

Summer Semester Courses 2011

Summer semester dates:

The official dates of next year's summer semester are May 2, 2011 until July 31, 2011. Please note, however that, due to the semester being a week shorter than normal, Block IV goes until August 5, 2011.

Within the "regular" semester dates:

Block I: 02.05.2011 – 27.05.2011

Block II: 30.05.2011 – 24.06.2011

Block III: 27.06.2011 – 15.07.2011

Block IV: 18.07.2011 – 05.08.2011

Outside of the semester dates:

Block V: 08.08.2011 – 02.09.2011

Block VI: 05.09.2011 – 23.09.2011

Block VII: 26.09.2011 – 14.10.2011

Required courses for second semester students:

- **Individual Research Training 2 (IRT2)**

Schedule: all semester

ECTS: 5

Module: P6.1

Students conduct a semester-long independent research project in a lab of their choice. The IRT2 module must be carried out in a different lab from the IRT1. Projects will usually be suggested by the lab advisor, but should be developed further by the student. Once they identify a topic, students research relevant background literature and write a research plan that they discuss with various people in the lab. They then conduct the study, write a final report in the style of a scientific manuscript (10,000 – 30,000 characters), and prepare a poster (as part of the Skills 3 course – see this entry for details).

- **Skills 3: Poster & Discussion**

Instructors: Edler, Wolinska

Times: all day for two days, and then Mondays 13:30 – 15:00 in Block IV

Dates: Apr 28 – 29, 2011, Mondays from July 18 – August 5, 2011

ECTS: 1

Module: P6.2

Students learn how to make a poster using standard software. With the skills they learn

in this seminar, they prepare a poster about their IRT2 research project, which they present at the annual EES Conference in October.

- **Seminar & Discussion 2: Global Change**

Instructors: Wörheide, Wolinska

Schedule: all semester (Block I – IV)

Times: Mondays, 15:15 – 16:45

ECTS: 3

Module: P6.3

Students read and discuss scientific publications on classical themes of Evolution, Ecology, and Systematics. They prepare presentations in different formats and lead discussions on selected scientific studies, which are chosen by the instructors.

- **EES Excursion**

Instructors: Laforsch, Witte, Wolinska

Times: all day

Dates: June 20 – June 24, 2011

ECTS: 3

Module: P7.1/2

Scope of the EES excursion is to learn about the biodiversity and ecology of typical German habitats. We plan to explore alpine habitats in a three day hiking trip. The following two days we visit additional aquatic and terrestrial habitats in the area around Munich. Preparing for the excursion, the students will be requested to specialize in certain habitats in order to give lectures to the rest of the group later during the field trips.

- **Statistics**

Instructor: Metzler

Dates: all semester (Block I – III)

Times: Monday 13:15 – 15:00, as well as a block course from May 23 – May 27 (9-18)

ECTS: 3

Module: P7.3/4

This course consists of both lectures and exercises. The lectures will provide the students with an overview of the most important topics in statistics for biologists. Topics include applied statistical testing, analysis of variance, regression and likelihood methods, and analysis of variance (ANOVA). In June, students will go on a field trip (see course entitled Excursion), where they will collect and analyze field data. During the “exercises” portion of the course in July, students will spend a full week applying the knowledge they have gathered during the lectures and field trip, and becoming familiar with statistics software programs (e.g. R and SPSS).

Elective Block Courses for EES and MEME second and fourth semester students

No set dates – contact instructor or attend preliminary meeting

- **Spermatophytes (Lecture, Seminar & Practical)**

Instructor: Gottschling

ECTS: 9

Module: P 8

Registration by 01.05.2011 under email address given below. Preliminary meeting on 02.05.2011 at 17:00 in C00.013. Please also contact instructor (gottschling@biologie.uni-muenchen.de) in order to find out if this module will be conducted in English or German.

Excursions:

Due to the current political situation in Egypt, the “Coral Reef Field Course in the Red Sea” has been cancelled.

- **Ponza: Ecophysiology of Bird Migration**

Instructors: Goymann, Cardinale, Fusani

Dates: 30.04.2011 – 07.05.2011 (application deadline for this excursion is 14.02.2011!)

ECTS: 3

Max. Number of Participants: 5

Costs: ca. €300

This course has both a theoretical and a practical part. During the theoretical part, you will be listening to 5 lectures on migration, given by the 3 instructors. You will also be asked to give a presentation on a selected topic in bird migration.

The practical part is also divided into 2 parts. In one part, you will be concentrating on bird ringing (identification, capture, sexing and measurement of birds), while in the other, you will be conducting experiments in order to study migratory restlessness in different species. For a more detailed description (including costs, application procedure and contact information) on this course, see the PDF.

Before Block I:

- **Evolutionary Ecology Modelling**

Instructor: Gabriel

Dates: 11.04.2011 – 29.04.2011, plus one extra block of your choice

Times: 09:00 – 17:00 (daily)

ECTS: 6

Module: P 8.0.7/8

This course, which consists of both lectures and exercises, will provide an overview of models and modeling approaches. During the lectures, students learn about various population growth models, different population interactions, simple quantitative and population genetics, and stochastic processes. The theory is applied to an example such as the evolution of pesticide resistance. Students learn methods such as time continuous models, time discrete models, individual-based models, and modeling of stochastic processes. During the exercises, students will analyze and apply different modeling approaches. They will be trained to outline, develop, and run a model using programming tools. Please note: when signing up for the course, students must select another block in which to complete their independent modeling project.

Please contact instructor (Wilfried.Gabriel@lrz.uni-muenchen.de) to sign up for this course!

Block I:

- **Introduction to Satellite Remote Sensing and GIS**

Instructor: Siegert

Dates: 02.05.2011 – 13.05.2011

Times: 09:00 – 13:00 (daily)

ECTS: 3

Module: P10.0.43

The aim of this course is to provide a first insight into the potential of satellite remote sensing and Geographical Information Systems (GIS) in the field of environmental monitoring. In the first part of the course we will give an introduction into various methods of image processing (using ERDAS IMAGINE). Satellite images will be analyzed for environmental impacts such as land cover change, deforestation and the impacts of fire and storm on ecosystems. The second part will give an introduction into GIS (using ARCGIS) and its basic functions for spatial analysis and cartography.

Please contact instructor (siegert@rssgmbh.de) to sign up for this course!

- **Basic Evolutionary Genomics**

Instructor: Parsch

Times: 12:00 – 14:00

Dates: Block I (02.05.2011 – 20.05.2011)

ECTS: 3

Module: P8.0.1/2

This block course will consist of lectures and exercises that provide an introduction to the field of genomics, with emphasis on methods and evolutionary applications. Topics include: genome sequencing and annotation, bacterial genomes, eukaryotic genomes, transcriptomics, interactomics, proteomics, metabolomics.

- **Principles of Behavioural Ecology**

Instructors: Witte, Kempenaers, Goymann, Brumm

Times: Variable

Dates: Block I (02.05.2011 – 20.05.2011)

ECTS: 3

Module: P8.0.17/18

In this lecture- and seminar-based module we give a thorough introduction into the field of behavioral ecology. We cover the following subjects: mechanisms of behavior, communication, sexual selection, mating systems and parental care, life history, altruism and cooperation, cooperative breeding in birds and mammals, eusocial insects, habitat choice and migration and human behavioral ecology. The class is taught by behavioral ecologists working on birds and eusocial insects, so that different perspectives allow a comprehensive overview of this field.

Lectures will cover the history of behavioral ecology; mechanisms of behavior; visual, acoustic and chemical communication; mating systems; parental care; life history; cooperation; socio-biology; orientation; and human behavioral ecology.

Tutorials will include discussions of the scientific content of lectures, reading of relevant literature, working on questions, and presentations by students.

Block II

- **Population Genetics I (lecture & practical)**

Instructors: Stephan, Hutter

Times: variable

*Dates: Blocks II & III – **please note that course spans 2 blocks***

ECTS: 6

Module: P8.0.5

This block course consists of both lectures and computer exercises. The lecture spans two blocks, and the computer course takes place during the last three weeks. The lecture provides insight into general principles of population genetics. Topics of discussion include forces like genetic drift, natural selection, migration and genetic mechanisms such as mutation and recombination. Specific examples will be used to show how the mechanisms affect genetic variability in plants and animals (including humans). The following topics will be covered in detail:

- Introduction (Genetic variability, Hardy-Weinberg Law, classic models of natural selection)
- Neutral theory of molecular evolution (genetic drift, mutation, recombination, effective population size, coalescent)
- Detecting natural selection (positive and negative selection, balancing selection)
- Population structure, demographic processes and systems of reproduction
- Linkage disequilibrium
- QTL analysis

- Special applications (human evolution, genome projects, uncovering disease genes using DNA polymorphism)

The aim of the computer course is to gain a better and more in-depth understanding of the topics introduced in the lecture. Modeling and analysis software will be used to visualize population genetic principles and exemplify the impact of different evolutionary forces on genetic variability. The course will focus on following topics:

- DNA polymorphism
- The neutral theory
- Effective population size
- Inbreeding and structured populations
- Genealogies and demographic models
- Recombination and linkage disequilibrium
- Various forms of selection
- Selection and polymorphism
- Neutrality tests

- **Mycology: Diversity and Evolution of Fungi**

Instructor: Agerer

Times: Variable

Dates: Block II

ECTS: 3

Module: P8.0.29/30

The students will learn that fungal organisms occur in different eukaryotic kingdoms and the reasons for their affiliations to these kingdoms, and will be able to distinguish between those characters useful for delimitation of relationships and those with adaptive values developed in parallel in different relationships. “Evolutionary tendencies” and key-innovations will be discussed, and it will be highlighted that substrate specialization and co-evolution with plants promote evolution of fungi. The importance of ultrastructural, chemical, anatomical, ecological, and DNA-sequence-data for phylogenetic reconstructions will be critically discussed.

Block III

- **Population Genetics I**

See Block II for description!

- **Archeometry (Lecture & Practical)**

Instructor: Grupe

ECTS: 3

Module: P10.0.3/4

Please contact instructor (g.grupe@lrz.uni-muenchen.de) for more information!

- **Plant Ecophysiology: Research at the Plant-Environment Interface**

Instructor: Matyssek, Fleischmann, Grams, Häberle

Times: contact instructor

Dates: Block IV

ECTS: 5

Module: P8.0.13/14

Plant ecophysiology deals with the interaction of plants with their abiotic and biotic environment (e.g. drought, global change, plant-plant competition). This course gives an introduction to actual research questions and hot topics in this ecological discipline. Students will be introduced to key methods and actual research projects of the lab at various field sites. Central part of this course is developing and perusing own research ideas by the participants and implementing them within the framework of the research done in the lab. Practical field work is typically performed at one of the field stations nearby the university campus in Freising-Weihenstephan. Most teachers are researchers of the various lab projects (i.e. PhD students, Post docs, research associates).

First Week: Research topics in plant ecophysiology

Theoretical and practical introduction to various research projects of the lab. Each day is dedicated to a specific research project.

Morning sessions: Lectures on methods and research projects, literature discussions

Afternoon sessions: Visiting of research projects in the field

Second Week: Student's research questions

Setting students' research questions into action in the framework of a research project of the lab (as introduced during the first week). Groups 2-3 students per research project.

Develop research hypothesis, establish and use of various methods, taking samples, making measurements,...

Third Week: Data evaluation and project presentations

Evaluation of data, writing paper on student's research in projects and final presentation of research done.

Please contact PD Dr. Thorsten Grams (grams@tum.de) for more information and to sign up for this course.

Block IV

- **Advanced Evolutionary Genomics**

Instructors: Parsch

Times: 12:00 – 14:00

Dates: Block IV

ECTS: 3

Module: P8.0.3/4

This block course will consist of lectures and exercises that cover advanced topics in evolutionary genomics, including: comparative genomics, evolution of genome size, gene and genome duplication, origin of new genes, isochores and GC content, codon bias, evolution of sex-biased genes, evolutionary functional genomics.

- **Experimental Behavioural Ecology (Lecture & Practical)**

Instructor: Witte, Forstmeier, Goymann

Times: Variable

Dates: Block IV

ECTS: 3

Module: P8.0.19/20

Experimental research with animals (birds, humans, fish, insects) to address questions about sexual selection, communication, orientation, and sociobiology. This lab course gives hands-on experience in diverse experiments in behavioral ecology. Short lectures introduce the scientific background to the experiments. Experiments cover a wide range of subjects and study organisms: Sexual selection in guppies (fish), nestmate recognition, division of labour and communication in ants, mate choice in humans and birds. Students are guided to develop their own experiments from the experimental design to the statistical analysis.

- **Soil Mycomicrobiology (Lecture & Practical)**

Instructor: Agerer

Times: Variable

Dates: Block IV

ECTS: 3

Module: P8.0.21/22

This course consists of both lectures and a practical. Lectures will cover different topics in soil mycomicrobiology, including fine root systems, determination of microbial biomass, physiological activity (enzyme tests of soil), patterns of substrate utilization, soil fungi, hyphal amounts in root horizons, ecological characterization of ectomycorrhizae, interactions between Nematodes and fungi, litter decomposition in the soil, and bacterial populations in the soil. Students will learn about the complexity of agriculturally- and silviculturally-used soils and of their microflora.

- **Multivariate Statistics (Lecture & Practical)**

Instructor: Metzler

Times: 09:00 – 18:00

Dates: Block IV

ECTS: 3

Module: P 10.0.45/46

- **Microscopic Anatomy and Histology of Vertebrates (Lecture & Practical)**

Instructor: Starck, Gerth

Times: 13:00 – 16:15

Dates: Block IV

ECTS: 3

Module: P8.0.9/10

Block V:

- **Aquatic Ecology (mini-Block)**

Instructor: Laforsch

Times & Dates: contact instructor (laforsch@zi.biologie.uni-muenchen.de)

ECTS: 1.5

Module: P 8

- **Microarray Analysis in Evolution**

Instructor: Parsch

Times: contact instructor (parsch@zi.biologie.uni-muenchen.de)

Dates: Block V

ECTS: 3

Module: P10.0.17/18

This block course will mainly be held in the form of a seminar, with students presenting and discussing papers from the current literature in the field of evolutionary transcriptomics. There will also be introductory lectures by the instructor, presentations of transcriptomics-related research projects, and a practical demonstration of microarray equipment.

- **Marine Biology (Seminar and Excursion to Banylus-sur-mer, France)**

Instructor: Haszprunar, Heß

Dates & Times: most probably in September 2011, but exact dates will be given

ECTS:

Module: P8.0.43/44

Preliminary meeting on 03.05.2011 in room B01.045.