SOFIA UNIVERSITY "ST. KLIMENT OHRIDSKI"

FACULTY OF CHEMISTRY AND PHARMACY

CURRICULUM

Signed by: .....

Approved by the Academic Council,
Record of Proceedings № 1
11 / 24 юни 2015 г.

Professional Field: 4.2 Chemistry

Educational and Qualification Degree: Master of Science

Subject Area: Computer chemistry

Master programme: Computational chemistry

C	H	C	2	5	2	4	1	5

Form of Study: full-time
Length of Study: 3 semesters

Professional Qualification: Master in Computer chemistry – Computational chemistry

C	2	5	2	4

CHC252415

Major "Computer Chemistry" / M. Sc. Program "Computational Chemistry"

for the academic year beginning in 2015

№	Course code	Course Title	Type – C, E, O	Semester	ECTS credits	Number of hours- total				Number of hours per week	Type of grading* - e, ca, m, a
						Total	Lectures	Seminars	Practical classes		
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Core courses											
1	C 0 1 8	Quantum chemistry for molecular systems	**C**	**1**	**8**	**240**	**60**	**-**	**45**	**7**	**e**
2	C 0 2 6	Molecular modelling with QSAR	**C**	**1**	**6**	**180**	**45**	**-**	**30**	**5**	**e**
3	C 0 3 6	Scientific programming	**C**	**1**	**6**	**180**	**30**	**-**	**45**	**5**	**e**
4	C 0 4 4	Molecular mechanics	**C**	**1**	**4**	**120**	**30**	**-**	**15**	**3**	**e**
5	C 0 5 6	Term project	**C**	**1**	**6**	**180**	**15**	**-**	**45**	**4**	**ca**
6	C 0 6 5	Quantum-chemical methods for periodic and nanostructures	**C**	**2**	**5**	**150**	**45**	**-**	**15**	**4**	**e**
7	C 0 7 4	Hybrid (QM/MM) methods	**C**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
8	C 0 8 4	Computational methods in spectroscopy	**C**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
9	C 0 9 5	Molecular dynamics and Monte Carlo simulations	**C**	**2**	**5**	**150**	**30**	**-**	**30**	**4**	**e**
10	C 1 0 9	Applied computational chemistry	**C**	**2**	**9**	**270**	**30**	**-**	**105**	**9**	**ca**
11	C 1 1 4	Analysis, reference and presentation of theoretical studies	**C**	**3**	**4**	**120**	**30**	**-**	**30**	**4**	**ca**
Elective courses – *courses with minimum of 4 ECTS (total) must be elected*											
1	E 0 1 4	Modelling of chemical processes (neural networks in chemistry)	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
2	E 0 2 4	Molecular kinetics and thermodynamics by ab initio MO calculations	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**

The Faculty Council has decided that min. 50% of the total education load is independent study of the students

Type of grading:
e-exam, ca-current assesment,
m-matriculation,
a-advances to the next semester

3	E	0	3	4	Introduction to programming in Linux shells and data processing	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
4	E	0	4	4	Object-oriented programming*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
5	E	0	5	4	Ecometrics*	**E**	**2**	**4**	**120**	**45**	**-**	**15**	**4**	**e**
6	E	0	6	4	Symmetry of molecules and crystals	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
7	E	0	7	4	Biophysical chemistry*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
8	E	0	8	4	Applied mass spectrometry*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
9	E	0	9	4	Structure and properties of materials*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
10	E	1	0	4	X-ray analysis *	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
11	E	1	1	4	Optical and electron microscopy*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
12	E	1	2	4	Methods for nanomaterials characterization*	**E**	**2**	**4**	**120**	**30**	**-**	**15**	**3**	**e**
13	E	1	3	4	Modeling of nanostructures*	**E**	**2**	**4**	**120**	**30**	**-**	**15**	**3**	**e**
14	E	1	4	4	Biological macromolecuels*	**E**	**2**	**4**	**120**	**30**	**-**	**15**	**3**	**e**
15	E	1	5	4	Bioelectronics*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
16	E	1	6	4	Chemistry and physics of luminophores*	**E**	**2**	**4**	**120**	**15**	**-**	**15**	**2**	**e**
17	E	1	7	4	Spectroscopic methods for characterization*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
18	E	1	8	4	Applied organic photochemistry*	**E**	**2**	**4**	**120**	**45**	**-**	**15**	**4**	**e**
19	E	1	9	4	Coordination compounds and their application in modern technologies*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
20	E	2	0	4	Theory and computer modeling of polymers*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
21	E	2	1	4	Photochemistry*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
22	E	2	2	4	X-ray fluorescence analysis*	**E**	**2**	**4**	**120**	**15**	**-**	**30**	**3**	**e**
23	E	2	3	4	Modern techniques in NMR spectroscopy*	**E**	**2**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
24	E	2	4	4	Modern methods of molecular spectroscopy*	**E**	**1**	**4**	**120**	**30**	**-**	**30**	**4**	**e**
25	E	2	5	4	Multivariant statistics in chemical analysis*	**E**	**1**	**4**	**120**	**30**	**-**	**30**	**4**	**e**

* Course from another M.Sc. Program

The Faculty Council has decided that min. 50% of the total education load is independent study of the students

Type of grading:
e-exam, ca-current assesment,
m-matriculation,
a-advances to the next semester

Study Internships									
№	code				Internship	Type – C, E, O	Semester	ECTS credits	Weeks	Hours	Type of grading* - e, ca, m
1	I	0	1	2	Pre-thesis training	**C**	**3**	**10**	**15**	**300**	**ca**

Degree completion			
Form of degree completion	ECTS credits	First session for thesis defence	Second session for thesis defence
Master thesis	15	February-March	June-July

The curriculum has been approved by the Faculty Council, Record of Proceedings № 5/18.11.2014

DEAN:.....

The Faculty Council has decided that min. 50% of the total education load is independent study of the students

Type of grading:
e-exam, ca-current assesment,
m-matriculation,
a-advances to the next semester

Sofia University "St. Kliment Ohridski"

Curriculum Reference Statement

M. Sc. Program "Computational chemistry"

Form of study: full-time; Length of study: three semesters

In-class course load, ECTS credits and courses completed per semester

Type of courses	I semester			II semester			III semester			Total		
	Course Load - number of hours	ECTS credits	Number of grades	Course Load - number of hours	ECTS credits	Number of grades	Course Load - number of hours	ECTS credits	Number of grades	Course Load - number of hours	ECTS credits	Number of grades
Compulsory courses	**360**	**30**	**5**	**375**	**27**	**5**	**60**	**4**	**1**	**795**	**61**	**11**
Min. of elective courses				**60**	**4**	**1**				**60**	**4**	**1**
Study internships							**150**	**10**	**1**	**150**	**10**	**1**
Total:	**360**	**30**	**5**	**435**	**31**	**6**	**210**	**14**	**2**	**1005**	**75**	**13**

Degree completion	ECTS credits	Number of hours for preparation	First state exam/ thesis defence session	Second state exam/ thesis defence session
Master thesis	15	300	February-March	June-July

Professional Qualification: **Master of Computer Chemistry - Computational Chemistry**

Record of Proceedings of the Faculty Council № 5/18.11.2014 **Dean:**