Course description

Department/Unit /	KCH / SEMIS			**Academic Year**	2016/2017
Title	Seminar - Light and Electron Microscopy			**Type of completion**	Pre-Exam Credit
Accredited/Credits	Yes, 2 Cred.			**Type of completion**	Oral
Number of hours	Seminář 1 [Hours/Week]				
Occ/max	Status A	Status B	Status C	**Course credit prior to**	NO
Summer semester	0 / -	0 / -	0 / -	**Counted into average**	NO
Winter semester	10 / -	28 / 35	0 / 0	**Min. (B+C) students**	not determined
Timetable	Yes			**Repeated registration**	NO
Language of instruction	Czech			**Semester taught**	Winter semester
Substituted course	KFY/SEMIS			**Internship duration**	0
Preclusive courses	N/A				
Prerequisite	N/A				
Informally recommended courses	N/A				
Courses depending on this Course	N/A				

Course objectives:

Special methods of light and electron microscopy with the emphasis on using in biophysical methods. Modern microscopy methods and their possible application for subcellular structures observing and for analysis of surface structure of solids.

Requirements on student

Evaluation of the subject as well as the exam grading is made according to the articles No 31 - 33 in the Regulations on Study and Examinations University of Ostrava

Content

Special methods of light and electron microscopy with the emphasis on using in biophysical methods. Modern microscopy methods and their possible application for subcellular structures observing and for analysis of surface structure of solids.

1. Specification of seminar works.
2. UV and IR microscopy. Introduction, instrumentation, application.
3. Interference microscopy. Introduction, instrumentation, application.
4. Fluorescence microscopes. Introduction, instrumentation, application.
5. Scanning near-field optical microscopy (SNOM). Introduction, instrumentation, application.
6. Scanning tunnelling microscopy (STM). Introduction, instrumentation, application.
7. Atomic force microscopy (AFM). Introduction, instrumentation, application.
8. Environmental electron microscope. Introduction, instrumentation, application.
9. X-rays structural analysis. Introduction, instrumentation, application.
10. Digital recording of image (CCD cameras).
11. Software for image processing and analysis.
12. Micromanipulators, ultramicrotomes, methods of freeze-etching and freeze-fracturing.
13. Granting of credits.

Prerequisites - other information about course preconditions

Competences acquired

The student has knowledge of special methods of light and electron microscopy with the emphasis on using in biophysical methods. The student knows modern microscopy methods and their possible application for subcellular structures observing and

for analysis of surface structure of solids.

Fields of study

Guarantors and lecturers

- **Guarantors:** doc. RNDr. Jiří Kalina, Ph.D.
- **Seminar lecturer:** doc. RNDr. Jiří Kalina, Ph.D.

Literature

- **Basic:** High-Magnification Stereoscopy - http://www.funsci.com/fun3_en/hmster/hmster_en.htm >
- **Basic:** http://ceg.fsv.cvut.cz/CZ/ceg-vyzkum/mikroskopie.htm - http://ceg.fsv.cvut.cz/CZ/ceg-vyzkum/mikroskopie.htm >
- **Basic:** http://encyklopedie.seznam.cz/heslo/139109-mikroskopie-atomarnich-sil - http://encyklopedie.seznam.cz/heslo/139109-mikroskopie-atomarnich-sil >
- **Basic:** http://www.funsci.com/fun3_en/usph/usph.htm - http://www.funsci.com/fun3_en/usph/usph.htm >
- **Basic:** http://www.funsci.com/texts/index_en.htm - http://www.funsci.com/texts/index_en.htm >
- **Basic:** http://www.matexpm.com/lext.htm - http://www.matexpm.com/lext.htm >
- **Basic:** http://www.paru.cas.cz/lem/book/ - http://www.paru.cas.cz/lem/book/ >
- **Basic:** http://www.vscht.cz/sls/vyzkum/metody/polarizacni_mikroskopie.htm - http://www.vscht.cz/sls/vyzkum/metody/polarizacni_mikroskopie.htm >
- **Basic:** Microscopy and Analysis - http://www.microscopy-analysis.com >
- **Recommended:** SMÉKAL, P. *Experimentální metody biofyziky II. Světelná a elektronová mikroskopie. 1. vyd. 220 s.*. Ostrava: Ostravská univerzita, 1995. ISBN 80-7042-723-X.
- **Recommended:** *Další aktuální knižní a časopisecká literatura*.

Time requirements

Activities	Time requirements for activity [h]
Being present in classes	13
Semestral work	15
Self-tutoring	5
Scientific text studying in a foreign language	10
Preparation for a credit test	5
Consultation of work with the teacher/tutor (incl. electronic)	5
Total:	**53**

assessment methods

professional knowledge

Continuous analysis of student´s achievements

Dialogue

teaching methods

professional knowledge

Dialogic (discussion, dialogue, brainstorming)

Projection (static, dynamic)

Working with text (coursebook, book)

learning outcomes

professional knowledge - knowledge resulting from the course:

The student has knowledge of special methods of light and electron microscopy with the emphasis on using in biophysical methods. The student knows modern microscopy methods and their possible application for subcellular structures observing and for analysis of surface structure of solids.

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Applied Physics	Bachelor	Full-time	Biophysics	1	2012	2016	Povinné předměty	A	2	ZS
Applied Physics	Bachelor	Full-time	Biophysics	1	2014	2016	Povinné předměty	A	2	ZS
Biology	Bachelor	Full-time	Experimental Biology	1	2	2016	Povinně volitelné předměty	B	2	ZS
Biology	Bachelor	Full-time	Experimental Biology	1	2016	2016	Povinně volitelné předměty	B	2	ZS
Chemistry	Postgraduate Master	Full-time	Analytical Chemistry of Solid Phase	1	2013	2016	Povinně volitelné předměty	B	2	ZS