

CURRICULUM starting form Academic year 2015-2016

BABEŞ-BOLYAI UNIVERSITY

FACULTY OF PHYSICS

Field of study: PHYSICS

Programme of study: COMPUTATIONAL PHYSICS

Language of instruction: ENGLISH

Name of qualification: MASTER'S DEGREE

Duration of studies: 4 SEMESTERS

Type of study: FULL TIME

I. DEGREE STRUCTURE

120 credits, whereof:

110 credits for compulsory courses;

10 credits for optional course;

and

10 credits for dissertation exam

II. STRUCTURE OF PROGRAMME (in weeks)

	Courses given		Examination period			Merged traineeships	Traineeship stages	Holiday		
	Sem I	Sem II	I	V	R			Winter	Spring	Sum
Year I	14	14	3	3	2	0	1	3	1	12
Year II	14	12	3	2	2	0	15	3	1	13

REMARKS:

Traineeship in Semester 2 and 4 is organized during the semester.

Semester 3 is entirely devoted to traineeship.

The examination period at the end of Semester 4 is followed by 2 weeks consacrated to preparing the Dissertat University of Edinburgh, UK

III. WEEKLY STRUCTURE OF TEH PROGRAMME (in hours)

	Semester I	Semester II
Year I	18	21
Year II	25	19

IV. DISSERTATION EXAM

Between 25 June - 6 July

Dissertation = 10 credits

V. SELECTION OF OPTIONAL COURSES

Sem. 1: Choosing 1 course from package: N/A

Sem. 2: Choosing 1 course from package: FMX1404

Sem. 3: Choosing 1 course from package: N/A

Sem. 4: Choosing 1 course from package: FMX1205

For a maximum of 3 optional courses, it is allowed for every student to select any course held at any other Faculty of the Babeş-Bolyai University.

VI. SIMILAR PROGRAMMES

University of Helsinki, Finland

Stockholm University, Sweden

University of Edinburgh, UK

VII. COURSES

Year I, Semester 1

CODE	COURSES	ECTS Credits	Hours / week			Hours for study / week			Assesment			Course type
			C	S	LP	F	I	T	E	C	VP	
FME1101	Advanced Solid State Physics	5	2	1	0	3	6	9	E			Fundamental
FME2102	Advanced Atomic and Molecular Physics	5	2	1	0	3	6	9	E			Fundamental
FME3103	Advanced Theoretical Physics	5	2	1	0	3	6	9	E			Fundamental
FME2104	Advanced Molecular Spectroscopy	5	2	0	1	3	6	9		C		Speciality
FME0105	Research Methodology and Drawing Up Scientific Papers	3	2	1	0	3	2	5		C		Fundamental
FME3106	Computational Methods in Physics	7	2	0	1	3	10	13	E			Fundamental
TOTAL		30	12	4	2	18	36	54	4	2	0	

Year I, Semester 2

CODE	COURSES	ECTS Credits	Hours / week			Hours for study / week			Assesment			Course type
			C	S	LP	F	I	T	E	C	VP	
FME3401	Numerical Computations in Atomic Physics	6	2	0	2	4	7	11	E			Speciality
FME3402	Methods of Stochastic Simulations in Statistical Physics. Interdisciplinary Appli	7	3	0	2	5	8	13	E			Speciality
FME3403	Communication Systems for Embedded Hardware	5	2	0	1	3	6	9	E			Speciality
FMX3205	Optional Course 1	5	2	0	2	4	5	9	E			Complementary
FME3404	Spectra Simulation	5	2	0	1	3	6	9		C		Speciality
FMX3206	Traineeship	2	0	0	2	2	2	4		C		Speciality
TOTAL		30	11	0	10	21	34	55	4	2	0	

Year II, Semester 3

CODE	COURSES	ECTS Credits	Hours / week			Hours for study / week			Assesment			Course type
			C	S	LP	F	I	T	E	C	VP	
FME1301	Research Traineeship	30	0	0	25	25	38	63		C		Speciality
TOTAL		30	0	0	25	25	38	63	0	1	0	

Year II, Semester 4

CODE	COURSES	ECTS Credits	Hours / week			Hours for study / week			Assesment			Course type
			C	S	LP	F	I	T	E	C	VP	
FME3201	Computation of Molecular Properties	5	2	0	2	4	6	10	E			Speciality
FME3202	Molecular Structure Simulation and Molecular Dynamics Simulation	7	2	0	2	4	11	15	E			Speciality
FME3203	Symbolic Computation in Physics	4	1	0	1	2	6	8	E			Speciality

FME3204	Object-Oriented Programming Applied to Physics	7	2	0	1	3	12	15		C		Speciality
FMX3205	Optional Course 2	5	2	0	2	4	6	10	E			Complementary
FME1407	Dissertation Writing	2	0	0	2	2	2	4		C		Speciality
TOTAL		30	9	0	10	19	43	62	4	2	0	

OPTIONAL COURSES

CODE	COURSES	ECTS Credits	Hours / week			Hours for study / week			Assesment			Course type
			C	S	LP	F	I	T	E	C	VP	
OPTIONAL COURSE 1 (Year I, Semester 1)												
		0	0	0	0	0	0	0				
OPTIONAL COURSE 2 (Year I, Semester 2)												
FME1205	Magnetic and Superconducting Materials	5	2	1	1	4	5	9	E			Complementary
FME3206	Digital Signal Processing	5	2	0	2	4	5	9	E			Complementary
OPTIONAL COURSE 3 (Year II, Semester 3)												
		0	0	0	0	0	0	0				
OPTIONAL COURSE 4 (Year II, Semester 4)												
FME1403	Nanostructures and Applications	5	2	1	1	4	5	9	E			Complementary
FME2405	Biomedical Applications of IR and Raman Spectroscopies	5	2	0	2	4	5	9	E			Complementary
FME3406	Design, Visualization and Imaging Techniques in Physics	5	2	0	2	4	5	9	E			Complementary
Credits / Hours / Week / Assesment / % from total number of courses		10	4	2	2	8	10	18	2	0	0	9.52%
Hours / week - Hours for study / week			52	26	26	104	130	234				
			104			234						

Appendix to the Curriculum for Programme of Study: FIZICA CORPULUI SOLID

FUNDAMENTAL COURSES (Fundamental)												
CODE	COURSES	ECTS Credits	Hours / week			Hours for study / week			Assesment			Course type
			C	S	LP	F	I	T	E	C	VP	
Semesters 1 - 3 (14 weeks)												
FME1101	Advanced Solid State Physics	5	2	1	0	3	6	9	E			Fundamental
FME2102	Advanced Atomic and Molecular Physics	5	2	1	0	3	6	9	E			Fundamental
FME3103	Advanced Theoretical Physics	5	2	1	0	3	6	9	E			Fundamental
FME0105	Research Methodology and Drawing Up Scientific Papers	3	2	1	0	3	2	5		C		Fundamental

FME3106	Computational Methods in Physics	7	2	0	1	3	10	13	E			Fundamental
TOTAL		25	10	4	1	15	30	45	4	1	0	
Semester 4 (12 weeks)												
												Fundamental
TOTAL		0	0	0	0	0	0	0	0	0	0	
Credits / Hours / Week / Assesment / % from total number of courses		25	10	4	1	15	30	45	4	1	0	23.81%
Hours / week - Hours for study / week			140	56	14	210	420	630				
			210			630						

SPECIALITY COURSES (Speciality)												
CODE	COURSES	ECTS Credits	Hours / week			Hours for study / week			Assesment			Course type
			C	S	LP	F	I	T	E	C	VP	
Semesters 1 - 3 (14 weeks)												
FME2104	Advanced Molecular Spectroscopy	5	2	0	1	3	6	9		C		Speciality
FME3401	Numerical Computations in Atomic Physics	6	2	0	2	4	7	11	E			Speciality
FME3402	Methods of Stochastic Simulations in Statistical Physics. Interdisciplinary Applic	7	3	0	2	5	8	13	E			Speciality
FME3403	Communication Systems for Embedded Hardware	5	2	0	1	3	6	9	E			Speciality
FME3404	Spectra Simulation	5	2	0	1	3	6	9		C		Speciality
FMX3206	Traineeship	2	0	0	2	2	2	4		C		Speciality
FME1301	Research Traineeship	30	0	0	25	25	38	63		C		Speciality
TOTAL		60	11	0	34	45	73	118	3	4	0	
Semester 4 (12 weeks)												
	Computation pf Molecular Properties											Speciality
FME3202	Molecular Structure Simulation and Molecular Dynamics Simulation	7	2	0	2	4	11	15	E			Speciality
FME3203	Symbolic Computation in Physics	4	1	0	1	2	6	8	E			Speciality
FME3204	Object-Oriented Programming Applied to Physics	7	2	0	1	3	12	15		C		Speciality
FME1407	Dissertation Writing	2	0	0	2	2	2	4		C		Speciality
TOTAL		20	5	0	6	11	31	42	2	2	0	
Credits / Hours / Week / Assesment / % from total number of courses		80	16	0	40	56	104	160	5	6	0	57.14%
Hours / week - Hours for study / week			214	0	548	762	1394	2156				
			762			2156						

COMPLEMENTARY COURSES (Complementary)

CODE	COURSES	ECTS Credits	Hours / week			Hours for study / week			Assesment			Course type
			C	S	LP	F	I	T	E	C	VP	
Semesters 1 - 3 (14 weeks)												
FMX3205	Optional Course 1	5	2	0	2	4	5	9	E			Complementary
TOTAL		5	2	0	2	4	5	9	1	0	0	
Semester 4 (12 weeks)												
FMX3205	Optional Course 2	5	2	0	2	4	6	10	E			Complementary
TOTAL		5	2	0	2	4	6	10	1	0	0	
Credits / Hours / Week / Assesment / % from total number of courses		10	4	0	4	8	11	19	2	0	0	9.52%
Hours / week - Hours for study / week			52	0	52	104	142	246				
			104			246						

OVERALL BALANCE

CODE	COURSES	HOURS	Hours for study / week			%	NR. OF CREDITS	
			F	I	T		YEAR I	YEAR II
1	COMPULSORY	75	75	141	216	90%	55	55
2	OPTIONAL	8	8	10	18	10%	5	5
TOTAL		83	83	151	234	100%	60	60