1/11/1	

ENVIRONMENTAL AND BIOMATERIAL SCIENCES							
A. Povinné kurzy (Compulsory courses)	B. Povinně volitelné teoretické kurzy (Compulsory optional courses)	C. Povinně volitelné praktické kurzy (Specialized laboratories and practicals)	D. Povinně volitelné doplňkové kurzy (Optional courses)				
Conference participation	Advances in biotechnology	Laboratory I – Cleanroom	Climate change: Influencing factors and impacts on ecosystem services				
Doctoral seminar I, II, and III	Advanced biophysical methods in nanomaterial research	Laboratory II – Circular chemistry	High-energy X-ray (synchrotron-based X- ray) analyses				
International internship	Advances in the application of analytical techniques	Laboratory III – ISO certified analytical measurements	Life-cycle assessment – Sustainable and eco- informed selection of materials				
Publication and dissemination	Advances in the characterization techniques of materials	Laboratory IV – Advanced microscopy of materials	Mitigation of pollution and toxicity in the environment				
Thesis preparation I, II, III, and IV	Chemistry and physics of surfaces and interfaces	Laboratory V – Synthesis of emerging inorganic materials	Molecular and cell biology for material research				
Workshop/summer school	Hydrodynamics	Laboratory VI – Synthesis of emerging organic materials	Principles of circular economy				
	Ion-beam synthesis and radiation testing of materials for energetic applications	Laboratory VII – Biomedical and immunology testing	Professional and academic German for scientists				
	Luminescence: From molecules to nanoparticles	Laboratory VIII – Application-oriented testing of materials					
	Magnetic properties of functional materials	Laboratory IX – Computational modelling of particle materials and fluid dynamics					
	Materials and living systems Materials and principles of energy storage and conversion						
	Materials for tissue engineering and medical use						
	Materials modelling Materials under extreme conditions						
	Microbiology in material research Porous materials						
	Powders and granular materials						

UNIVERZITA J. E. PURKYNĚ V ÚSTÍ NAD LABEM Fakulta životního prostředí

Environmental and Biomaterial Sciences doc. Ing. Jiří Orava, Ph.D.

A. POVINNÉ KURZY (COMPULSORY COURSES)

B-III – Course details						
Course title	Conference partici	pation				
Туре	A. Povinné kurzy (C	Compulsory	courses)	Recommended year		1-4
Course length	1 week	Hours	40	Credits	10	
Course completion	Pre-exam credit			Teaching type	Conf	erence
Verification	Active participation	(contribut	ed paper of	or poster) at international	confere	nce (if
	available then the p	roof of part	icipation i	ssued by the organizers).		
Guarantor	Supervisor					
Lecture(s)	Supervisor					
Syllabus						

As a part of mandatory modules, students will be required to actively participate, as a contributed paper or poster, in at least one international conference relevant to their thesis topic. The length of the conference may vary, but is expected to be typically between 3-5 days.

Literature

There is no relevant scientific literature.

B-III – Course details						
Course title	Doctoral seminar	l, II, and II	Ι			
Туре	A. Povinné kurzy (Compulsory courses)			Recommended year		1-3
Course length	20s+20s+20s	Hours	60	Credits	10+1	0+10
Course completion	3×pre-exam credit			Teaching type	eaching type Semin	
Verification	Active participation at doctoral seminars between the 1-3 years of study. Active participation at doctoral conferences.					
Guarantor	doc. Ing. Jiří Orav	a, Ph.D.				
Lecture(s)	doc. Ing. Jiří Orava,	, Ph.D.				
	Ing. Daniel Bůžek,	Ph.D.				
	Ing. Tadeáš R. Wan	gle, Ph.D.				
G N I						

Syllabus

The doctoral seminar is intended for discussing scientific topics relevant to students. The approach in the seminar and the way information are disseminated is three-fold.

- A) Students will present progress in their work to other PhD students, supervisors and members of the faculty. It is expected that every student will present annually. 1st-year students are expected to present a vision, ideas, literature overview of the thesis, and the expected outcome. 2nd-year PhD students shall present early results, their discussion, and provide critical feedback on the early experimental results. 3rd-year students should present comprehensive, mostly experimentally supported, and evidenced results, providing in-depth discussion with ideas to steer their research towards a successful end. Students will use the seminar as the opportunity to practise thesis defence in front of a wide research audience, and also to make final adjustments to their work.
- B) Foreign experts will be invited to deliver scientific talks on either research topics relevant to the study programme and to the individual dissertation theses. Experts in providing and communicating soft skills will also lecture in the seminar providing information, for example, on writing scientific papers, knowledge transfer, patenting law, entrepreneurship (from lab to fab) and other relevant topics.
- C) Doctoral students will participate in the annual StudKon conference (<u>http://projects.fzp.ujep.cz/studkon/</u>). The conference is intended mainly for PhD students of relevant natural and technical science PhD programmes at UJEP. The conference scope includes the preparation and characterization of (nano)materials and their applications, nanotechnology, chemical and physical modifications of materials, the chemistry of materials, environmental analytical chemistry, environmental chemistry and pollution of the environment, phytoremediation and biotechnology, modelling in chemistry, physics and materials, and other related topics. The participation of PhD students will be mandatory.

Literature

There is no relevant literature for this course.

B-III – Course details								
Course title	International internship							
Туре	A. Povinné kurzy (Compulsory courses)			s) Recommended year		1-2		
Course length	min. 1 month	Hours		Credits	20			
Course completion	Pre-exam credit			Teaching type	Internship			
Verification	Written report							
Guarantor	Supervisor							
Lecture(s)	Supervisor							
	doc. Ing. Jiří Orava,	Ph.D.						
Syllabus								

Completion of a foreign internship lasting at least 30 days is a mandatory part of doctoral study. Ideally, the student chooses a foreign institution on their own, in cooperation with their supervisor and/or chair of the doctoral programme, and according to the focus and research topic of the dissertation thesis. The Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden, the cooperating institute in the study programme, will be the natural choice.

In exceptional cases, the requirement of fulfilling the international internship can be substituted by either i) active participation in international projects, or ii) by national internship, longer than 30 days, at the R&D of an innovative company with international outreach. In both cases, the internship must be pre-approved by the doctoral board and later recognized by submitting a written report explicitly describing the student's role, participation details, and contribution towards and benefiting from internationalization.

Literature

There is no relevant scientific literature.

B-III – Course details								
Course title	Publication and dissemination							
Туре	A. Povinné kurzy (Compulsory courses) Recommended year				2-4			
Course length	Individual	Hours		Credits	25			
Course completion	Pre-exam credit			Teaching type S		Supervising		
Verification	Accepted publicatio	n or any ve	rified diss	emination record and output	ıt			
Guarantor	Supervisor							
Lecture(s)	Supervisor							
Syllabus								

To successfully defend the dissertation thesis, the student must meet the following requirements in terms of the publication activity:

- 1. The student is the author/co-author of at least two papers published in journals registered in the WoS database.
- 2. The student is the first author of at least one of the published papers.
- 3. In the second paper, the student can be any other co-author but must have a significant proven contribution to the paper (assessed by the doctoral board).
- 4. Published papers must be thematically relevant to the dissertation thesis.
- 5. Papers are expected to be published in journals of D1 and Q1 quality.
- 6. Students are discouraged from submitting papers in so-called "predatory" journals (the current list of non-recommended publishers and journals is published and updated at https://www.fzp.ujep.cz/pp). The final decision on the recognition of the publication belongs to the doctoral board.
- 7. Alternatively, students can be (co)-authors of patents, prototypes, software, databases, internet scripts, algorithms etc. The work dissemination should reflect the nature, character, and general requirements expected by different research fields and scientific disciplines. In such cases, the student's contribution and recognition shall always be decided by the doctoral board.

SLiterature

- 1. Lecture on "*How to write scientific papers*", which will be a part of the doctoral seminars in the programme.
- 2. Annual workshop on writing scientific papers organized at UJEP.
- 3. Various Online resources and webinars.



B-III – Course details							
Course title	Thesis preparation I, II, III, and IV						
Туре	A. Povinné kurzy (C	A. Povinné kurzy (Compulsory courses) Recommended year				1-4	
Course length	40s+40s+50s+60s	Hours	190	Credits	15 + 1	5+20	
					+25		
Course completion	4×pre-exam credit Teaching type				Individual		
Verification	Individual verification based on supervisor's report						
Guarantor	Supervisor						
Lecture(s)	All supervisors						
Syllabus							

The dissertation thesis preparation is one of the most important parts of doctoral studies and forms an essential part of the study plan for the entire study period. It is primarily based on the individual work, mentoring and discussion of a supervisor with the student. The course includes both theoretical studies focused on specific problems given by the topic of the dissertation, as well as the acquisition of more general knowledge and skills needed for scientific work and, last but not least, own experimental activity and evaluation of results. The inclusion of this subject in the study plan is intended to emphasize the need for continuous monitoring of the set objectives of the work (or the necessity of their continuous revision) to ensure timely progress and successful completion of the study. In guiding the student in the preparation of the dissertation, the supervisor has an essential role, they monitor and annually evaluate the student's progress in the dissertation's preparation. The supervisor also closely cooperates with the chairperson of the doctoral study programme *"Environmental and Biomaterial Sciences"*.

Literature

Scientific literature is set by the supervisor reflecting the topic of the dissertation thesis. Students actively look for relevant scientific literature.



B-III – Course details						
Course title	Workshop/summer	r school				
Туре	A. Povinné kurzy (C	ompulsory	courses)	Recommended year		1-3
Course length	One week	Hours	40	Credits	10	
Course completion	Pre-exam credits			Teaching type	Work	shop
Verification	Written report (if av	ailable ther	the proof	of participation issued by the	ne orga	nizers)
Guarantor	Supervisor					
Lecture(s)	Supervisor					
Svllabus						

As a part of mandatory modules, students will be required to participate in at least one workshop/summer school, ideally one week long, important to their scientific interest and the thesis topic. Typical relevant workshops/summer schools may include professional training in using specific advanced research facilities, deepening fundamental knowledge beyond the courses offered in the programme, and/or workshops reflecting the actual scientific problems etc. It is expected that international workshops will be the preferred choice, but national workshops presented by well-recognized scientists and experts in the relevant fields are also possible.

Literature

There is no relevant scientific literature.