Course description

Department/Unit /	KCH / SFYC1			**Academic Year**	2016/2017
Title	Seminar - Physical Chemistry 1			**Type of completion**	Pre-Exam Credit
Accredited/Credits	Yes, 2 Cred.			**Type of completion**	Oral
Number of hours	Seminář 2 [Hours/Week]				
Occ/max	Status A	Status B	Status C	**Course credit prior to**	NO
Summer semester	0 / 0	0 / 0	0 / 0	**Counted into average**	NO
Winter semester	0 / 0	38 / -	0 / 0	**Min. (B+C) students**	not determined
Timetable	Yes			**Repeated registration**	NO
Language of instruction	Czech			**Semester taught**	Winter semester
Substituted course	None			**Internship duration**	0
Preclusive courses	N/A				
Prerequisite	N/A				
Informally recommended courses	N/A				
Courses depending on this Course	N/A				

Course objectives:

Aims
The course is focused on practising of tasks from physical chemistry complementing subject matter from lectures and demonstrating it by practical exercises from laboratory and everyday practice.

Requirements on student

Requirements
Achieving minimum point level from the written test during semester.

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

Content
1) The first law of thermodynamics, heat capacities.
PV work (work in changes of volume, reversible/irreversible performance.
2) Enthalpy, Mayer equation.
3) Application of the first law of thermodynamics to ideal gas, isothermal and adiabatic process, reversible and irreversible course
4) Entropy, the entropy change in the isolated systems, Boltzmann relation;
5) The entropy change calculation for ideal gas, the entropy change in change of states, calculation of the entropy absolute value.
6) Chemical potential, calculation for the gas, ideal and real mixtures.
7) Clapeyron, Clausius - Clapeyron equation, Henry law
8) Raoult law, the colligative properties, cryoscopy and ebullioscopy.
9) Equilibrium constant Kp, relation between Kp a Gro;
10+11) Calculation of the Gibbs energy change from the reactive mixture composition, from the Gibbs energy of formation; determination of the Gibbs energy change from the entropy change and reaction enthalpy; heats of combustion, heats of combination, bond enthalpy, atomic heat;
The equilibrium constant dependence on temperature, van´t Hoff equation.
12+13) Equilibrium potential of electrode, Nernst equation; Galvanic cells, electrode potential, hydrogen scale, Peters equation, thermodynamics of the electrochemical cells, calculation of the enthalpy changes and equilibrium constant of the electrodes

reactions.

Prerequisites - other information about course preconditions

none

Competences acquired

Competences
The students deepen their knowledge and understanding of basic relations and connections from the field of physical chemistry by means of the practical calculations and exercises. The students deepen their knowledge and understanding of basic relations and connections from the field of physical chemistry.
Orientation in basic relations and connections from the field of physical chemistry and understanding of connections with the laboratory chemical practice and everyday life.

Fields of study

Guarantors and lecturers

- **Guarantors:** doc. RNDr. Roman Maršálek, Ph.D.
- **Seminar lecturer:** doc. RNDr. Roman Maršálek, Ph.D.

Literature

- **Basic:** Z.Adamcová a kol. *Příklady a úlohy z fyzikální chemie, SNTL Praha, 1989.*.
- **Recommended:** P.W.Atkins, C.A.Trap. *Solution Manual for Physical Chemistry, 5th edition, Oxford University Press, Oxford, 1994.*.

Time requirements

Activities	Time requirements for activity [h]
Being present in classes	26
Self-tutoring	20
Consultation of work with the teacher/tutor (incl. electronic)	4
Total:	**50**

assessment methods

professional knowledge

Continuous analysis of student´s achievements

Dialogue

Written examination

teaching methods

professional knowledge

Dialogic (discussion, dialogue, brainstorming)

Working with text (coursebook, book)

learning outcomes

professional knowledge - knowledge resulting from the course:

Competences
The students deepen their knowledge and understanding of basic relations and connections from the field of physical chemistry by means of the practical calculations and exercises. The students deepen their knowledge and understanding of basic relations and connections from the field of physical chemistry.
Orientation in basic relations and connections from the field of physical chemistry and understanding of connections with the laboratory chemical practice and everyday life.

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	Povinně volitelné předměty	B	2	ZS
Applied Physics	Bachelor	Full-time	Biophysics	1	2014	2016	Povinně volitelné předměty	B	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	Bachelor	Full-time	Chemistry	1	2012	2016	Povinně volitelné předměty	B	2	ZS
Chemistry	Bachelor	Full-time	Chemistry with Other Degree Specialization	1	2014	2016	Povinně volitelné předměty	B	2	ZS
Chemistry	Bachelor	Full-time	Chemistry with Other Degree Specialization	1	2	2016	Povinně volitelné předměty	B	2	ZS
Physics	Bachelor	Full-time	Chemistry with Other Degree Specialization	1	2014	2016	Povinně volitelné předměty	B	2	ZS