:

Course description
Title: Motion in Man and Machine Block Seminar in May + Seminar project and presentation Exact
Dates to be announced in February

**Course Title:** Computational Photography  (Course number: INFO4176)  
**Link:** http://campus.uni-tuebingen.de/20181e167889  
**Course type:** Lecture/Excercises  
**Contact hours:** 4  
**Course coordinator:** o. Prof. Dr.-Ing. Hendrik Lensch, M.Sc. Jieen Chen

**Course Title:** Current Advances in Deep and Recurrent Neural Networks  
**Link:** http://campus.uni-tuebingen.de/20181e169561  
**Course type:** Seminar  
**Contact hours:**  
**Course coordinator:** M.Sc. Sebastian Otte  
**Course description**  
This lecture focusses on current advancements in deep and recurrent ANNs. Each participant will need to prepare a presentation on one of the covered papers, write a summary on the talk and paper, and review several of the other summaries.

**Course Title:** Discrete Optimization for Image Analysis  
**Link:** http://campus.uni-tuebingen.de/20181e169547  
**Course type:** Lecture  
**Contact hours:** 2  
**Course coordinator:** Ph.D. Sujit Rajappa, M.Sc. Ma Wang, M.Sc. Chenhao Yang  
**Course description**  
This lecture introduces fundamental tasks in the field of image analysis through their mathematical abstraction in the form of discrete optimization problems. The tasks include image classification, image and video segmentation, multiple object recognition and multiple object tracking. The problems include the unconstrained binary quadratic program, graph decomposition and node labeling problems. The course establishes the computational complexity of these problems by reduction techniques. It introduces algorithms for computing feasible solutions, partial solutions and bounds. An emphasis is on efficient algorithms that are practical for image analysis, including local search, bounded reverse search and network flow. The last part of the course introduces the simplex algorithm and branch-and-bound search.

**Course Title:** Flying Robots  (Course number: INF4364)  
**Link:** http://campus.uni-tuebingen.de/20181e167877  
**Course type:** Internship  
**Contact hours:** 4  
**Course coordinator:** Ph.D. Sujit Rajappa, M.Sc. Ma Wang, M.Sc. Chenhao Yang

**Course Title:** Machine Learning: Algorithms and Theory  (Course number: INFO4491)  
**Link:** http://campus.uni-tuebingen.de/20181e167914  
**Course type:** Lecture/Excercises  
**Contact hours:**  
**Course coordinator:** Prof. Dr. rer. nat. Ulrike Luxburg  
**Course description**  
In many applications and domains, massive amounts of data are collected and processed every day. To be able to make efficient use of such data, there is an urgent need for tools to extract important pieces of information from the flood of unimportant details. Machine learning is a relatively young discipline that tries to deal with this problem, by designing algorithms to analyze large amounts of complex data in a principled way. Machine learning is the core technique in many applications such as spam filtering, object recognition, analyzing user preferences,
recommender systems, and so on. Scientific disciplines such as biology, neuroscience, physics, or medicine discover the potential of machine learning methods for analyzing their empirical data. And, last but not least, many large companies like google, Amazon, facebook heavily rely on machine learning techniques. The field of machine learning combines ingredients from several fields: we need to design efficient algorithms to process the amount of data, and we need to ensure that predictions made by machine learning algorithms are statistically sound. The focus of the lecture is on algorithmic and theoretical aspects of machine learning. We will cover many of the standard algorithms, learn about the general principles for building good machine learning algorithms, and analyze their theoretical properties. - Supervised learning problems: Linear methods; regularization; SVMS; kernel methods - Unsupervised learning problems: Dimension reduction (kernel PCA, multi-dimensional scaling, manifold methods); spectral clustering and spectral graph theory - How to model machine learning problems: Bayesian decision theory, loss functions, feature selection, evaluation and comparison of algorithms. Common pitfalls - Online algorithms - Learning theory (no free lunch theorem; generalization bounds; VC dimension; universal consistency; Theorem of Stone) - Low rank matrix methods (collaborative filtering, low rank matrix completion, compressed sensing) The following topics are NOT going to be covered: decision trees, neural networks / deep networks, graphical models, Bayesian approaches to machine learning, reinforcement learning.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Machine Learning and Artificial Neural Networks in Biomedical Applications
(Course number: INFO4192)
Link: http://campus.uni-tuebingen.de/20181e167895
Course type: Seminar
Contact hours:
Course coordinator: Dr. rer. nat. Martin Spüler

Course description
The Seminar “Machine Learning and Artificial Neural Networks in Biomedical Applications” covers current topics of signal processing on neural signals (e.g. fMRI, EEG or MEG) for their use in biomedical applications (e.g. neuroprosthetics or brain-computer interfaces, BCIs) and related topics; as well as methods and algorithms applied in those fields.

Course Title: Machine Learning II  (Course number: NIP02B)
Link: http://campus.uni-tuebingen.de/20181e168042
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: Ph.D. Tjeerd Dijkstra, Prof. Dr.-Ing. Martin Giese
Prerequisites
Machine learning I
Course description
After the course, the participants will have a solid understanding of probability logic, Bayesian networks, inference and learning in Bayesian networks and Markov random fields with exact, (variational) EM and sampling methods. Moreover, the course covers modern stochastic process approaches in Machine learning, such as the Gaussian process and dynamical extensions.

Additional information
http://www.neuroschool-tuebingen.de/courses/summer-term/master-neural-inf-process/?tx_neur
Course Title: Machine Learning in Graphics and Vision  
Link: http://campus.uni-tuebingen.de/20181e168446

Course type: Lecture/Exercises

Contact hours:


Course Title: Machine Learning Theory: Statistical Inference on Networks  (Course number: INFO4493)  
Link: http://campus.uni-tuebingen.de/20181e168523

Course type: Seminar

Contact hours:

Course coordinator: Ph.D. Debarghya Ghoshdastidar

Course description
Modelling and learning from networks is an important research topic in many scientific disciplines. Statistical analysis of social networks reveals the reasons for making new connections, or how information spreads among people. On the other hand, study of brain and genetic networks helps in understanding different biological processes. In this seminar, we learn different applications, algorithms and theory related to networks. In particular, we look at how machine learning can be used to solve various network analysis problems. Prior knowledge of machine learning is not needed. The course will be held as a block seminar.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Massively Parallel Computing  (Course number: INFO4173)  
Link: http://campus.uni-tuebingen.de/20181e167890

Course type: Lecture/Exercises

Contact hours: 4

Course coordinator: o. Prof. Dr.-Ing. Hendrik Lensch, Dipl.-Inf. Benjamin Resch, M.Sc. Patrick Wieschollek

Course description
Blockveranstaltung vor Vorlesungsbeginn Vorlesung mit Übungen

Course Title: Philosophy of Mathematics  
Link: http://campus.uni-tuebingen.de/20181e169990

Course type: Lecture

Contact hours:

Course coordinator: o. Prof. Dr. phil. Peter Schroeder-Heister

Course description
This course is announced both for the winter semester 2017-18 and the summer semester 2018. It is assigned to winter or summer semester depending on whether it is attended by a student of computer science or of philosophy. This compact course is announced under my name (Schroeder-Heister) in order to have an entry in the course list. I stay responsible for it and will issue the certificates. The course will actually be given by a visiting professor (Prof. Adzic, Belgrade). It is a sequel to the course “Advanced Mathematical Logic” (March 5-16, 2018). It is a 3 ECTS points course, which addresses both computer scientists and philosophers. Computer scientists can only attend it as an extension of “Advanced mathematical logic”, giving them 3 additional ECTS points, resulting in 9 ECTS points in total. Correspondingly, for computer scientists it is a course in the winter semester 2017-18. Philosophers can attend it independently.
as a Vorlesung, giving them 3 ECTS points. For philosophers, it is a course in the summer semester 2018. Its intended audience are students with a solid knowledge in Mathematical Logic, for example from the introductory course on Mathematical Logic in the winter semester 2017-28. To avoid misunderstandings If you just want to come and listen, please do so! The above regulations are only for students who want to acquire credit points and need a certificate.

**Course Title**: Probabilistic Methods for Assessing Information Quality  
**Link**: [http://campus.uni-tuebingen.de/20181e171941](http://campus.uni-tuebingen.de/20181e171941)  
**Course type**: Seminar  
**Contact hours**:  

**Course description**  
Assessing the correctness of claims coming from different sources is of tremendous importance for many information integration and reconciliation tasks. Such tasks encompass the aggregation and sharing of news, social editing, the description of e-Commerce products, the consolidation of database entries (e.g., after the merger of companies), etc. In the absence of a ground truth, one of the main challenges is the reconciliation of contradicting claims from sources that may deliver noisy, outdated, erroneous, or incomplete information. For example, for the same flight, different flight booking web sites may report different arrival times. The task of estimating the correctness of claims by aggregating the information from the available sources is commonly referred to as latent truth discovery (LTD). This seminar focuses on state-of-the-art approaches to the LTD problem, which go well beyond majority voting schemes, and instead jointly infer source reliabilities and the correctness of claims through probabilistic inference schemes.

**Course Title**: Sensory Psychology (Lecture Psychophysical Methods and Seminar Colour Vision and Material Perception)  
**Link**: [http://campus.uni-tuebingen.de/20181e167960](http://campus.uni-tuebingen.de/20181e167960)  
**Course type**: Lecture  
**Contact hours**: 4  
**Course coordinator**: Ph.D. Tom Wallis  
**Additional information**  
[http://www.nip.uni-tuebingen.de/teaching/lectures-seminars](http://www.nip.uni-tuebingen.de/teaching/lectures-seminars)

**Course Title**: Structure and Systems Bioinformatics  
(Course number: BIOINF4120)  
**Link**: [http://campus.uni-tuebingen.de/20181e167838](http://campus.uni-tuebingen.de/20181e167838)  
**Course type**: Lecture/Excercises  
**Contact hours**:  
**Course coordinator**: Mitarbeiter, o. Prof. Dr.-Ing. Oliver Kohlbacher  
**Target audience**  
1. Studienjahr Nicht geeignet für Bachelorstudierende. / This course is not suitable for BSc students.

**Course Title**: Structure-based Drug Design  
(Course number: BIOINF4371)  
**Link**: [http://campus.uni-tuebingen.de/20181e167851](http://campus.uni-tuebingen.de/20181e167851)  
**Course type**: Lecture/Excercises  
**Contact hours**: 2  
**Course coordinator**: Dr. rer. nat. Philipp Thiel  
**Target audience**  
3. Studienjahr (BSc), 1. Studienjahr (MSc) Geeignet auch für Bachelorstudierende. / This course is suitable for BSc students.

**Course Title**: Theoretical Foundations of Logic Programming  
(Course number: INF4468)
Media Technologies – Master

Course Title: Advanced Transcriptomics  (Course number: BIOINF4331)
Link: http://campus.uni-tuebingen.de/20181e168892
Course type: Lecture/Excercises
Contact hours:
Course coordinator: apl. Prof. Dr. math. Katja Nieselt

Course Title: Biorobotics - Lecture
Link: http://campus.uni-tuebingen.de/20181e170050
Course type: Lecture
Contact hours:

Course description
In this lecture, we will discuss technical tools to investigate und support biological motor control. This lecture is organised in collaboration with Syn Schmitt, Biomechanics and Biorobotics, University of Stuttgart. We will have at least three joint dates where we will meet with Students from Stuttgart and discuss the topics.

* Lecture * Title: Biorobotics Main topics: 1) Concepts of classical robotics (rigid bodies, PID controller ...) 2) Soft robotics (series elastic actuation, artificial muscles, soft material systems ...) 3) Rehabilitation robotics (prosthetics, exoskeletons, brain computer interfaces ...)

Course Title: Biorobotics - Seminar
Link: http://campus.uni-tuebingen.de/20181e170052
Course type: Seminar
Contact hours:

Course description
Title: Motion in Man and Machine Block Seminar in May + Seminar project and presentation Exact Dates to be announced in February

Course Title: Computational Photography  (Course number: INFO4176)
Link: http://campus.uni-tuebingen.de/20181e167889
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: o. Prof. Dr.-Ing. Hendrik Lensch, M.Sc. Jieen Chen

Course Title: Current Advances in Deep and Recurrent Neural Networks
Link: http://campus.uni-tuebingen.de/20181e169561
Course type: Seminar
Contact hours:
Course coordinator: M.Sc. Sebastian Otte
Course description
This lecture focusses on current advancements in deep and recurrent ANNs. Each participant will need to prepare a presentation on one of the covered papers, write a summary on the talk and paper, and review several of the other summaries.
Course Title: Discrete Optimization for Image Analysis  
Link: http://campus.uni-tuebingen.de/20181e169547  
Course type: Lecture  
Contact hours: 2  

Course description  
This lecture introduces fundamental tasks in the field of image analysis through their mathematical abstraction in the form of discrete optimization problems. The tasks include image classification, image and video segmentation, multiple object recognition and multiple object tracking. The problems include the unconstrained binary quadratic program, graph decomposition and node labeling problems. The course establishes the computational complexity of these problems by reduction techniques. It introduces algorithms for computing feasible solutions, partial solutions and bounds. An emphasis is on efficient algorithms that are practical for image analysis, including local search, bounded reverse search and network flow. The last part of the course introduces the simplex algorithm and branch-and-bound search.

Course Title: Flying Robots  (Course number: INF4364)  
Link: http://campus.uni-tuebingen.de/20181e167877  
Course type: Internship  
Contact hours: 4  

Course Title: Machine Learning: Algorithms and Theory  (Course number: INFO4491)  
Link: http://campus.uni-tuebingen.de/20181e167914  
Course type: Lecture/Excercises  
Contact hours:  
Course coordinator: Prof. Dr. rer. nat. Ulrike Luxburg  

Course description  
In many applications and domains, massive amounts of data are collected and processed every day. To be able to make efficient use of such data, there is an urgent need for tools to extract important pieces of information from the flood of unimportant details. Machine learning is a relatively young discipline that tries to deal with this problem, by designing algorithms to analyze large amounts of complex data in a principled way. Machine learning is the core technique in many applications such as spam filtering, object recognition, analyzing user preferences, recommender systems, and so on. Scientific disciplines such as biology, neuroscience, physics, or medicine discover the potential of machine learning methods for analyzing their empirical data. And, last but not least, many large companies like google, Amazon, facebook heavily rely on machine learning techniques. The field of machine learning combines ingredients from several fields: we need to design efficient algorithms to process the amount of data, and we need to ensure that predictions made by machine learning algorithms are statistically sound. The focus of the lecture is on algorithmic and theoretical aspects of machine learning. We will cover many of the standard algorithms, learn about the general principles for building good machine learning algorithms, and analyze their theoretical properties. - Supervised learning problems:  Linear methods; regularization;  SVMS; kernel methods - Unsupervised learning problems:  Dimension reduction (kernel  PCA, multi-dimensional scaling, manifold methods); spectral clustering and spectral graph theory - How to model machine learning problems: Bayesian decision theory, loss functions, feature selection, evaluation and comparison of algorithms. Common pitfalls - Online algorithms  - Learning theory (no free lunch theorem; generalization bounds;  VC dimension; universal consistency; Theorem of Stone) - Low rank matrix methods (collaborative filtering, low rank matrix completion, compressed sensing) The following topics are NOT going to be covered: decision trees, neural networks / deep networks, graphical models, Bayesian approaches to machine learning, reinforcement learning.

Additional information
**Course Title:** Machine Learning and Artificial Neural Networks in Biomedical Applications  
(Course number: INFO4192)  
**Link:** http://campus.uni-tuebingen.de/20181e167895  
**Course type:** Seminar  
**Contact hours:**  
**Course coordinator:** Dr. rer. nat. Martin Spüler  
**Course description**  
The Seminar “Machine Learning and Artificial Neural Networks in Biomedical Applications” covers current topics of signal processing on neural signals (e.g. fMRI, EEG or MEG) for their use in biomedical applications (e.g. neuroprosthetics or brain-computer interfaces, BCIs) and related topics; as well as methods and algorithms applied in those fields.

**Course Title:** Machine Learning II  
(Course number: NIP02B)  
**Link:** http://campus.uni-tuebingen.de/20181e168042  
**Course type:** Lecture/Exercises  
**Contact hours:** 4  
**Course coordinator:** Ph.D. Tjeerd Dijkstra, Prof. Dr.-Ing. Martin Giese  
**Prerequisites**  
Machine learning I  
**Course description**  
After the course, the participants will have a solid understanding of probability logic, Bayesian networks, inference and learning in Bayesian networks and Markov random fields with exact, (variational) EM and sampling methods. Moreover, the course covers modern stochastic process approaches in Machine learning, such as the Gaussian process and dynamical extensions.  
**Additional information**  

**Course Title:** Machine Learning in Graphics and Vision  
**Link:** http://campus.uni-tuebingen.de/20181e168446  
**Course type:** Lecture/Exercises  
**Contact hours:**  
**Course coordinator:** Prof. Dr.-Ing. Andreas Geiger, o. Prof. Dr.-Ing. Hendrik Lensch, M.Sc. Arijit Mallick, M.Sc. Patrick Wieschollek

**Course Title:** Machine Learning Theory: Statistical Inference on Networks  
(Course number: INFO4493)  
**Link:** http://campus.uni-tuebingen.de/20181e168523  
**Course type:** Seminar  
**Contact hours:**  
**Course coordinator:** Ph.D. Debarghya Ghoshdastidar  
**Course description**  
Modelling and learning from networks is an important research topic in many scientific disciplines.
Statistical analysis of social networks reveals the reasons for making new connections, or how information spreads among people. On the other hand, study of brain and genetic networks helps in understanding different biological processes. In this seminar, we learn different applications, algorithms and theory related to networks. In particular, we look at how machine learning can be used to solve various network analysis problems. Prior knowledge of machine learning is not needed. The course will be held as a block seminar.

**Additional information**
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

**Course Title**: Massively Parallel Computing  (Course number: INFO4173)
**Link**: http://campus.uni-tuebingen.de/20181e167890
**Course type**: Lecture/Excercises
**Contact hours**: 4
**Course coordinator**: o. Prof. Dr.-Ing. Hendrik Lensch, Dipl.-Inf. Benjamin Resch, M.Sc. Patrick Wieschollek
**Course description**
Blockveranstaltung vor Vorlesungsbeginn Vorlesung mit Übungen

**Course Title**: Philosophy of Mathematics
**Link**: http://campus.uni-tuebingen.de/20181e169990
**Course type**: Lecture
**Contact hours**: 4
**Course coordinator**: o. Prof. Dr. phil. Peter Schroeder-Heister
**Course description**
This course is announced both for the winter semester 2017-18 and the summer semester 2018. It is assigned to winter or summer semester depending on whether it is attended by a student of computer science or of philosophy. This compact course is announced under my name (Schroeder-Heister) in order to have an entry in the course list. I stay responsible for it and will issue the certificates. The course will actually be given by a visiting professor (Prof. Adzic, Belgrade). It is a sequel to the course “Advanced Mathematical Logic” (March 5-16, 2018). It is a 3 ECTS points course, which addresses both computer scientists and philosophers. Computer scientists can only attend it as an extension of “Advanced mathematical logic”, giving them 3 additional ECTS points, resulting in 9 ECTS points in total. Correspondingly, for computer scientists it is a course in the winter semester 2017-18. Philosophers can attend it independently as a Vorlesung, giving them 3 ECTS points. For philosophers, it is a course in the summer semester 2018. Its intended audience are students with a solid knowledge in Mathematical Logic, for example from the introductory course on Mathematical Logic in the winter semester 2017-28. To avoid misunderstandings If you just want to come and listen, please do so! The above regulations are only for students who want to acquire credit points and need a certificate.

**Course Title**: Probabilistic Methods for Assessing Information Quality
**Link**: http://campus.uni-tuebingen.de/20181e171941
**Course type**: Seminar
**Contact hours**: 4
**Course description**
Assessing the correctness of claims coming from different sources is of tremendous importance for many information integration and reconciliation tasks. Such tasks encompass the aggregation and sharing of news, social editing, the description of e-Commerce products, the consolidation of database entries (e.g., after the merger of companies), etc. In the absence of a ground truth, one of the main challenges is the reconciliation of contradicting claims from sources that may deliver noisy, outdated, erroneous, or incomplete information. For example, for the same flight, different flight booking web sites may report different arrival times. The task of estimating the correctness
of claims by aggregating the information from the available sources is commonly referred to as latent truth discovery (LTD). This seminar focuses on state-of-the-art approaches to the LTD problem, which go well beyond majority voting schemes, and instead jointly infer source reliabilities and the correctness of claims through probabilistic inference schemes.

**Course Title**: Sensory Psychology (Lecture Psychophysical Methods and Seminar Colour Vision and Material Perception)
**Link**: http://campus.uni-tuebingen.de/20181e167960
**Course type**: Lecture
**Contact hours**: 4
**Course coordinator**: Ph.D. Tom Wallis
**Additional information**
http://www.nip.uni-tuebingen.de/teaching/lectures-seminars

**Course Title**: Structure and Systems Bioinformatics  (Course number: BIOINF4120)
**Link**: http://campus.uni-tuebingen.de/20181e167838
**Course type**: Lecture/Excercises
**Contact hours**: 2
**Course coordinator**: Mitarbeiter, o. Prof. Dr.-Ing. Oliver Kohlbacher
**Target audience**
1. Studienjahr Nicht geeignet für Bachelorstudierende. / This course is not suitable for BSc students.

**Course Title**: Structure-based Drug Design  (Course number: BIOINF4371)
**Link**: http://campus.uni-tuebingen.de/20181e167851
**Course type**: Lecture/Excercises
**Contact hours**: 2
**Course coordinator**: Dr. rer. nat. Philipp Thiel
**Target audience**
3. Studienjahr (BSc), 1. Studienjahr (MSc) Geeignet auch für Bachelorstudierende. / This course is suitable for BSc students.

**Course Title**: Theoretical Foundations of Logic Programming  (Course number: INF4468)
**Link**: http://campus.uni-tuebingen.de/20181e168568
**Course type**: Lecture/Excercises
**Contact hours**
**Course coordinator**: Dr. rer. nat. Thomas Piecha

**Medicineinformatics – Master**

**Course Title**: Advanced Transcriptomics  (Course number: BIOINF4331)
**Link**: http://campus.uni-tuebingen.de/20181e168892
**Course type**: Lecture/Excercises
**Contact hours**
**Course coordinator**: apl. Prof. Dr. math. Katja Nieselt

**Course Title**: Algorithms of Bioinformatics  (Course number: BIOINF4362)
**Link**: http://campus.uni-tuebingen.de/20181e167854
**Course type**: Seminar
**Contact hours**: 2
**Course coordinator**: Mitarbeiter, apl. Prof. Dr. math. Katja Nieselt
Course description
Topic of the seminar is “The future of next-generation sequencing”. Recommended only for students who have at least visited the lecture “Bioinformatics 1” / “Sequence Bioinformatics”. If you are interested in enrolling, please first send an email to Prof. Nieselt (We will soon invite to an ILIAS repository which will list possible topics (and accompanying papers). Registered students then can choose or rank their favorite topic.

Course Title: Biorobotics - Lecture
Link: http://campus.uni-tuebingen.de/20181e170050
Course type: Lecture
Contact hours:

Course description
In this lecture, we will discuss technical tools to investigate and support biological motor control. This lecture is organized in collaboration with Syn Schmitt, Biomechanics and Biorobotics, University of Stuttgart. We will have at least three joint dates where we will meet with students from Stuttgart and discuss the topics. * Lecture * Title: Biorobotics Main topics: 1) Concepts of classical robotics (rigid bodies, PID controller ...) 2) Soft robotics (series elastic actuation, artificial muscles, soft material systems ...) 3) Rehabilitation robotics (prosthetics, exoskeletons, brain computer interfaces ...)

Course Title: Biorobotics - Seminar
Link: http://campus.uni-tuebingen.de/20181e170052
Course type: Seminar
Contact hours:

Course description
Title: Motion in Man and Machine Block Seminar in May + Seminar project and presentation Exact Dates to be announced in February

Course Title: Computational Photography  (Course number: INFO4176)
Link: http://campus.uni-tuebingen.de/20181e167889
Course type: Lecture/Exercises
Contact hours: 4
Course coordinator: o. Prof. Dr.-Ing. Hendrik Lensch, M.Sc. Jieen Chen

Course Title: Current Advances in Deep and Recurrent Neural Networks
Link: http://campus.uni-tuebingen.de/20181e169561
Course type: Seminar
Contact hours: 5
Course coordinator: M.Sc. Sebastian Otte

Course description
This lecture focuses on current advancements in deep and recurrent ANNs. Each participant will need to prepare a presentation on one of the covered papers, write a summary on the talk and paper, and review several of the other summaries.

Course Title: Datenmanagement für die Quantitative Biologie  (Course number: BIOINF4399C)
Link: http://campus.uni-tuebingen.de/20181e167846
Course type: Lecture/Exercises
Contact hours:
Course coordinator: Mitarbeiter, Dr. rer. nat. Sven Nahnsen
Course Title: Discrete Optimization for Image Analysis  
Link: http://campus.uni-tuebingen.de/20181e169547  
Course type: Lecture  
Contact hours: 2

Course description  
This lecture introduces fundamental tasks in the field of image analysis through their mathematical abstraction in the form of discrete optimization problems. The tasks include image classification, image and video segmentation, multiple object recognition and multiple object tracking. The problems include the unconstrained binary quadratic program, graph decomposition and node labeling problems. The course establishes the computational complexity of these problems by reduction techniques. It introduces algorithms for computing feasible solutions, partial solutions and bounds. An emphasis is on efficient algorithms that are practical for image analysis, including local search, bounded reverse search and network flow. The last part of the course introduces the simplex algorithm and branch-and-bound search.

Course Title: Flying Robots  (Course number: INF4364)  
Link: http://campus.uni-tuebingen.de/20181e167877  
Course type: Internship  
Contact hours: 4  

Course Title: Machine Learning: Algorithms and Theory  (Course number: INFO4491)  
Link: http://campus.uni-tuebingen.de/20181e167914  
Course type: Lecture/Excercises  
Contact hours:  
Course coordinator: Prof. Dr. rer. nat. Ulrike Luxburg  
Course description
In many applications and domains, massive amounts of data are collected and processed every day. To be able to make efficient use of such data, there is an urgent need for tools to extract important pieces of information from the flood of unimportant details. Machine learning is a relatively young discipline that tries to deal with this problem, by designing algorithms to analyze large amounts of complex data in a principled way. Machine learning is the core technique in many applications such as spam filtering, object recognition, analyzing user preferences, recommender systems, and so on. Scientific disciplines such as biology, neuroscience, physics, or medicine discover the potential of machine learning methods for analyzing their empirical data. And, last but not least, many large companies like google, Amazon, facebook heavily rely on machine learning techniques. The field of machine learning combines ingredients from several fields: we need to design efficient algorithms to process the amount of data, and we need to ensure that predictions made by machine learning algorithms are statistically sound. The focus of the lecture is on algorithmic and theoretical aspects of machine learning. We will cover many of the standard algorithms, learn about the general principles for building good machine learning algorithms, and analyze their theoretical properties. - Supervised learning problems: Linear methods; regularization;   SVMS; kernel methods - Unsupervised learning problems:  Dimension reduction (kernel   PCA, multi-dimensional scaling, manifold methods); spectral clustering and spectral graph theory - How to model machine learning problems: Bayesian decision theory, loss functions, feature selection, evaluation and comparison of algorithms. Common pitfalls - Online algorithms  - Learning theory (no free lunch theorem; generalization bounds;   VC dimension; universal consistency; Theorem of Stone) - Low rank matrix methods (collaborative filtering, low rank matrix completion, compressed sensing) The following topics are NOT going to be covered: decision trees, neural networks / deep networks, graphical models, Bayesian approaches to machine learning, reinforcement learning.  
Additional information
Course Title: Machine Learning and Artificial Neural Networks in Biomedical Applications  
(Course number: INFO4192)  
Link: http://campus.uni-tuebingen.de/20181e167895  
Course type: Seminar  
Contact hours:  
Course coordinator: Dr. rer. nat. Martin Spüler  
Course description: The Seminar “Machine Learning and Artificial Neural Networks in Biomedical Applications” covers current topics of signal processing on neural signals (e.g. fMRI, EEG or MEG) for their use in biomedical applications (e.g. neuroprosthetics or brain-computer interfaces, BCIs) and related topics; as well as methods and algorithms applied in those fields.

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Im Seminar “Maschinelles Lernen und Künstliche Neuronale Netze in der biomedizinischen Anwendung” werden aktuelle Themen aus der Signalverarbeitung im Bereich der Verarbeitung von Nervensignalen (z.B. Neuroprothetik oder Brain-Computer-Interfaces), medizinischer Signalen (z.B.: fMRT oder MEG) oder verwandten Bereichen sowie in diesen Bereichen verwendeten Algorithmen der Signalverarbeitung bearbeitet.

Course Title: Machine Learning II  
(Course number: NIP02B)  
Link: http://campus.uni-tuebingen.de/20181e168042  
Course type: Lecture/Excercises  
Contact hours: 4  
Course coordinator: Ph.D. Tjeerd Dijkstra, Prof. Dr.-Ing. Martin Giese  
Prerequisites: Machine learning I  
Course description: After the course, the participants will have a solid understanding of probability logic, Bayesian networks, inference and learning in Bayesian networks and Markov random fields with exact, (variational) EM and sampling methods. Moreover, the course covers modern stochastic process approaches in Machine learning, such as the Gaussian process and dynamical extensions.

Additional information:  

Course Title: Machine Learning in Graphics and Vision  
Link: http://campus.uni-tuebingen.de/20181e168446  
Course type: Lecture/Excercises  
Contact hours:  

Course Title: Machine Learning Theory: Statistical Inference on Networks  
(Course number: INFO4493)  
Link: http://campus.uni-tuebingen.de/20181e168523  
Course type: Seminar  
Contact hours:  
Course coordinator: Ph.D. Debarghya Ghoshdastidar  
Course description: Modelling and learning from networks is an important research topic in many scientific disciplines.
Statistical analysis of social networks reveals the reasons for making new connections, or how information spreads among people. On the other hand, study of brain and genetic networks helps in understanding different biological processes. In this seminar, we learn different applications, algorithms and theory related to networks. In particular, we look at how machine learning can be used to solve various network analysis problems. Prior knowledge of machine learning is not needed. The course will be held as a block seminar.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Massively Parallel Computing  
(Course number: INFO4173)
Link: http://campus.uni-tuebingen.de/20181e167890
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: o. Prof. Dr.-Ing. Hendrik Lensch, Dipl.-Inf. Benjamin Resch, M.Sc. Patrick Wieschollek

Course description
Blockveranstaltung vor Vorlesungsbeginn Vorlesung mit Übungen

Course Title: Medical Data Science  
(Course number: MEDZ4991)
Link: http://campus.uni-tuebingen.de/20181e167916
Course type: Lecture
Contact hours:
Course coordinator: Prof. Dr. rer. nat. Nico Pfeifer

Course Title: Microbiome Analysis  
(Course number: BIOINF4322)
Link: http://campus.uni-tuebingen.de/20181e167835
Course type: Seminar
Contact hours:
Course coordinator: o. Prof. Dr. math. Daniel Huson

Additional information
http://ab.inf.uni-tuebingen.de/teaching/sose2018/seminar

Course Title: Philosophy of Mathematics
Link: http://campus.uni-tuebingen.de/20181e169990
Course type: Lecture
Contact hours:
Course coordinator: o. Prof. Dr. phil. Peter Schroeder-Heister

Course description
This course is announced both for the winter semester 2017-18 and the summer semester 2018. It is assigned to winter or summer semester depending on whether it is attended by a student of computer science or of philosophy. This compact course is announced under my name (Schroeder-Heister) in order to have an entry in the course list. I stay responsible for it and will issue the certificates. The course will actually be given by a visiting professor (Prof. Adzic, Belgrade). It is a sequel to the course “Advanced Mathematical Logic” (March 5-16, 2018). It is a 3 ECTS points course, which addresses both computer scientists and philosophers. Computer scientists can only attend it as an extension of “Advanced mathematical logic”, giving them 3 additional ECTS points, resulting in 9 ECTS points in total. Correspondingly, for computer scientists it is a course in the winter semester 2017-18. Philosophers can attend it independently as a Vorlesung, giving them 3 ECTS points. For philosophers, it is a course in the summer semester 2018. Its intended audience are students with a solid knowledge in Mathematical Logic, for example from the introductory course on Mathematical Logic in the winter semester 2017-28. To avoid misunderstandings If you just want to come and listen, please do so! The
above regulations are only for students who want to acquire credit points and need a certificate.

**Course Title:** Probabilistic Methods for Assessing Information Quality  
**Link:** [http://campus.uni-tuebingen.de/20181e171941](http://campus.uni-tuebingen.de/20181e171941)  
**Course type:** Seminar  
**Contact hours:**  

**Course description**
Assessing the correctness of claims coming from different sources is of tremendous importance for many information integration and reconciliation tasks. Such tasks encompass the aggregation and sharing of news, social editing, the description of e-Commerce products, the consolidation of database entries (e.g., after the merger of companies), etc. In the absence of a ground truth, one of the main challenges is the reconciliation of contradicting claims from sources that may deliver noisy, outdated, erroneous, or incomplete information. For example, for the same flight, different flight booking web sites may report different arrival times. The task of estimating the correctness of claims by aggregating the information from the available sources is commonly referred to as latent truth discovery (LTD). This seminar focuses on state-of-the-art approaches to the LTD problem, which go well beyond majority voting schemes, and instead jointly infer source reliabilities and the correctness of claims through probabilistic inference schemes.

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**Course Title:** Sensory Psychology (Lecture Psychophysical Methods and Seminar Colour Vision and Material Perception)  
**Link:** [http://campus.uni-tuebingen.de/20181e167960](http://campus.uni-tuebingen.de/20181e167960)  
**Course type:** Lecture  
**Contact hours:** 4  
**Course coordinator:** Ph.D. Tom Wallis  
**Additional information**
[http://www.nip.uni-tuebingen.de/teaching/lectures-seminars](http://www.nip.uni-tuebingen.de/teaching/lectures-seminars)

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**Course Title:** Structure and Systems Bioinformatics  
**Link:** [http://campus.uni-tuebingen.de/20181e167838](http://campus.uni-tuebingen.de/20181e167838)  
**Course type:** Lecture/Excercises  
**Contact hours:**  

**Course coordinator:** Mitarbeiter, o. Prof. Dr.-Ing. Oliver Kohlbacher  
**Target audience**
1. Studienjahr Nicht geeignet für Bachelorstudierende. / This course is not suitable for BSc students.

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**Course Title:** Structure-based Drug Design  
**Link:** [http://campus.uni-tuebingen.de/20181e167851](http://campus.uni-tuebingen.de/20181e167851)  
**Course type:** Lecture/Excercises  
**Contact hours:** 2  
**Course coordinator:** Dr. rer. nat. Philipp Thiel  
**Target audience**
3. Studienjahr (BSc), 1. Studienjahr (MSc) Geeignet auch für Bachelorstudierende. / This course is suitable for BSc students.

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**Course Title:** Theoretical Foundations of Logic Programming  
**Link:** [http://campus.uni-tuebingen.de/20181e168568](http://campus.uni-tuebingen.de/20181e168568)  
**Course type:** Lecture/Excercises  
**Contact hours:**  
**Course coordinator:** Dr. rer. nat. Thomas Piecha
**Medicineinformatics – Bachelor**

**Course Title**: Systems Biology I - Properties of Reconstructed Networks  (Course number: BIOINF3371)  
**Link**: http://campus.uni-tuebingen.de/20181e167844  
**Course type**: Lecture/Excercises  
**Contact hours**:  
**Course coordinator**: Dr. rer. nat. Andreas Dräger, Dr. rer. nat. Reihaneh Mostolizadeh  
**Prerequisites**  
The prerequisite is some knowledge of linear algebra and biochemistry. Through the links between mathematical ideas and biological processes are made clear, the lecture reflects the irreversible trend of increasing mathematical content in biology education. Grundlegende Kenntnisse linearer Algebra und der Biochemie.  
**Course description**  
Genome sequences are now available that enable us to determine the biological components that make up a cell or an organism. Systems biology examines how these components interact and form networks and how the networks generate whole cell functions corresponding to observable phenotypes. This lecture is an introduction to basic concepts of systems biology devoted to undergraduate students. It describes how to model networks, how to determine their properties, and how to relate these to phenotypic functions. Genomische Sequenzen sind nun für zahlreiche Organismen verfügbar. Ausgehend von diesen Bauplänen des Lebens sind wir nun in der Lage, alle Komponenten biologischer Systeme in ihrer Gesamtheit zu erfassen, deren Wechselwirkungen zu beschreiben und in Netzwerke abzubilden, um das Wirkungsgefüge aller zellulären Prozesse beschreiben zu können. Diese Netzwerke bilden die Grundlage für Computermodelle, deren Simulation Vorhersagen über beobachtbare Phänomene ermöglicht. Diese Vorlesung bietet eine Einführung in die grundlegenden Konzepte der Systembiologie und richtet sich gleichermaßen an Bachelorstudenten der Mathematik, Informatik, Bioinformatik und Biologie. Es wird beschrieben, wie biologische Netzwerke aufgebaut und modelliert werden können. Es wird behandelt, wie die charakteristischen Eigenschaften dieser Modelle bestimmt und daraus wesentliche Aussagen zum Systemverhalten bis hin zum Phänotyp abgeleitet werden können. Durch die Anwendung mathematischer Konzepte auf biologische Fragestellung bereitet diese Veranstaltung auf den unumkehrbaren Trend eines stetig steigenden Anteils mathematischer und rechnergestützter Inhalte in der biologischen Ausbildung vor.

**Mathematics – Bachelor**

**Course Title**: Example Class for Mathematical Relativity  (Course number: MAT6513X)  
**Link**: http://campus.uni-tuebingen.de/20181e164235  
**Course type**: Exercises  
**Contact hours**: 2  
**Course coordinator**: Jun.-Prof. Dr. rer. nat. Carla Cederbaum

**Course Title**: Example Class for Mathematical Statistical Physics  (Course number: MAT6514X)  
**Link**: http://campus.uni-tuebingen.de/20181e164238  
**Course type**: Exercises  
**Contact hours**: 2  
**Course coordinator**: Prof. Ph.D. Marcello Porta

**Course Title**: Lie Groups  (Course number: MAT5551V)  
**Link**: http://campus.uni-tuebingen.de/20181e164268  
**Course type**: Lecture
Contact hours: 4
Course coordinator: Prof. Dr. rer. nat. Anton Deitmar

Course description
A Lie group is a group G which at the same time is a smooth manifold such that the group law G x G -> G is a smooth map. Lie groups occur naturally as transformation groups of geometric objects. Typical examples are matrix groups like SL(n,R) or SO(n). In the lecture we introduce the general theory of Lie groups with a special focus on compact groups and their representation theory culminating in the complete description of representations through Highest Weight Theory.

Additional information
http://www.math.uni-tuebingen.de/user/deitmar/LEHRE/2018/

Course Title: Machine Learning: Algorithms and Theory  (Course number: INFO4491)
Link: http://campus.uni-tuebingen.de/20181e167914
Course type: Lecture/Excercises
Contact hours:
Course coordinator: Prof. Dr. rer. nat. Ulrike Luxburg

Course description
In many applications and domains, massive amounts of data are collected and processed every day. To be able to make efficient use of such data, there is an urgent need for tools to extract important pieces of information from the flood of unimportant details. Machine learning is a relatively young discipline that tries to deal with this problem, by designing algorithms to analyze large amounts of complex data in a principled way. Machine learning is the core technique in many applications such as spam filtering, object recognition, analyzing user preferences, recommender systems, and so on. Scientific disciplines such as biology, neuroscience, physics, or medicine discover the potential of machine learning methods for analyzing their empirical data. And, last but not least, many large companies like google, Amazon, facebook heavily rely on machine learning techniques. The field of machine learning combines ingredients from several fields: we need to design efficient algorithms to process the amount of data, and we need to ensure that predictions made by machine learning algorithms are statistically sound. The focus of the lecture is on algorithmic and theoretical aspects of machine learning. We will cover many of the standard algorithms, learn about the general principles for building good machine learning algorithms, and analyze their theoretical properties. - Supervised learning problems: Linear methods; regularization; SVMS; kernel methods - Unsupervised learning problems: Dimension reduction (kernel PCA, multi-dimensional scaling, manifold methods); spectral clustering and spectral graph theory - How to model machine learning problems: Bayesian decision theory, loss functions, feature selection, evaluation and comparison of algorithms. Common pitfalls - Online algorithms - Learning theory (no free lunch theorem; generalization bounds; VC dimension; universal consistency; Theorem of Stone) - Low rank matrix methods (collaborative filtering, low rank matrix completion, compressed sensing) The following topics are NOT going to be covered: decision trees, neural networks / deep networks, graphical models, Bayesian approaches to machine learning, reinforcement learning.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Machine Learning Theory: Statistical Inference on Networks  (Course number: INFO4493)
Link: http://campus.uni-tuebingen.de/20181e168523
Course type: Seminar
Contact hours:
Course coordinator: Ph.D. Debarghya Ghoshdastidar

Course description
Modelling and learning from networks is an important research topic in many scientific disciplines. Statistical analysis of social networks reveals the reasons for making new connections, or how
information spreads among people. On the other hand, study of brain and genetic networks helps in understanding different biological processes. In this seminar, we learn different applications, algorithms and theory related to networks. In particular, we look at how machine learning can be used to solve various network analysis problems. Prior knowledge of machine learning is not needed. The course will be held as a block seminar.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Mathematical Relativity  (Course number: MAT6513V)
Link: http://campus.uni-tuebingen.de/20181e164263
Course type: Lecture
Contact hours: 4
Course coordinator: Jun.-Prof. Dr. rer. nat. Carla Cederbaum
Prerequisites
Geometry in Physics or Differential Geometry or Mathematische Physik: Klassische Mechanik
Useful, but not required: Linear PDEs
Course description
After a short introduction to Special Relativity and its underlying Minkowskian geometry, we will study general Lorentzian manifolds and the Einstein equations of General Relativity. One part of the lecture course will focus on static solutions of the Einstein equation, describing spacetimes that are in a state of equilibrium. These solutions are geometrically rather simple and therefore suitable for a first approach to geometric, analytic, and physical questions about spacetimes and isolated systems. In particular, we will prove the Bunting–Masood-ul-Alaam static black hole uniqueness theorem. In the second part, we will investigate causality, cosmological models, and the Big Bang, specifically the Penrose–Hawking singularity theorems.

Additional information
https://www.math.uni-tuebingen.de/arbeitsbereiche/gadr/personen/dr-carla-cederbaum-1/lehre-cederbaum

Course Title: Mathematical Statistical Physics  (Course number: MAT6514V)
Link: http://campus.uni-tuebingen.de/20181e164266
Course type: Lecture
Contact hours: 4
Course coordinator: Prof. Ph.D. Marcello Porta

Course Title: Seminar Foundations of Quantum Mechanics  (Course number: MAT30103S)
Link: http://campus.uni-tuebingen.de/20181e164215
Course type: Seminar
Contact hours: 2
Course coordinator: apl. Prof. Dr. rer. nat. Roderich Tumulka

Mathematics – Master

Course Title: Cluster Algebras 2  (Course number: MAT5016V)
Link: http://campus.uni-tuebingen.de/20181e168203
Course type: Lecture
Contact hours: 2
Course coordinator: Ph.D. Jonathan Wilson

Course Title: Example Class for Mathematical Relativity  (Course number: MAT6513X)
Link: http://campus.uni-tuebingen.de/20181e164235
Course type: Exercises
Contact hours: 2
Course coordinator: Jun.-Prof. Dr. rer. nat. Carla Cederbaum

Course Title: Example Class for Mathematical Statistical Physics  (Course number: MAT6514X)
Link: http://campus.uni-tuebingen.de/20181e164238
Course type: Exercises
Contact hours: 2
Course coordinator: Prof. Ph.D. Marcello Porta

Course Title: Example Class for Spectral Theory of Schrödinger Type Operators  (Course number: MAT6531X)
Link: http://campus.uni-tuebingen.de/20181e167380
Course type: Exercises
Contact hours: 2
Course coordinator: Prof. Dr. rer. nat. Christian Hainzl

Course Title: Levy Processes  (Course number: MAT7016V)
Link: http://campus.uni-tuebingen.de/20181e164270
Course type: Lecture
Contact hours: 2
Course coordinator: Ph.D. Ananta Kumar Majee

Course Title: Lie Groups  (Course number: MAT5551V)
Link: http://campus.uni-tuebingen.de/20181e164268
Course type: Lecture
Contact hours: 4
Course coordinator: Prof. Dr. rer. nat. Anton Deitmar

Course description
A Lie group is a group G which at the same time is a smooth manifold such that the group law G x G -> G is a smooth map. Lie groups occur naturally as transformation groups of geometric objects. Typical examples are matrix groups like SL(n,R) or SO(n). In the lecture we introduce the general theory of Lie groups with a special focus on compact groups and their representation theory culminating in the complete description of representations through Highest Weight Theory.

Additional information
http://www.math.uni-tuebingen.de/user/deitmar/LEHRE/2018/

Course Title: Machine Learning: Algorithms and Theory  (Course number: INFO4491)
Link: http://campus.uni-tuebingen.de/20181e167914
Course type: Lecture/Excercises
Contact hours:
Course coordinator: Prof. Dr. rer. nat. Ulrike Luxburg

Course description
In many applications and domains, massive amounts of data are collected and processed every day. To be able to make efficient use of such data, there is an urgent need for tools to extract important pieces of information from the flood of unimportant details. Machine learning is a relatively young discipline that tries to deal with this problem, by designing algorithms to analyze large amounts of complex data in a principled way. Machine learning is the core technique in many applications such as spam filtering, object recognition, analyzing user preferences, recommender systems, and so on. Scientific disciplines such as biology, neuroscience, physics, or medicine discover the potential of machine learning methods for analyzing their empirical data. And, last but not least, many large companies like google, Amazon, facebook heavily rely on
machine learning techniques. The field of machine learning combines ingredients from several fields: we need to design efficient algorithms to process the amount of data, and we need to ensure that predictions made by machine learning algorithms are statistically sound. The focus of the lecture is on algorithmic and theoretical aspects of machine learning. We will cover many of the standard algorithms, learn about the general principles for building good machine learning algorithms, and analyze their theoretical properties. - Supervised learning problems: Linear methods; regularization; SVMS; kernel methods - Unsupervised learning problems: Dimension reduction (kernel PCA, multi-dimensional scaling, manifold methods); spectral clustering and spectral graph theory - How to model machine learning problems: Bayesian decision theory, loss functions, feature selection, evaluation and comparison of algorithms. Common pitfalls - Online algorithms - Learning theory (no free lunch theorem; generalization bounds; VC dimension; universal consistency; Theorem of Stone) - Low rank matrix methods (collaborative filtering, low rank matrix completion, compressed sensing) The following topics are NOT going to be covered: decision trees, neural networks / deep networks, graphical models, Bayesian approaches to machine learning, reinforcement learning.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Machine Learning Theory: Statistical Inference on Networks (Course number: INFO4493)
Link: http://campus.uni-tuebingen.de/20181e168523
Course type: Seminar
Contact hours:
Course coordinator: Ph.D. Debarghya Ghoshdastidar
Course description
Modelling and learning from networks is an important research topic in many scientific disciplines. Statistical analysis of social networks reveals the reasons for making new connections, or how information spreads among people. On the other hand, study of brain and genetic networks helps in understanding different biological processes. In this seminar, we learn different applications, algorithms and theory related to networks. In particular, we look at how machine learning can be used to solve various network analysis problems. Prior knowledge of machine learning is not needed. The course will be held as a block seminar.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Mathematical Relativity (Course number: MAT6513V)
Link: http://campus.uni-tuebingen.de/20181e164263
Course type: Lecture
Contact hours: 4
Course coordinator: Jun.-Prof. Dr. rer. nat. Carla Cederbaum
Prerequisites
Geometry in Physics or Differential Geometry or Mathematische Physik: Klassische Mechanik
Useful, but not required: Linear PDEs
Course description
After a short introduction to Special Relativity and its underlying Minkowskian geometry, we will study general Lorentzian manifolds and the Einstein equations of General Relativity. One part of the lecture course will focus on static solutions of the Einstein equation, describing spacetimes that are in a state of equilibrium. These solutions are geometrically rather simple and therefore suitable for a first approach to geometric, analytic, and physical questions about spacetimes and isolated systems. In particular, we will prove the Bunting–Masood-ull-Alaam static black hole uniqueness theorem. In the second part, we will investigate causality, cosmological models, and the Big Bang, specifically the Penrose–Hawking singularity theorems.

Additional information
Course Title: Mathematical Statistical Physics  (Course number: MAT6514V)
Link: http://campus.uni-tuebingen.de/20181e164266
Course type: Lecture
Contact hours: 4
Course coordinator: Prof. Ph.D. Marcello Porta

Course Title: Seminar Foundations of Quantum Mechanics  (Course number: MAT30103S)
Link: http://campus.uni-tuebingen.de/20181e164215
Course type: Seminar
Contact hours: 2
Course coordinator: apl. Prof. Dr. rer. nat. Roderich Tumulka

Course Title: Spectral Theory of Schrödinger Type Operators  (Course number: MAT6531V)
Link: http://campus.uni-tuebingen.de/20181e167378
Course type: Lecture
Contact hours: 4
Course coordinator: Prof. Dr. rer. nat. Christian Hainzl

Prerequisites
Funktionalanalysis und Grundwissen über lokalkompakte Gruppen, wie Existenz und Eindeutigkeit des Haar-Maßes. Dies kann aber auch während der Vorlesung nachgeholt werden.

Course description

Course Title: SU(N), Birdtracks, and Applications in QCD  (Course number: MAT6536V)
Link: http://campus.uni-tuebingen.de/20181e169968
Course type: Lecture
Contact hours:
Course coordinator: Ph.D. Judith Alcock-Zeilinger

Course Title: The Rigorous Renormalisation Group  (Course number: MAT6535V)
Link: http://campus.uni-tuebingen.de/20181e164277
Course type: Lecture
Contact hours: 2
Course coordinator: Prof. Ph.D. Marcello Porta

Mathematical Physics – Master

Course Title: Cluster Algebras 2  (Course number: MAT5016V)
Link: http://campus.uni-tuebingen.de/20181e168203
Course type: Lecture
Contact hours: 2
Course coordinator: Ph.D. Jonathan Wilson

Course Title: Example Class for Mathematical Relativity  (Course number: MAT6513X)
Link: http://campus.uni-tuebingen.de/20181e164235
Course type: Exercises
Contact hours: 2
Course coordinator: Jun.-Prof. Dr. rer. nat. Carla Cederbaum

Course Title: Example Class for Mathematical Statistical Physics  (Course number: MAT6514X)
Link: http://campus.uni-tuebingen.de/20181e164238
Course type: Exercises
Contact hours: 2
Course coordinator: Prof. Ph.D. Marcello Porta

Course Title: Example Class for Spectral Theory of Schrödinger Type Operators  (Course number: MAT6531X)
Link: http://campus.uni-tuebingen.de/20181e167380
Course type: Exercises
Contact hours: 2
Course coordinator: Prof. Dr. rer. nat. Christian Hainzl

Course Title: Levy Processes  (Course number: MAT7016V)
Link: http://campus.uni-tuebingen.de/20181e164270
Course type: Lecture
Contact hours: 2
Course coordinator: Ph.D. Ananta Kumar Majee

Course Title: Lie Groups  (Course number: MAT5551V)
Link: http://campus.uni-tuebingen.de/20181e164268
Course type: Lecture
Contact hours: 4
Course coordinator: Prof. Dr. rer. nat. Anton Deitmar
Course description
A Lie group is a group G which at the same time is a smooth manifold such that the group law \(G \times G \rightarrow G\) is a smooth map. Lie groups occur naturally as transformation groups of geometric objects. Typical examples are matrix groups like \(\text{SL}(n, \mathbb{R})\) or \(\text{SO}(n)\). In the lecture we introduce the general theory of Lie groups with a special focus on compact groups and their representation theory culminating in the complete description of representations through Highest Weight Theory.

Additional information
http://www.math.uni-tuebingen.de/user/deitmar/LEHRE/2018/

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Link: http://campus.uni-tuebingen.de/20181e168523
Course type: Seminar
Contact hours:
Course coordinator: Ph.D. Debarghya Ghoshdastidar
Course description
Modelling and learning from networks is an important research topic in many scientific disciplines. Statistical analysis of social networks reveals the reasons for making new connections, or how information spreads among people. On the other hand, study of brain and genetic networks helps
in understanding different biological processes. In this seminar, we learn different applications, algorithms and theory related to networks. In particular, we look at how machine learning can be used to solve various network analysis problems. Prior knowledge of machine learning is not needed. The course will be held as a block seminar.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Mathematical Relativity  (Course number: MAT6513V)
Link: http://campus.uni-tuebingen.de/20181e164263
Course type: Lecture
Contact hours: 4
Course coordinator: Jun.-Prof. Dr. rer. nat. Carla Cederbaum
Prerequisites
Geometry in Physics or Differential Geometry or Mathematische Physik: Klassische Mechanik
Useful, but not required: Linear PDEs
Course description
After a short introduction to Special Relativity and its underlying Minkowskian geometry, we will study general Lorentzian manifolds and the Einstein equations of General Relativity. One part of the lecture course will focus on static solutions of the Einstein equation, describing spacetimes that are in a state of equilibrium. These solutions are geometrically rather simple and therefore suitable for a first approach to geometric, analytic, and physical questions about spacetimes and isolated systems. In particular, we will prove the Bunting–Masood-ul-Alaam static black hole uniqueness theorem. In the second part, we will investigate causality, cosmological models, and the Big Bang, specifically the Penrose–Hawking singularity theorems.

Additional information
https://www.math.uni-tuebingen.de/arbeitsbereiche/gadr/personen/dr-carla-cederbaum-1/lehre-cederbaum

Course Title: Mathematical Statistical Physics  (Course number: MAT6514V)
Link: http://campus.uni-tuebingen.de/20181e164266
Course type: Lecture
Contact hours: 4
Course coordinator: Prof. Ph.D. Marcello Porta

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Link: http://campus.uni-tuebingen.de/20181e164215
Course type: Seminar
Contact hours: 2
Course coordinator: apl. Prof. Dr. rer. nat. Roderich Tumulka

Course Title: Spectral Theory of Schrödinger Type Operators  (Course number: MAT6531V)
Link: http://campus.uni-tuebingen.de/20181e167378
Course type: Lecture
Contact hours: 4
Course coordinator: Prof. Dr. rer. nat. Christian Hainzl
Prerequisites
Funktionalanalysis und Grundwissen über lokalkompakte Gruppen, wie Existenz und Eindeutigkeit des Haar-Maßes. Dies kann aber auch während der Vorlesung nachgeholt werden.

Course Title: SU(N), Birdtracks, and Applications in QCD  (Course number: MAT6536V)
Link: http://campus.uni-tuebingen.de/20181e169968
Course type: Lecture
Contact hours:
Course coordinator: Ph.D. Judith Alcock-Zeilinger

Course Title: The Rigorous Renormalisation Group  (Course number: MAT6535V)
Link: http://campus.uni-tuebingen.de/20181e164277
Course type: Lecture
Contact hours: 2
Course coordinator: Prof. Ph.D. Marcello Porta

Nanoscience – Bachelor

Course Title: Bioinformatics for Life Scientists  (Course number: BIOINF1910)
Link: http://campus.uni-tuebingen.de/20181e167837
Course type: Lecture/Excercises
Contact hours:
Course coordinator: Prof. Dr. rer. nat. Nico Pfeifer
Target audience
2. Studienjahr

Course Title: S-Schiene (Fr) “A journey through the RNA world: from ribozymes to riboswitches” (4021)
Link: http://campus.uni-tuebingen.de/20181e167578
Course type: Block Course
Contact hours:
Course coordinator: Dr. rer. nat. Andreas Wachter
Target audience
Themenmodul im Master
Prerequisites
Teilnahme an den Grundmodulen “Biomoleküle der Zelle” (BMZ), “Molekulare Biologie I und II” (MBI, MBII) oder vergleichbaren Veranstaltungen
Course description
This module aims at providing an overview of the functional capacity of RNA elements in viruses, bacteria and eukaryotes. Besides catalytically active RNAs, mainly aspects of RNA-based gene regulatory mechanisms will be discussed. In the wide field of RNA-mediated gene control, topics will be primarily focused on structured mRNA elements including thermosensors and riboswitches. The lecture section will provide an introduction into the various aspects of RNA functions in different cellular processes. In the tutorial and the seminar, selected aspects will be discussed in more detail and general principles will be worked out. The lectures will be given in English, whereas discussions and presentations can be held in German as well. A final written examination will take place on July 27th, 2018, at 10 c.t. at ZMBP, room 4U09.

Course Title: Molecular Cell Biology (4024)
Link: http://campus.uni-tuebingen.de/20181e163446
Course type: Lecture
Contact hours: 2
Course coordinator: Dr. rer. nat. Christopher Grefen, Dr. rer. nat. Sabine Müller, Dr. rer. nat. Laura Ragni, Dr. rer. nat. Sandra Richter, o. Prof. Dr. rer. nat. Gerd Jürgens
Target audience
Course description
Überblick über den Stand der Forschung und aktuelle Forschungsthemen in der molekularen Zellbiologie.

Nanoscience – Master

Course Title: ANM7 (Sensoren) (Course number: PC0810)
Link: http://campus.uni-tuebingen.de/20181e162537
Course type: Lecture
Contact hours: 2
Course coordinator: Prof. Dr. rer. nat. Udo Weimar, Dr. rer. nat. Nicolae Barsan, Dr. rer. nat. Alexandru Oprea

Course Title: Comparative innate immunity in animals and plants, Themenmodul 4026
Link: http://campus.uni-tuebingen.de/20181e164088
Course type: Lecture/Exercises
Contact hours: 3
Course coordinator: o. Prof. Dr. rer. nat. Thorsten Nürnberg, Prof. Dr. rer. nat. Georg Felix, PD Dr. rer. nat. Andrea Gust, Dr. rer. nat. Birgit Kemmerling
Prerequisites
Lecture in the preceding winter semester.
Course description
Module comprises a lecture, seminar and tutorial. The lecture (winter semester) concerns current topics of innate immunity in animals and plants. The seminar (summer semester) consolidates the topics covered in the lecture by using original publications. Content of the tutorial (summer semester) will be writing of a research proposal based on the original publications covered in the seminar. The seminar and tutorial will take place in the summer semester. Final schedule for the seminar and the discussion of proposals within the tutorial will be according to agreement.

Course Title: Elective: Advanced-Level Course in Plant Physiology 4031
Link: http://campus.uni-tuebingen.de/20181e167052
Course type: Block Course
Contact hours: 13
Course coordinator: Dr. rer. nat. Christina Chaban, Dr. rer. nat. Farid El-Kasmi, Dr. rer. nat. Katharina Markmann, Dr. rer. nat. Virtudes Mira-Rodado, Prof. Dr. rer. nat. Claudia Oecking, o. Prof. Dr. rer. nat. Klaus Harter
Prerequisites
A background in molecular plant science is expected
Course description
Implementation of a small research project involving a wide spectrum of methods

Course Title: Current Topics in General Genetics (4014)
Link: http://campus.uni-tuebingen.de/20181e167573
Course type: Lecture/Exercises
Contact hours:
Course coordinator: Dr. rer. nat. Chang Liu, Dr. rer. nat. Annett Strauß, Dr. rer. nat. Andreas Wachter, apl. Prof. Dr. rer. nat. Ulrike Zentgraf, o. Prof. Dr. rer. nat. Thomas Lahaye
Target audience
Masterstudierende im 1.-3. Fachsemester
Course description
Dieses Modul ist ein Pflichtmodul im Masterstudiengang des ZMBPs und wird für das 2. Semester

Cognition Science – Bachelor

Course Title: Advanced Regression Modeling
Link: http://campus.uni-tuebingen.de/20181e167141
Course type: Hauptseminar
Contact hours: 2
Course coordinator: Prof. Dr. phil. Harald Baayen

Course Title: Communicative Development
Link: http://campus.uni-tuebingen.de/20181e167143
Course type: Hauptseminar
Contact hours: 2
Course coordinator: Ph.D. Michael Ramscar

Course Title: Discriminative Linguistics
Link: http://campus.uni-tuebingen.de/20181e167144
Course type: Hauptseminar
Contact hours: 2
Course coordinator: Ph.D. Michael Ramscar

Course Title: Frequency effects in language processing
Link: http://campus.uni-tuebingen.de/20181e167108
Course type: Hauptseminar
Contact hours: 2
Course coordinator: Ph.D. Ching-Chu Hendrix-Sun

Course Title: Grammar Formalisms in Computational Linguistics
Link: http://campus.uni-tuebingen.de/20181e167091
Course type: Proseminar
Contact hours: 4
Course coordinator: Prof. Dr. phil. Detmar Meurers

Course description
Given that natural languages cannot be characterized by simply listing all possible sentences and their meaning, a range of grammar formalisms have been developed to characterize form and meaning in a general and compact way. The approaches differ in terms of their focus, empirical coverage, formal foundations, expressive power, conceptualization of generalizations, and the processing regimes that have been developed for those formalisms. After a general overview of grammar types in the Chomsky Hierarchy, we will discuss plain context-free grammars as a baseline on which we will introduce and compare several current grammar formalisms. The plan is to include a discussion of unification-based phrase structure grammars and dependency grammars like Head-Driven Phrase Structure Grammar (HPSG), Lexical Functional Grammar (LFG), Slot Grammar, but, if time allows, also others like Categorial Grammar. The focus will be on obtaining a sound working knowledge of how different formalisms capture some of the fundamental phenomena of natural language syntax: argument and adjunct realization, agreement and government, middle-distance phenomena (e.g., equi, raising), long-distance
phenomena (e.g., fronting).

Course Title: How cultures evolve  
Link: http://campus.uni-tuebingen.de/20181e169098  
Course type: Seminar  
Contact hours: 2  
Course coordinator: Dr. rer. nat. Claudio Tennie  
Course description: The aim of this seminar is to delve deep into the evolution of culture ("from stone tools to space rockets"), with special focus on the role of copying / social transmission. In order to allow a detailed exploration of these topics, the seminar will be discussion-heavy, and will involve careful reading of papers/chapters on each subject matter. The reading will be drawing from different fields (mostly from archaeology, psychology and biology/ethology). There will be in-depth debates about the cognition of non-human great apes, such as chimpanzees (the main research focus of Dr. Tennie). In order to gain credits, participants will be required to prepare and present a "Referat" (a talk, based on the literature that is to be discussed). These student talks may be given either in English (which is encouraged) or in German (the language of the student talks will be each student's choice). All interested students welcome. Please note that this seminar might be mostly in English, including at least some (if not all) of the Referate (talks) presented by the participating students. Early on in the seminar, there will be a lecture (in English) by Dr. Tennie about how to actually do a Referat/talk (and how to find relevant literature) to help you prepare for your own talk.

Course Title: Indo-European Languages  
Link: http://campus.uni-tuebingen.de/20181e167106  
Course type: Hauptseminar  
Contact hours: 2  
Course coordinator: MA Fabrício Marcel Ferraz Gerardi

Course Title: Introduction to Formal Epistemology (BA 02, 05)  
Link: http://campus.uni-tuebingen.de/20181e166436  
Course type: Proseminar  
Contact hours: 2  
Course coordinator: Ph.D. Justin Vlasits  
Course description: Introduction to Formal Epistemology  
Epistemology is the study of knowledge, belief, and related notions. Formal epistemology is the application of tools from logic and mathematics to this study. In this course, we will examine two dominant strands in formal epistemology, their explanatory power, their limits, and how they relate to each other. The first theory treats belief and knowledge as all or nothing states. This approach encourages investigations into higher order belief/knowledge, the belief/knowledge of groups, and the dynamics of belief/knowledge. According to the second theory, belief and knowledge are not treated directly, but instead a graded notion of belief is the object of study. In this part of the course we will look at probability theory and the theory of learning associated with it. Along with examining the theories, we will be look at how formal epistemology can be applied to various philosophical questions, such as: • are all truths knowable? • when does evidence confirm a scientific hypothesis? • are there multiple universes? • how should I act? Finally, we will look at a number of paradoxes about belief and knowledge with two questions in mind. Does one theory give a better account? Do the paradoxes reveal a deep problems in one of the theories? The assessment in this course will primarily be through short problem sets.

Course Title: Introduction to Moral Psychology (BA 03, 05)
Course Title: Introduction to Regression Modeling  
**Contact hours:** 2  
**Course coordinator:** Prof. Dr. phil. Harald Baayen

Course Title: Introduction to the Philosophy of Mind (BA 01, 02, 05)  
**Contact hours:** 2  
**Course coordinator:** o. Prof. Dr. Hong Yu Wong

Course Title: Introduction to the Philosophy of Mind (Counterpart to / Parallele zu Prof. Wong’s Vorlesungen "Introduction to the Philosophy of Mind")  
**Contact hours:** 2  
**Course coordinator:** Dr. phil. Chiara Brozzo

Course Title: Phonetics and Phonology  
**Contact hours:**  
**Course coordinator:** Fabian Tomaschek

**Prerequisites**  
IMPORTANT: The course will present speech signal examples by means of Praat (http://www.fon.hum.uva.nl/praat/). In order to make the course as productive as possible, students need to own and bring their OWN LAPTOP COMPUTER to the course so that usage of the program, i.e. acoustical analysis and measurements can be done by the students on their own.

**Course description**  
Phonetics +++++++++ The course will present the biological, physical and acoustic basics, which
are necessary to understand current problems and research questions in Phonetics. Biological basics cover the articulatory and respiratory apparatus; physical and acoustic basics cover the study the spectro-temporal characteristics of the speech signal. Phonology

Simultaneously, the course will give a thorough introduction into current, to certain extent contradictory, formal theories of Phonology. Their relation to the phonetic and physical reality as well as their problematics will be discussed.

Course Title: Psycholinguistic Models of Sentence Comprehension
Link: http://campus.uni-tuebingen.de/20181e170352
Course type: Hauptseminar
Contact hours: 2
Course coordinator: Dr. phil. Oliver Bott
Course description
Sentence comprehension is a classic field of research within psycholinguistics. It is concerned with the study of the cognitive processes underlying our ability to hear or read sentences. The focus is on developing theories and models about how parsing works in realtime language processing. Research during more than fifty years has contributed strongly to our understanding of sentence comprehension processes. The present Pro-/Hauptseminar serves as an introduction to the field of sentence comprehension. We will start with classic theories and experiments on syntactic structure building and will proceed to up to date psycholinguistic models of sentence comprehension. We will end with a comparison between what is known about syntactic processing and the semantic interpretation of sentences. A course schedule and a reading list will be distributed in the first session. Course requirements will be announced in the first session. This is an introductory course. Basic knowledge of syntax is an asset.

Course Title: Reduction in spontaneous speech
Link: http://campus.uni-tuebingen.de/20181e167102
Course type: Hauptseminar
Contact hours: 2
Course coordinator: Ph.D. Ching-Chu Hendrix-Sun
Course description
When people are speaking, not all words are fully pronounced. Many acoustic forms are subject to reduction. The sentence “I don’t know”, for instance, is often reduced to “I dunno”, or even “I ono”. Recently, the phenomenon of acoustic reduction has enjoyed increased popularity in phonetic research in different languages. In this course, we will review this research to get an idea about the circumstances in which acoustic reduction occurs. Furthermore, you will gain hands-on experience by looking at acoustic reduction in actual speech data in Mandarin Chinese.

Course Title: S Bayesian Estimation and Model Comparison
Link: http://campus.uni-tuebingen.de/20181e169956
Course type: Seminar
Contact hours: 2
Course coordinator: PD Dr. phil. Martin Lages
Course description
Modern statistical tools enable us to build and test tailored models of cognitive processing. In this seminar and tutorial we will model discrete and continuous data using examples from a range of experimental topics and studies. We will discuss different sampling approaches and work through a number of exercises using packages in R/RStudio. Some programming knowledge and exposure to R would be beneficial but is not essential. PBYOL (please bring your own laptop).

Course Title: Selected Topics in Cognitive Science SS: Episodic Memory: Learning and Behavior
Course Title: Statistical Language Processing (CL III)
Link: http://campus.uni-tuebingen.de/20181e167097
Course type: Proseminar
Contact hours: 6
Course coordinator: Dr. phil. Cagri Cöltekin
Course description
This course is an undergraduate introduction to natural language processing (NLP). The aim of this course is to expose students to a large variety of topics in NLP. The topics covered in the course include:

- Machine learning techniques used in NLP, such as classification, sequence learning and unsupervised methods, with both 'classical' methods (e.g., logistic regression, naive Bayes) and (deep) neural networks.
- Statistical approaches to text processing, segmentation/tokenization, morphology, syntax and semantics.
- Common application areas of NLP, such as text classification, question answering, machine translation.

This is a practical, fast-paced, broad introduction to the field. Fluency in programming and ability to learn new programming languages and/or environments will be assumed. The course is compulsory for the BA degree International Studies in Computational Linguistics. For other degree programs, please contact the instructor before signing up. More details, including suggested reading material, can be obtained at the course web page at <http://sfs.uni-tuebingen.de/~ccoltekin/courses/snlp/>

Cognition Science – Master

Course Title: Biorobotics - Lecture
Link: http://campus.uni-tuebingen.de/20181e170050
Course type: Lecture
Contact hours:
Course description
In this lecture, we will discuss technical tools to investigate and support biological motor control. This lecture is organised in collaboration with Syn Schmitt, Biomechanics and Biorobotics, University of Stuttgart. We will have at least three joint dates where we will meet with Students from Stuttgart and discuss the topics.

* Lecture * Title: Biorobotics Main topics: 1) Concepts of classical robotics (rigid bodies, PID controller ...) 2) Soft robotics (series elastic actuation, artificial muscles, soft material systems ...) 3) Rehabilitation robotics (prosthetics, exoskeletons, brain computer interfaces ...)

Course Title: Biorobotics - Seminar
Link: http://campus.uni-tuebingen.de/20181e170052
Course type: Seminar
Contact hours:
Course description
Title: Motion in Man and Machine Block Seminar in May + Seminar project and presentation Exact Dates to be announced in February

Course Title: Current Advances in Deep and Recurrent Neural Networks
Link: http://campus.uni-tuebingen.de/20181e169561
Course type: Seminar
Contact hours:
Course coordinator: M.Sc. Sebastian Otte
Course description
This lecture focusses on current advancements in deep and recurrent ANNs. Each participant will need to prepare a presentation on one of the covered papers, write a summary on the talk and paper, and review several of the other summaries.

Course Title: Efficient Linear Algebra and Machine Learning for CL
Link: http://campus.uni-tuebingen.de/20181e167101
Course type: Hauptseminar
Contact hours: 4
Course coordinator: Dr. phil. Daniël de Kok
Prerequisites
ISCL BA major: Introduction to CL Logic Statistics Java 1 + 2 + 3 ISCL BA minor: Introduction to CL Logic Java 1 + 2 ISCL MA students: Familiarity with the foundations of computational linguistics. Programming background equivalent to Java 1 + Java 2 or another statically-typed language, such as C, C++, C#, ML, or Haskell.
Course description
Computational linguists deal with increasingly large data sets and computationally-intensive machine learning techniques. For example, web corpora and deep learning have changed the computational linguistics landscape in the last decade. Coping with these changes not only requires the development of new algorithms and data structures, but also a renewed focus on efficiently implementing core data structure and algorithms. This Hauptseminar will introduce the Rust programming language. Rust is a safe, low-level programming language that was started by Mozilla Research. Rust allows a programmer to write efficient code with fine-grained control over memory layout. However, in contrast to many other low-level languages, Rust’s safety features preclude many types of bugs. Even though Rust is a low-level language, it provides many conveniences of high-level languages (such as Python, Ruby, and Haskell) through zero-cost abstractions, including algebraic data types, traits, and operator overloading. This course provides a comprehensive introduction to Rust, covering everything from the basics to advanced topics. Throughout the course, we will implement, benchmark, and discuss interesting data structures and algorithms from computational linguistics, linear algebra, and machine learning to practice Rust. After successfully completing course, you will be able to implement CL projects in Rust with an eye to efficiently.

Course Title: Flying Robots  (Course number: INF4364)
Link: http://campus.uni-tuebingen.de/20181e167877
Course type: Internship
Contact hours: 4

Course Title: Fundamentals of Sensorimotor Integration (Mo) (4085)
Link: http://campus.uni-tuebingen.de/20181e167360
Course type: Lecture
Contact hours: 2  
Course coordinator: apl. Prof. Dr. rer. nat. Uwe Ilg  
Course description  
The lecture provides an overview of sensorimotor integration in the animal kingdom, including man. One of the hallmarks of sensorimotor integration is the modification of sensory processing by ongoing executed motor actions. Since many motor actions are consequences of sensory stimuli, sensorimotor integration can be explained as a closed-loop feed-back system. The examples presented in the lecture extend from simple reactions and its learning-related modifications in the marine snail Aplysia to the complex eye movement pattern reflecting cognitive abilities in humans. The use of sub-human primates in this research is explained and justified in detail by different examples. On several occasions, basic principles of learning are addressed; the neuronal substrate of motor learning and adaptation is explained in detail. Tool use and tool fabrication observed by the Caledonian crows are introduced. The lecture places special emphasis on the visual system. Nevertheless, examples from other modalities such as the electric sense, the mechanism of echolocation and the importance of whiskers for prey detection in blindfolded seals are presented as well.

Course Title: Machine Learning: Algorithms and Theory  
(Course number: INFO4491)  
Link: http://campus.uni-tuebingen.de/20181e167914  
Course type: Lecture/Excercises  
Contact hours:  
Course coordinator: Prof. Dr. rer. nat. Ulrike Luxburg  
Course description:  
In many applications and domains, massive amounts of data are collected and processed every day. To be able to make efficient use of such data, there is an urgent need for tools to extract important pieces of information from the flood of unimportant details. Machine learning is a relatively young discipline that tries to deal with this problem, by designing algorithms to analyze large amounts of complex data in a principled way. Machine learning is the core technique in many applications such as spam filtering, object recognition, analyzing user preferences, recommender systems, and so on. Scientific disciplines such as biology, neuroscience, physics, or medicine discover the potential of machine learning methods for analyzing their empirical data. And, last but not least, many large companies like google, Amazon, facebook heavily rely on machine learning techniques. The field of machine learning combines ingredients from several fields: we need to design efficient algorithms to process the amount of data, and we need to ensure that predictions made by machine learning algorithms are statistically sound. The focus of the lecture is on algorithmic and theoretical aspects of machine learning. We will cover many of the standard algorithms, learn about the general principles for building good machine learning algorithms, and analyze their theoretical properties. - Supervised learning problems: Linear methods; regularization; SVMS; kernel methods - Unsupervised learning problems: Dimension reduction (kernel PCA, multi-dimensional scaling, manifold methods); spectral clustering and spectral graph theory - How to model machine learning problems: Bayesian decision theory, loss functions, feature selection, evaluation and comparison of algorithms. Common pitfalls - Online algorithms - Learning theory (no free lunch theorem; generalization bounds; VC dimension; universal consistency; Theorem of Stone) - Low rank matrix methods (collaborative filtering, low rank matrix completion, compressed sensing) The following topics are NOT going to be covered: decision trees, neural networks / deep networks, graphical models, Bayesian approaches to machine learning, reinforcement learning.  
Additional information:  
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Machine Learning and Artificial Neural Networks in Biomedical Applications  
(Course number: INFO4192)  
Link: http://campus.uni-tuebingen.de/20181e167895
Course type: Seminar
Contact hours:
Course coordinator: Dr. rer. nat. Martin Spüler
Course description
The Seminar “Machine Learning and Artificial Neural Networks in Biomedical Applications” covers current topics of signal processing on neural signals (e.g. fMRI, EEG or MEG) for their use in biomedical applications (e.g. neuroprosthetics or brain-computer interfaces, BCIs) and related topics; as well as methods and algorithms applied in those fields.

Im Seminar “Maschinelles Lernen und Künstliche Neuronale Netze in der biomedizinischen Anwendung” werden aktuelle Themen aus der Signalverarbeitung im Bereich der Verarbeitung von Nervensignalen (z.B. Neuroprothetik oder Brain-Computer-Interfaces), medizinischer Signalen (z.B.: fMRT oder MEG) oder verwandten Bereichen sowie in diesen Bereichen verwendeten Algorithmen der Signalverarbeitung bearbeitet.

Course Title: Machine Learning II  (Course number: NIP02B)
Link: http://campus.uni-tuebingen.de/20181e168042
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: Ph.D. Tjeerd Dijkstra, Prof. Dr.-Ing. Martin Giese
Prerequisites
Machine learning I
Course description
After the course, the participants will have a solid understanding of probability logic, Bayesian networks, inference and learning in Bayesian networks and Markov random fields with exact, (variational) EM and sampling methods. Moreover, the course covers modern stochastic process approaches in Machine learning, such as the Gaussian process and dynamical extensions.

Additional information

Course Title: Machine Learning Theory: Statistical Inference on Networks  (Course number: INFO4493)
Link: http://campus.uni-tuebingen.de/20181e168523
Course type: Seminar
Contact hours:
Course coordinator: Ph.D. Debarghya Ghoshdastidar
Course description
Modelling and learning from networks is an important research topic in many scientific disciplines. Statistical analysis of social networks reveals the reasons for making new connections, or how information spreads among people. On the other hand, study of brain and genetic networks helps in understanding different biological processes. In this seminar, we learn different applications, algorithms and theory related to networks. In particular, we look at how machine learning can be used to solve various network analysis problems. Prior knowledge of machine learning is not needed. The course will be held as a block seminar.

Additional information
http://www.tml.cs.uni-tuebingen.de/teaching/index.php

Course Title: Methodological Frontiers in the Cognitive Neurosciences  (Course number: NB04C)
Link: http://campus.uni-tuebingen.de/20181e168032
Course type: Seminar
Contact hours: 2  
**Course coordinator:** Prof. Dr. rer. nat. Andreas Bartels, apl. Prof. Dr. rer. nat. Christoph Braun, Dr. Marc Himmelbach, apl. Prof. Dr. rer. soc. habil. Hans-Gerhard Klinzing, PD Dr. rer. nat. Axel Lindner, Maren Prass  
**Target audience**  
Students Graduate School of Neural and Behavioural Sciences (MSc) Students Cognitive Science - Cognitive Neuroscience (MSc) Students Biology - Neurobiology (MSc)  
[Modul “Einführung in die Neurobiologie”, Anrechnung erfolgt durch Prof. J. Ostwald” (joachim.ostwald@uni-tuebingen.de)]  
**Additional information**  

**Course Title:** Motor Systems  
(Course number: NB03D)  
**Link:** [http://campus.uni-tuebingen.de/20181e164770](http://campus.uni-tuebingen.de/20181e164770)  
**Course type:** Lecture  
**Contact hours:** 2  
**Course coordinator:** o. Prof. Dr. med. Hans-Peter Thier  
**Prerequisites**  
Basic knowledge of brain anatomy and mechanical principles.  
**Course description**  
The course consists of 10 two-hours lectures. The first lectures introduce several of the major theoretical issues and concepts in the study of motor control such as the degrees of freedom problem or the inverse dynamics problem. This introduction is followed by a presentation of the major brain systems contributing to the control of various types of eye movements, hand movements as well as stance and gait. This overview consists of presentation of the organization of the motor periphery (peripheral nerves and muscles, neuromuscular junction, spinal cord), the architecture of motor and premotor cortices and their role in the guidance of hand movements, and an overview of the major subcortical structures involved in motor control (basal ganglia, cerebellum, superior colliculus), always followed by excursions into the consequences of disease, affecting the structures at issue.  
**Additional information**  
http://www.neuroschool-tuebingen-cogni.de/index.php?id=87

**Course Title:** Neural Coding  
(Course number: NIP01B)  
**Link:** [http://campus.uni-tuebingen.de/20181e168031](http://campus.uni-tuebingen.de/20181e168031)  
**Course type:** Lecture/Excercises  
**Contact hours:** 3  
**Course coordinator:** PD Dr. rer. nat. Philipp Berens, Prof. Dr. Matthias Bethge  
**Additional information**  

**Course Title:** Neural Data Analysis + Exercises  
(Course number: NIP03B)  
**Link:** [http://campus.uni-tuebingen.de/20181e168041](http://campus.uni-tuebingen.de/20181e168041)  
**Course type:** Lecture/Excercises  
**Contact hours:** 4  
**Course coordinator:** PD Dr. rer. nat. Philipp Berens, Dr. rer. nat. Alexander Ecker  
**Additional information**  
Course Title: Neurobiologisches Kolloquium  
Link: http://campus.uni-tuebingen.de/20181e163397  
Course type: Colloquium  
Contact hours: 2  
Course coordinator: Prof. Dr. rer. nat. Jan Benda, PD Dr. rer. nat. Gregor Hardieß, o. Prof. Dr. rer. nat. Hanspeter Mallot, Prof. Dr. rer. nat. Andreas Nieder  
Additional information  
http://www.cog.uni-tuebingen.de/talks.html

Course Title: Neuropsychology (Course number: NB06D)  
Link: http://campus.uni-tuebingen.de/20181e168034  
Course type: Lecture  
Contact hours: 2  
Course coordinator: Prof. Dr. med., Dr. phil. Hans-Otto Karnath, Dr. Marc Himmelbach  
Prerequisites  
Lecture course ‘Methods in Neuropsychology’ by M. Himmelbach (winter semester).  
Course description  
Neuropsychology bridges the fields of neurology and psychology to unravel and understand the relationship between structure and function in the human brain. Understanding of mental structure can inform theories about brain functions and knowledge about neural mechanisms are useful in understanding mental structure. One approach to understand processes such as language, attention, perception, action, sensory-motor integration, learning, consciousness etc. is to study neurological patients with brain damage. Other techniques used by neuropsychologists are functional neuroimaging (fMRI, PET, MEG) and function interference methods (TMS) in healthy and in brain-damaged subjects. The course will present neuropsychological disorders as well as results obtained by the latter techniques, both with respect to their contribution for our understanding of cognitive functions in humans.  
Additional information  

Course Title: Philosophy of Perception  
Link: http://campus.uni-tuebingen.de/20181e166325  
Course type: Hauptseminar  
Contact hours: 2  
Course coordinator: Dr. phil. Roberta Locatelli  
Course description  
Contact: Locatelli.robe@gmail.com  
Content: In this seminar, we will address a problem which is central to the philosophy of perception, so much so that it is often called ‘the puzzle of perception’. The problem arises from a tension between (a) our ordinary intuitions that perception puts us in a direct relation of awareness with objects and (b) the possibility of hallucinations (experiences that present the very same phenomenology of seemingly putting us in touch with an object, in the absence of such an object). How is possible for an experience to truly be a relation to mind-independent objects if it is possible for such an experience to occur in the absence of such objects? This problem has significant implications for a host of issues in the philosophy of mind, epistemology and metaphysics. In this seminar, we will explore different ways in which analytic philosophers have addressed this issue and the way in which the question itself has shifted and got refined over the past half-century.

Course Title: Philosophy of Vision & Consciousness  
Link: http://campus.uni-tuebingen.de/20181e166346  
Course type: Hauptseminar
Contact hours: 2
Course coordinator: Ph.D. Wesley Sauret

Course Title: Selected Topics in Cognitive Science SS: Episodic Memory: Learning and Behavior
Link: http://campus.uni-tuebingen.de/20181e170320
Course type: Seminar
Contact hours:
Course coordinator: o. Prof. Ph.D. Martin Butz, Dipl.-Psych. Johannes Lohmann

Course Title: Sensory Psychology (Lecture Psychophysical Methods and Seminar Colour Vision and Material Perception)
Link: http://campus.uni-tuebingen.de/20181e167960
Course type: Lecture
Contact hours: 4
Course coordinator: Ph.D. Tom Wallis
Additional information
http://www.nip.uni-tuebingen.de/teaching/lectures-seminars

Course Title: S Neurobiological principles of pleasure and desire
Link: http://campus.uni-tuebingen.de/20181e170444
Course type: Seminar
Contact hours: 2
Course coordinator: Dr. rer. nat. Nils Kroemer
Course description
Pleasure and desire are key facets of motivation driving goal-directed behavior. Although these motivational facets are commonly summarized by the term "reward", liking and wanting recruit separable circuits in the brain. Whereas dysfunctions in positive valence systems play a critical role in many mental disorders, the effectiveness of treating these dysfunctions is limited to date. One reason might be the challenge in mapping symptoms onto neurobiological mechanisms, which is exemplified in anhedonia. To this end, the seminar will delineate neurotransmission and core functional modules in the brain subserving pleasure and desire including pathological alterations in mental disorders. We will discuss the implications of recent cutting-edge work for future translational research and potential clinical applications (e.g., using biomarkers of motivation for classification and prediction of behavior). Moreover, we will discuss vital modulatory factors such as hormones and metabolic state that finesse pleasure and desire according to the need of the body. This will be related to broader implications for the design of biological versus artificial agents. Main literature (examples) Food reward: Berridge (2009); Berridge and Kringelbach (2015); Cameron, Chaput, Sjodin, and Goldfield (2017); Kenny (2011); (Keramati & Gutkin, 2014); Kroemer and Small (2016); Palmiter (2007) Addiction: Dubol et al. (2017); Garcia-Garcia, Zeighami, and Dagher (2017) Anhedonia: Ferenczi et al. (2016); Martinez-Molina, Mas-Herrero, Rodriguez-Fornells, Zatorre, and Marco-Pallares (2016); Treadway and Zald (2011) Structure of the seminar Each session will cover a paper on the topic, progressing from canonical neurobiology to dysfunctions in common disorders. This paper should be read by everyone to facilitate the discussion within the group. The findings and their potential application will be discussed. Attendees can select one of the topics for a brief term paper reflecting on the contribution of the paper to the field, limitations, and future directions. To facilitate applications, we will emphasize "lessons learned" for theory-guided study design working towards a principled approach (cf. research domain criteria). Attendance and grading Requirements will be according to the examination regulations of the attendees. Grades will be based on a talk (50%) and a brief term paper on one of the topics covered in the seminar (50%). ECTS points 3 (attendance: 90 min per week, 2 h slot) Bibliography (selected) Berridge, K. C. (2009). ‘Liking’ and ‘wanting’ food rewards: brain substrates and roles in eating disorders. Physiol Behav, 97(5),
Course Title: Evolutionary Cognitive Neuroscience (4108)
Link: http://campus.uni-tuebingen.de/20181e167372
Course type: Lecture/Excercises
Contact hours: 4
Course coordinator: Ph.D. Katharina Brecht
Target audience
Students of biology, cognitive science, psychology, and related areas
Prerequisites
Knowledge about fundamental neuroscience, behavior and physiology is required.
Course description
This 6CP-Module consists of the lecture “Evolutionary Cognitive Neuroscience” (Mo, 4-6 pm) and
the seminar “Physiology of Cognition and Behaviour” (Mo, 2-4 pm; see Campus): With a strong
emphasis on evolutionary and comparative aspects, the lecture “Evolutionary Cognitive
Neuroscience” addresses the behavioural and neural foundations of cognition in the animal
kingdom (from insects to humans) from a comparative perspective. Topics comprise: Theory of
evolution; evolutionary neuroscience; phylogeny and ontogeny of communication & social
cognition; neuroethological model systems of cognition, core knowledge of objects, actions,
number, and space. The topic of the seminar “Physiology of Cognition and Behaviour” in the
summer term 2016 is “Numerical competence: from behaviour to neurons”. Recent findings from
the current literature will be presented and discussed. This seminar aims at elucidating
behavioural and neuronal mechanisms and principles giving rise to cognition and complex
behaviour.

Course Title: S-Schiene (Mo): Physiology of Cognition and Behaviour
Link: http://campus.uni-tuebingen.de/20181e167373
Course type: Seminar
Contact hours: 2
Course coordinator: Ph.D. Katharina Brecht

**Target audience**
Participants of the Module “Evolutionary Cognitive Neuroscience 4108”. Students of Biology and related areas Master students of Cognitive Science

**Prerequisites**
basic knowledge of animal behavior, psychophysics, and neurophysiology

**Course description**
Topic of summer term 2018: Social cognition from an evolutionary perspective. Recent findings from the literature will be presented and discussed, ranging from face perception to theory of mind and cooperation.

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**Course Title**: Topics in the Philosophy of Mind: Mental Representation  
**Link**: [http://campus.uni-tuebingen.de/20181e166349](http://campus.uni-tuebingen.de/20181e166349)  
**Course type**: Hauptseminar  
**Contact hours**: 2  
**Course coordinator**: o. Prof. Dr. Hong Yu Wong  
**Course description**
This Hauptseminar will focus on 2 different topics in the philosophy of mind. In the first half we will focus on topics concerning self-representation, such as first person thought and its connections to action and perception. In the second half we will read selections from Christopher Peacocke’s forthcoming monograph The Primacy of Metaphysics, which argues for the primacy of metaphysics over mental representations in determining the structure of mind.

**Course Title**: Visual Information Processing in Perception and Action  
**Link**: [http://campus.uni-tuebingen.de/20181e167964](http://campus.uni-tuebingen.de/20181e167964)  
**Course type**: Colloquium  
**Contact hours**:  
**Course coordinator**: Prof. Dr. rer. nat. Volker Franz

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**Psychology – – Bachelor**

**Course Title**: FS Cognitive Control  
**Link**: [http://campus.uni-tuebingen.de/20181e169709](http://campus.uni-tuebingen.de/20181e169709)  
**Course type**: Forschungsseminar  
**Contact hours**: 2  
**Course coordinator**: Ph.D. Ian Grant Mackenzie  

**Course Title**: FS Metacognitive monitoring of our own cognitive processes  
**Link**: [http://campus.uni-tuebingen.de/20181e169639](http://campus.uni-tuebingen.de/20181e169639)  
**Course type**: Forschungsseminar  
**Contact hours**: 2  
**Course coordinator**: Ph.D. Donna Bryce

**Course Title**: S Bayesian Estimation and Model Comparison  
**Link**: [http://campus.uni-tuebingen.de/20181e169956](http://campus.uni-tuebingen.de/20181e169956)  
**Course type**: Seminar  
**Contact hours**: 2  
**Course coordinator**: PD Dr. phil. Martin Lages  
**Course description**
Modern statistical tools enable us to build and test tailored models of cognitive processing. In this seminar and tutorial we will model discrete and continuous data using examples from a range of
experimental topics and studies. We will discuss different sampling approaches and work through a number of exercises using packages in R/RStudio. Some programming knowledge and exposure to R would be beneficial but is not essential. PBYOL (please bring your own laptop).

**Course Title:** S For better or worse: Applying mechanisms of behaviour change  
**Link:** http://campus.uni-tuebingen.de/20181e169878  
**Course type:** Seminar  
**Contact hours:** 2  
**Course coordinator:** Michael Vliek  

**Course description**
Social psychology offers theories, methods and evidence that help explain and predict everyday, 'normal' human behaviour. Such knowledge is increasingly recognized as central to many of the challenges the individual, the state and civil society faces. As a result, social psychological findings are being applied across public, commercial and charity sectors, often with the goal to influence people and change their behaviour. In the current course, we will analyse concrete human behaviour in applied settings (e.g., voting behaviour, organ donation, unhealthy eating, use of public transport, smoking, discrimination, exercise, recycling, vaccination, speeding, shopping) using social psychological theory. We will analyse determinants of such behaviour, identify mechanisms of behaviour change and critically evaluate potential interventions. The class will be directed toward the application of social psychological insights to practice and real world situations. Language: English Examination: Short presentation (English) Individual paper (German or English language) Literature: Van der Pligt, J., & Vliek, M. (2016). The psychology of influence: Theory, research and practice. Routledge. ISBN-13: 978-1138655393.