

## SYLLABUS – A COURSE DESCRIPTION

### I. General information

1. Course name: **Developmental biology**
2. Course code: **01-BTA-DEVBIOL**
3. Course type (compulsory or optional): **compulsory**
4. Study programme name: **Biotechnology**
5. Cycle of studies (1st or 2nd cycle of studies or full master's programme): **2nd cycle of studies**
6. Educational profile (general academic profile or practical profile): **general academic profile**
7. Year of studies (if relevant): **I**
8. Type of classes and number of contact hours (e.g. lectures: 15 hours; practical classes: 30 hours):  
**lectures: 15 hours**  
**practical classes: 22 hours**
9. Number of ECTS credits: **3**
10. Name, surname, academic degree/title of the course lecturer/other teaching staff:  
**prof. Jadwiga Jaruzelska, [jadwiga.jaruzelska@igcz.poznan.pl](mailto:jadwiga.jaruzelska@igcz.poznan.pl), Instytut Genetyki Człowieka PAN**  
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**dr hab. Kinga Kamieniarz-Gdula, [kinga.kamieniarz-gdula@amu.edu.pl](mailto:kinga.kamieniarz-gdula@amu.edu.pl)**
11. Language of classes: **English**
12. Online learning – yes (partly – online / fully – online) / no: **If necessary, the theoretical part could be available by MS Teams or similar platform.**

### II. Detailed information

1. Course aim (aims)

The overall aim of this course to provide the basic knowledge of developmental biology and practical skills related to studying developmental processes occurring in animals. Developmental biology will be described based on different model organisms with special focus on human development and human genetic diseases. The overview of the lectures is the following:

  - variability of sex determination in animals, human sex determination including abnormalities of that process and their medical impact.
  - specification and development of the germ cells: from pre-formation by the presence of the germ plasm in the model organisms such as *Xenopus*, *Danio*, *Drosophila* and *Caenorhabditis*, up to animals such as mouse, pig and humans specifying germ cells by induction from peri-implantation cell precursors
  - molecular mechanisms of the body patterning from *Drosophila* based on morphogenetic gradients up to mammals
  - epigenetics, parental imprinting and human diseases originating from disturbed imprinting
  - mechanisms of X-inactivation and pathologies due to abnormal X-inactivation
  - posttranscriptional control in development including body patterning, germ cell development and sex determination
  - mechanisms of ageing

The overview of the practical classes:

  - Following animal development using microscopy methods
  - Organ and tissue development on the example of the epidermis and hair follicle (laboratory)
  - Transcriptional and epigenetic regulation of development from a genomics perspective (computational class)
2. Pre-requisites in terms of knowledge, skills and social competences (if relevant)

The knowledge and skills acquired during the course of the study concerning molecular and cell biology; knowledge of English.
3. Course learning outcomes (EU) in terms of knowledge, skills and social competences and their reference to study programme learning outcomes (EK)

Course learning outcome symbol (EU)	On successful completion of this course, a student will be able to:	Reference to study programme learning outcomes (EK)
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EU_01	Explain basic processes of animal development	BT_W02, BT_W03, BT_W04
EU_02	Improve and update knowledge of developmental processes in more details based on the proposed literature	BT_U03, BT_U07, BT_K02
EU_03	Perceive close connections between developmental processes; both in health and disease	BT_W02, BT_W03, BT_W04
EU_04	Initiate scientific discussions on those topics with colleagues and supervisors	BT_U03, BT_U04, BT_U05, BT_K01, BT_K03
EU_05	Recognise importance of the research in this field for medicine	BT_K01, BT_W03, BT_U01
EU_06	Get acquainted with specific terms used in developmental biology	BT_U05, BT_W09
EU_07	Get familiar with animal models used to study developmental processes	BT_W02, BT_W03, BT_W04, BT_U01
EU_08	Study developmental processes using microscopy, computationally analyze published microscopy data, and present findings	BT_U01, BT_W07, BT_U03, BT_U05, BT_U06
EU_09	Take advantage of a genomic browser to access and browse epigenetic developmental data	BT_U01, BT_W01, BT_U03, BT_K01, BT_K02, BT_K03
EU_10	Appreciate developmental processes viewed at the level of whole organisms, organs/tissues and single cells	BT_W03, BT_W01, BT_U01, BT_U03, BT_K01, BT_K02, BT_K03

#### 4. Learning content with reference to course learning outcomes (EU)

Course learning content	Course learning outcome symbol (EU)
Animal and human sex determination including human pathologies of that process	EU_01, EU_02, EU_03, EU_04, EU_05, EU_06, EU_07
Specification and development of germ cell line in lower organisms and mammals	EU_01, EU_02, EU_03, EU_04, EU_06, EU_07
Molecular processes of early stages of the body patterning in lower organisms and mammals	EU_01, EU_02, EU_03, EU_04, EU_06, EU_07
Parental imprinting and human syndromes caused by disruption of that process	EU_01, EU_02, EU_03, EU_04, EU_05, EU_06
X-inactivation and its significance in development	EU_01, EU_02, EU_03, EU_04, EU_05, EU_06, EU_07
Posttranscriptional regulation of development, involvement of RNA-binding proteins and small RNAs	EU_01, EU_02, EU_03, EU_04, EU_05, EU_06, EU_07
Molecular mechanisms of ageing, from Drosophila up to humans	EU_01, EU_02, EU_03, EU_04, EU_05, EU_06, EU_07
Following animal development in model organisms	EU_01, EU_02, EU_03, EU_04, EU_07, EU_08, EU_10
Organ and tissue development on the example of the epidermis and hair follicle	EU_01, EU_03, EU_04, EU_05, EU_06, EU_07, EU_08, EU_10



Portfolio										
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### 3. Student workload and ECTS credits

Activity types	Mean number of hours spent on each activity type
Contact hours with the teacher as specified in the study programme	37
Preparation for classes	10
Reading for classes	10
Essay / report / presentation / demonstration preparation, etc.	18
Project preparation	
Term paper preparation	
Exam preparation	15
Total hours	90
Total ECTS credits for the course	3

### 4. Assessment criteria according to AMU in Poznan grade system

Very good (bdb; 5,0): outstanding performance without errors

Good plus (+db; 4,5): above the average standard but with minor errors

Good (db; 4,0): generally sound work with some errors

Satisfactory plus (+dst; 3,5): fair but with significant shortcomings

Satisfactory (dst; 3,0): performance meets the minimum criteria

Unsatisfactory (ndst; 2,0): fail – considerable further work is required before the credit can be awarded