



# *International Master Horticultural Science*

---

## Summer Semester 2009 (30 ECTS)

---

**Location: TUM - Center of Life Sciences Weihenstephan, Freising**

The courses offered at TUM cover two main fields of targeted plant cultivation: “environmental safety” and “intrinsic product quality”. They include special topics on “Energy use and protected cultivation systems” and “Optimization of plant metabolism for both plant resistance and human health”.



Place of an ancient Christian monastery and the oldest beer brewery of the world

<b>Äquivalent lt. Prüfungsordnung</b> <i>Official name</i>	<b>Lehrangebot SoSe 2009</b> <i>Lectures/Exercises, offered in SoSe 2009</i>	
<b>“Biotechnology in horticulture”</b>	Biotechnology in Horticulture, (2.5 credits),	Lecture (Hauser)
	Exercise, Biotec I (2.5 credits)	<i>Somatic embryogenesis and adventitious root formation; Acclimatization of micropropagated plants</i> (Hauser)
	Exercise, Biotec II (2.5 credits)	<i>Biological and technical principles of callus and cell cultures</i> (Rühmann)
	Exercise, Biotec V (1.25 credits)	<i>Experiments in micropropagation and plant tissue culture</i> (Habegger)
<b>“Control and optimization of secondary plant metabolites”</b>	Bioactive compounds in fruits and vegetables and secondary plant metabolites (2.5 credits)	Lecture (Treutter)
	Exercise BioComp II (2.5 credits)	<i>Elicitation of secondary metabolites, on-destructive quantification, HPLC</i> (Rühmann, Treutter)
	Exercise BioComp I (2.5 credits)	<i>Biochemistry of reactive oxygen species and free radicals: Antioxidant capacity of secondary plant metabolites</i> (Schempp)
	Exercise BioComp III (2.5 credits)	<i>Plant Metabolomics</i> (Farag, Shulaev, Regos, Treutter)
<b>“Genetic and environmental control of vegetal plants” = “Ecophysiology and crop quality”</b>	Ecophysiology and Crop Quality (5 credits)	<i>Aroma volatiles in vegetable crops</i> (Habegger) <i>Influence of mineral nutrition on crop quality</i> (von Tucher)
<b>“Methods in woody plant pathology”</b>	<i>Histology and Histochemistry</i>	Lecture, Exercises (Neumüller)
<b>“Energy conservation and alternative energy resources”</b>	Energy conservation and alternative energy resources (5 credits)	Lecture + exercises (Meyer, Pietzsch)
<b>“Ecophysiology: technical procedures and principles of protected cultivation”</b>	Summerschool "EnviroHort", Environmental protection	Meyer et al., Hauser, Steinbacher
<b>“Systems analysis as a research method “</b>	Systems analysis as a research method (systems evaluation), <i>lecture 2.5 credits</i>	Lecture (Meyer)
	Exercise, Syst. Anal. I (2.5 credits)	Meyer, Pietzsch
	Exercise, Syst. Anal. II (2.5 credits)	Introduction to modelling of plant growth (Gayler, Treutter)
<b>Research and science management</b>		Lux-Endrich

## Environmental protection

### Modules

#### A) Energy conservation and alternative energy resources

Mandatory lecture, 5 credits (Meyer, Pietzsch)

#### B) Systems analysis as a research method (systems evaluation), 5 credits are required

- Mandatory lecture, 2.5 credits (Meyer)
- Elective exercises:
  - Syst Anal. I, 2.5 credits (Meyer, Pietzsch)
  - Syst Anal. II, 2.5 credits: *Introduction to modelling of plant growth* (Gayler)

#### C) Ecophysiology: Technical procedures and principles of protected cultivation

Mandatory lecture, 5 credits (Meyer et al., Hauser, Steinbacher)

## Intrinsic product quality

### Modules

#### D) Bioactive compounds in fruits and vegetables and secondary plant metabolites

- Mandatory lecture, 2.5 credits (Treutter)
- Elective exercises:
  - Exercise BioComp I, 2.5 credits: *Biochemistry of reactive oxygen species and free radicals: Antioxidant capacity of secondary plant metabolites* (Schempp)  
max. number of participants: 8
  - Exercise BioComp II, 2.5 credits: *Elicitation of secondary metabolites; non-destructive quantification; HPLC-Analysis* (Rühmann, Treutter)  
max. number of participants: 8
  - Exercise BioComp III, 2.5 credits: *Plant Metabolomics* (Farag, Shulaev, Regos, Treutter)  
max. number of participants: 8

#### E) Biotechnology in Horticulture

- Mandatory lecture, 2.5 credits (Hauser, Neumüller)
- Elective exercises:
  - Biotec I, 2.5 credits: *Somatic embryogenesis and adventitious root formation; Acclimatization of micropropagated plants* (Hauser)  
max. number of participants: 12
  - Biotec II, 2.5 credits: *Biological and technical principles of callus and cell cultures* (Rühmann)  
max. number of participants: 10
  - Biotec III, 2.5 credits: *Histology and Histochemistry* (Neumüller)  
max. number of participants: 6
  - Biotec IV, 1.25 credits: *Experiments in micropropagation and plant tissue culture* (Habegger)  
max. number of participants: 2

#### F) Ecophysiology and Crop Quality

- Mandatory lecture, 5 credits: *Genetic and environmental control of vegetal crops* (Habegger, von Tucher)

## General Schedule

Summer Semester 2009, TUM

	Week of the year	Date	
Block 1	15	07. - 09.04.	<b>Lectures, mandatory Modules A, B, D, E, F</b>
	16	14. - 16.04.	
	17	20. - 24.04.	
	18	27.04. - 01.05.	
	19	04. - 08.05.	
Block 2	20	11. - 15.05.	<b>Mandatory lectures, modules A, F Elective exercises, modules B, D, E</b>
	21	18. - 22.05.	
	22	25. - 29.05.	
	23	01. - 05.06.	
	24	08. - 12.06.	
	25	15. - 19.06.	
	26	22. - 26.06.	
	27	29.06. - 03.07.	
	28	06. - 10.07.	
	29	13. - 17.07.	
Block 3	30	20. - 24.07.	<b>Module C, mandatory</b>
	31	27. - 31.07.	
Block 4	32	03. - 07.08.	<b>Presentations (students)</b>
	33	10. - 14.08.	<b>Oral Examinations</b>

### Student Advisory Service:

Dipl.-Ing.agr. Carina Menk

Fachgebiet Technik im Gartenbau, Dürnast 4, D-85354 Freising

Tel: +49 (0)8161 71 3447, [carina.menk@wzw.tum.de](mailto:carina.menk@wzw.tum.de)



Prof. Dr. habil. Joachim Meyer

Fachgebiet Technik im Gartenbau,  
Dürnast 4, D-85354 Freising  
Tel: +49 (0)8161 71-3448  
[joachim.meyer@wzw.tum.de](mailto:joachim.meyer@wzw.tum.de)

Prof. Dr. habil. Joachim Meyer, Unit of Horticultural Engineering; greenhouse construction and climate control, production process, documentation and evaluation, ecophysiology/physics of plant environment.



Prof. Dr. habil. Dieter Treutter

Fachgebiet Obstbau,  
Dürnast 2, D-85354 Freising  
Tel: +49 (0)8161 71-3753  
[dieter.treutter@wzw.tum.de](mailto:dieter.treutter@wzw.tum.de)

Prof. Dr. habil. Dieter Treutter, Unit of Fruit Science; bioactive compounds in plants and their physiological role. Special topic of research is the role of phenolics in plant resistance and the induction of their biosynthesis



Dr. Bernhard Hauser, Akad. Direktor

Gewächshauslaborzentrum,  
Dürnast 3, D-85354 Freising  
Tel: +49 (0) 8161 71 5003  
[hauser@wzw.tum.de](mailto:hauser@wzw.tum.de)



Dr. Ruth Habegger

Biomolekulare  
Lebensmitteltechnologie,  
Hochfeldweg 2, D-85354 Freising  
Tel: +49 (0) 8161 71 3429  
[habegger@wzw.tum.de](mailto:habegger@wzw.tum.de)



Dr. Susanne Rühmann

Fachgebiet Obstbau,  
Dürnast 2, D-85354 Freising  
Tel: +49 (0)8161 71 3129  
[susanne.ruehmann@wzw.tum.de](mailto:susanne.ruehmann@wzw.tum.de)



Dr. Michael Neumüller

Fachgebiet Obstbau,  
Dürnast 2, D-85354 Freising  
Tel: +49 (0)8161 71 3238  
[neumueller@wzw.tum.de](mailto:neumueller@wzw.tum.de)



Dr. agr. Sabine von Tucher,  
Akad. ORätin

Lehrstuhl für Pflanzenernährung  
Am Hochanger 2, 85350 Freising  
Tel: +49 (0)8161 71 5084  
[tucher@wzw.tum.de](mailto:tucher@wzw.tum.de)

Dr. rer.nat Harald Schempp

Lehrstuhl für Pytopathologie  
Am Hochanger 2, 85350 Freising  
Tel: +49 (0)8161 713737 or 715626  
[h.schempp@lrz.tum.de](mailto:h.schempp@lrz.tum.de)

Dipl.-Ing. agr. Markus Pietzsch

Fachgebiet Technik im Gartenbau,  
Dürnast 4, D-85354 Freising  
Tel: +49 (0)8161 71 3447  
[markus.pietzsch@wzw.tum.de](mailto:markus.pietzsch@wzw.tum.de)

Prof. Mohammed Farag,  
Erasmus Mundus Scholar

Prof. Vladimir Shulaev,  
Erasmus Mundus Scholar

---