COURSE SYLLABUS

1. Data about the program

1.1 Higher education institution	Babeș-Bolyai University
1.2 Faculty	Faculty of Biology and Geology
1.3 Doctoral school	Integrative Biology
1.4 Field of study	Molecular Biology and Biotechnology
1.5 Study cycle	PhD
1.6 Study program / Qualification	PhD training / **PhD in Biology**

2. Course data

2.1 Name of discipline	Developmental Genetics						
2.2 Teacher responsible for lectures	Professor Elena Rakosy						
2.3 Teacher responsible for seminars	Professor Elena Rakosy						
2.4 Year of study	1	2.5 Semester	1	2.6. Type of evaluation	C	2.7 Course framework	Compulsory

3. Estimated total time of teaching activities (hours per semester)

3.1 Hours per week	4	Out of which: 3.2 Lectures	2	3.3 Seminars / Laboratory classes	2
3.4 Total hours in the curriculum	56	Out of which: 3.5 Lectures	28	3.6 Seminars / Laboratory classes	28

Allocation of study time:	h
Study supported by textbooks, other course materials, recommended bibliography and personal student notes	10
Additional learning activities in the library, on specialized online platforms and in the field	6
Preparation of seminars / laboratory classes, topics, papers, portfolios and essays	6
Tutoring	3
Examinations	3
Other activities: -	

3.7 Individual study (total hours)	24
3.8 Total hours per semester	56
3.9 Number of credits	20

4. Preconditions (where applicable)

4.1 Curriculum	• Cellular and Molecular Biology • General and Molecular Genetics
4.2 Competences	• Good skills for laboratory work and learning to use equipment • Capacity of selecting and reading in English scientific literature for a specific topic and to synthetize acquired information

5. Conditions (where applicable)

5.1 Conducting lectures	• Logistic support for on site or remote learning
5.2 Conducting seminars / laboratory classes	• Logistic support for seminars

6. Specific competences acquired

Professional competences	• Knowledge on the organism development • Recognizing the main stages of development in model organisms (*Drosophila melanogaster*, *Arabidopsis thaliana*, etc.) • New insights into the technologies used to analyse different stages and mechanisms of development from molecular to tissue and whole organism level • Learning the main principles of a good presentation or debate in the field of developmental genetics • New abilities to search relevant literature and to synthetize a topic in the field of developmental genetics
Transversal competences	• Discovering the links and complementarity with molecular and cellular biology and genetics • The correct use of concepts of molecular level, tissue and organism during development • Linking structural and biochemical or physiological knowledge during embryogenesis, differentiation, morphogenesis and organogenesis • Corroborate data from different disciplines and informatics, internet, data bases etc.

7. Course objectives (based on the acquired competencies grid)

7.1 The general objective of the course	• New knowledge on the development of multicellular organisms from the zygote to embryos and mature individuals with a specific developmental plan and understanding the genetic tools used in studying development
7.2 Specific objectives	• Understanding the processes and genetics of embryo development • Knowledge on cell differentiation, cell adhesion, morphogenesis and organogenesis • Understanding how old and new technologies of investigation do contribute to knowledge in developmental biology from molecular level to senescence and death • Knowledge on practical applications of developmental genetics from cloning, stem cells, teratogens and cancer

8. Content

8.1 Lectures	Teaching methods	Comments
Introduction in developmental biology (2 h)	Presentation, discussion, case studies	During pandemic the lectures are run as remote learning
Life cycles and pattern development (2 h)		
Development of angiosperms (2 h)		
Principles of experimental embryology, stem cells and cell adhesion (2)		
Developmental genetics, cloning, the molecular techniques use to get new insights into developmental processes and genetic engineering (4 h)		
Differential gene expression and its importance in developmental biology (4 h)		
Intercellular communication, the inductive and paracrine interactions (4 h)		
Genes involved in development, the body axe formation in *Drosophila* and floral developmental genes (4 h)		
Practical applications of developmental biology: teratogens and cancer (2 h)		
Final discussions on genetics and development (2 h)		

8.2 Seminars / laboratory classes	Teaching methods	Comments
Case studies prepared with the doctoral students, based on their individual doctoral research topics	Presentation and discussion	The topics will be selected by the students from a list of topics; depending on the number of students groups will be organized to work and present a topic or a case study

Bibliography:

Gilbert SF (2006) Developmental Biology (Eight edition) Sinauer Assoc. Inc. Sunderland Massachusetts USA

Campbell NA, Reece BJ (2005) Biology – cap. 21 The genetic basis of development. Pearson B. Cummings

Cornea, C.P., Vătafu, I., Barbu, A., Elemente de inginerie genetică (Elements of genetic engineering), Ed. All, Bucureşti, 1998.

Rakosy-Tican E (2005) Inginerie genetica vegetala – note de curs (Plant Genetic Engineering – lecture notes). Editura Casa Cartii de Stiinta Cluj-Napoca

Lecture support as pdf – library and online.
(Lecture notes and related references are to be found in the faculty libraries)

9. Aligning the contents of the discipline with the expectations of the epistemic community representatives, professional associations and standard employers operating in the program field

- The content of lectures and seminar activities are at the level of other universities having Developmental Genetics in their curricula

10. Examination

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final grade
10.4 Lectures	Assessment of knowledge	Written exam	50%
	Assessment of knowledge	Ongoing tests	25%
10.5 Seminars / laboratory classes	Activity during seminars	Student presentation on a topic related to Develpmental genetics and its PhD subject Discussions, answers to questions	25%
10.6 Minimum performance standard			
• Knowledge of minimum 50% of lecture information • Knowledge of minimum 40% of seminar information			

Date of issue
10.09.2018

Signature of the teacher responsible for lectures

Signature of the teacher responsible for seminars

Date of approval by the doctoral school council

Signature of the doctoral school director