

## SYLLABUS

Academic year 2023 - 2024

### 1. Details about the program

1.1. Higher Education Institution	„Lucian Blaga” University of Sibiu
1.2. Faculty	Faculty of Sciences
1.3. Department	Environmental Sciences, Physics, Physical Education and Sports
1.4. Field of study	Biology
1.5. Study cycle <sup>1</sup>	Bachelor
1.6. Specialization	Biology

### 2. Details about the course

2.1. Course name	<b>General genetics</b>		Code	FSTI.MFE.BIOEN.L. SA.5.2110.C-4.53	
2.2. Course coordinator	Lector Dr. Boeraş Ioana				
2.3. Practical activity coordinator	Lector Dr. Boeraş Ioana				
2.4. Year of study <sup>2</sup>	3	2.5. Semester <sup>3</sup>	5	2.6. Type of assessment <sup>4</sup>	Colocviu
2.7. Type of discipline <sup>5</sup>	A	2.8. Formative category of the discipline <sup>6</sup>	S		

### 3. Estimated total time

3.1. Proportion of the discipline within the curriculum – <i>number of hours / week</i>					
3.1.a.Lecture	3.1.b. Seminar	3.1.c. Laboratory	3.1.d. Project	3.1.e Other	Total
2	1	1			4
3.2. Proportion of the discipline within the curriculum – <i>number of hours / week</i>					
3.2.a.Lecture	3.2.b. Seminar	3.2.c. Laboratory	3.2.d. Project	3.2.e Other	Total <sup>7</sup>
28	14	14			56
<b>Allocation of time budget for individual study<sup>8</sup></b>					<b>No. hours</b>
Study based on textbook, lecture notes, bibliography and course notes					28
Additional research: library, specialized electronic platforms and field or on-site investigation and documentation					9
Preparing for the seminar / laboratorires, home assignments, reports, portfolios and essays					14
Tutoring <sup>9</sup>					14
Examinations <sup>10</sup>					4
<b>3.3. Total number of hours for individual study<sup>11</sup> (NOS<sub>sem</sub>)</b>					<b>69</b>
<b>3.4. Total number of hours in the curriculum (NOAD<sub>sem</sub>)</b>					<b>56</b>
<b>3.5. Total number of hours per semester<sup>12</sup> (NOAD<sub>sem</sub> + NOS<sub>sem</sub>)</b>					<b>125</b>
<b>3.6. No of hours / ECTS</b>					<b>25</b>
<b>3.7. Number of credits<sup>13</sup></b>					<b>5</b>

#### 4. Prerequisites (if applicable)

4.1. Prerequisite courses for enrollment to this subject (from the curriculum) <small>14</small>	Basic genetics
4.2. Competencies	

#### 5. Requirements (wherever applicable)

5.1. Lecture organization and structure <sup>15</sup>	<ul style="list-style-type: none"> <li>- Students have to sign up with their institutional e-mail on Google Classroom</li> <li>- Classrooms need to be equipped with videoprojector and blackboard</li> </ul>
5.2. Organization and structure of practical activities (lab/sem/pr/other) <sup>16</sup>	<ul style="list-style-type: none"> <li>- Students have to sign up with their institutional e-mail on Google Classroom</li> <li>- Students read the preparatory materials offered by the professor</li> <li>- Classrooms need to be equipped with videoprojector and blackboard</li> </ul>

#### 6. Specific competencies<sup>17</sup>

		Number of credits assigned to the discipline <sup>18</sup>	Distribution of credits according to competencies <sup>19</sup>
<b>6.1. Professional competencies</b>	CP1	Knowledge of basic and specific genetic terminology and ability to use them correctly.	1
	CP2	Ability to adapt to new challenges provided by the advances in molecular genetics.	1
	CP3	Ability to discuss classical and modern concepts in genetics.	1
	CP4	Create a pedigree and use it to determine the mode of transmission of a hereditary disease.	1
	CP5	Knowledge and use of molecular and cytogenetic diagnostic techniques.	1
<b>6.2. Transversal competencies</b>	CT1	Ability to apply the learned knowledge.	
	CT2	Ability to conceive and implement projects.	
	CT3	Problem solving abilities.	

#### 7. Course objectives (reflected by the framework of specific competencies)

7.1. General objective	To provide students with the ability to understand normal and pathological mechanisms of heredity and the principles of storing and expressing the genetic material.
7.2. Specific objectives	<ul style="list-style-type: none"> <li>O1. To define the structure and function of the genetic material.</li> <li>O2. To identify the mendelian mechanisms of heredity in eredopathology.</li> <li>O3. To describe the distribution and frequency of genes in the human population and the factors that determine this distribution.</li> <li>O4. To identify and define genetic and congenital disease.</li> </ul>

#### 8. Course description

8.1. Lecture <sup>20</sup>	Teaching methods <sup>21</sup>	No. of hours
Lecture 1. The DNA structure, replication and distribution in new cells during cell division.	Expunere, utilizare videoprojector, discuții cu studenții	2
Lecture 2. Transcription, the genetic code and translation	Prelegere, prezentare la tablă a problematicii studiate, utilizare videoprojector	2

Lecture 3. The complex relation between genes and traits: interallelic relationships.	Presentation aided by the videoprojector, drawing on the blackboard, discussion with the students.	2
Lecture 4. The complex relation between genes and traits: modes of gene expression, pleiotropy and polyploidy.	Presentation aided by the videoprojector, drawing on the blackboard.	2
Lecture 5. Gene expression in prokaryotes.	Presentation aided by the videoprojector.	2
Lecture 6. Gene expression in eukaryotes: transcription.	Presentation aided by the videoprojector.	2
Lecture 7. Gene expression in eukaryotes: posttranscriptional mechanisms.	Presentation aided by the videoprojector.	2
Lecture 8. Transposons, mitochondrial DNA and organelle DNA transmission.	Presentation aided by the videoprojector, discussion with the students.	2
Lecture 9. The human genome, its structure and origin.	Presentation aided by the videoprojector, discussion with the students.	2
Lecture 10. Meiosis and variation in the number of chromosomes – monosomies and trisomies.	Presentation aided by the videoprojector, drawing on the blackboard, discussion with the students.	2
Lecture 11. Chromosomal structural anomalies Monogenetic diseases: autosomal dominant and autosomal recessive.	Presentation aided by the videoprojector, drawing on the blackboard, discussion with the students.	2
Lecture 12. Monogenetic diseases – x-linked. Polifactorial disease.	Presentation aided by the videoprojector, drawing on the blackboard, discussion with the students.	2
Lecture 13. Congenital diseases and terathogens.	Presentation aided by the videoprojector, discussion with the students.	2
Lecture 14. Genetic disease profilaxy and genetic screening.	Presentation aided by the videoprojector, discussion with the students.	2
<b>Total number of lecture hours:</b>		<b>28</b>

<b>8.2. Practical activities</b> (8.2.a. Seminar <sup>22</sup> / 8.2.b. Laboratory <sup>23</sup> / 8.2.c. Project <sup>24</sup> / 8.2.d. Other practical activities <sup>25</sup> )	<b>Teaching methods</b>	<b>No. of hours</b>
Act. 1 Methods for the study of chromosomes, chromosome classification, G banding.	Discussion, practical demonstration, exercise, experiment	2
Act. 2 Gene relations when determining the characters: <u>exercises to determine phenotypes from known genotypes.</u>	Discussion, exercise, experiment	2
Act. 3 Gene relations when determining the characters: <u>exercises to determine phenotypes from known genotypes.</u>	Discussion, practical demonstration, exercise, experiment	2
Act. 4 DNA electrophoresis.	Discussion, practical demonstration, experiment	2
Act. 5 Molecular techniques in Genetics: FISH, PCR, Southern Blott, micro array-CGH	Discussion, exercise, experiment	2

Act. 6 Sex chromatin: methods to observe and determine its presence using epithelial cells from the oral cavity.	Discussion, practical demonstration	2
Act. 7 Monohybrid crosses: Mendel's laws of heredity.	Discussion, exercise	2
Act. 8 Poligenetic characters. Analysis of dermatoglyphs.	Discussion, practical demonstration	2
Act. 9 Human karyotype – analysis of the normal karyotype.	Discussion, practical demonstration, exercise	2
Act. 10 Genomic mutations – Down syndrome, Klinefelter syndrome, Patau syndrome, Edwards syndrome	Discussion, exercise	2
Act. 11 Pedigree analysis.	Discussion, exercise	2
Act. 12 Mendelian genetics: tracing heredity with the aid of the pedigree analysis.	Discussion, exercise	2
Act. 13 Blood groups and Rh genetics.	Discussion, practical demonstration, exercise,	2
Act. 14 Final recap and oral evaluation	Exercise	2
<b>Total number of hours: seminar/laboratory</b>		<b>28</b>

## 9. Bibliography

9.1. Recommended references	Nussbaum R, McInnes R, Willard H, 2007, Thompson and Thompson Genetics in Medicine 7th edition, Saunders Elsevier
	Pierce B. A. 2014, Genetics a conceptual approach, 5th edition, W. H. Freeman and company
	Online Mendelian Inheritance in Man <a href="http://www.ncbi.nih.gov.OMIM">http:// www.ncbi.nih.gov. OMIM</a>
9.2. Additional references	Marchian Sanda, Atasie Diter, 2014 - Indrumator de lucrari practice, Ed. ULBS.
	Mircea Covic, D. Stefanescu, I. Sandovici, 2004 - Genetica Medicală, Ed. Polirom.
	Marchian Sanda, 2001 - Genetica Medicala , Ed. ULBS.

## 10. Correlating the course description with the expectations and requirements of representatives of the epistemic community, professional associations and significant employers and stakeholders related to the study program and the specific area<sup>26</sup>

Periodic interaction with the concerned organizations in order to correlate the course professional competencies and objectives with what is required in the work force.

## 11. Evaluate

Type of activity	11.1 Assessment criteria	11.2 Assessment methods		11.3 Percentage of the final grade	Notes. <sup>27</sup>
11.4a Exam / Colloquium	<ul style="list-style-type: none"> <li>Theoretical and practical knowledge (quantity, correctness, accuracy)</li> </ul>	Midterm / ongoing assignments <sup>28</sup> :	%	70% (minimum 5)	
		Home assignments: 3 home assignments distributed throughout the semester	15%		
		Other activities <sup>29</sup> :	%		
		Final assessment: multiple choice test	55% (min. 5)		
11.4b Seminar	<ul style="list-style-type: none"> <li>Frequency/relevance of contributions or answers</li> </ul>	Proof of contributions, portfolio (scientific papers, syntheses)		10% (minimum 5)	
11.4c Laboratory	<ul style="list-style-type: none"> <li>Knowledge of equipment, methods of using specific instruments and tools; assessment of tools or achievements,</li> </ul>	<ul style="list-style-type: none"> <li>Oral examination</li> <li>Laboratory notebook, experimental work</li> </ul>		20% (minimum 5)	



	processing and interpretation of results			
11.4d Project	•	•		
11.5 Minimum performance standard <sup>30</sup> Ability to define basic human genetics terms, describe the structure and function of the human genetic material and the rules governing hereditary transmission of genetic diseases.				

***The course description includes components adapted to SEN (Special Educational Needs) persons, according to their type and degree, at all curricular elements and dimensions (competencies, objectives, course description, teaching methods, alternative assessment), in view of providing and ensuring equitable and fair opportunities to academic education for all students, with special attention to special educational needs.***

Date of submission: | 2 | 5 | / | 0 | 9 | / | 2 | 0 | 2 | 3 |

Date of approval in the Department: | 1 | 9 | / | 1 | 0 | / | 2 | 0 | 2 | 3 |

	Degree, title, first name, surname	Signature
Course coordinator	Lecturer PhD. Boeraş Ioana	
Study program coordinator	Assoc. Prof. Ana-Maria Benedek-Sîrbu, PhD	
Director Departament	Lecturer PhD. Voichița GHEOCA	

<sup>1</sup> Licență / Master

<sup>2</sup> 1-4 pentru licență, 1-2 pentru master

<sup>3</sup> 1-8 pentru licență, 1-3 pentru master

<sup>4</sup> Examen, colocviu sau VP A/R – din planul de învățământ

<sup>5</sup> Regim disciplină: O=Disciplină obligatorie; A=Disciplină opțională; U=Facultativă

<sup>6</sup> Categoria formativă: S=Specialitate; F=Fundamentală; C=Complementară; I=Asistată integral; P=Asistată parțial; N=Neasistată

<sup>7</sup> Este egal cu 14 săptămâni x numărul de ore de la punctul 3.1 (similar pentru 3.2.a.b.c.d.e.)

<sup>8</sup> Liniile de mai jos se referă la studiul individual; totalul se completează la punctul 3.37.

<sup>9</sup> Între 7 și 14 ore

<sup>10</sup> Între 2 și 6 ore

<sup>11</sup> Suma valorilor de pe liniile anterioare, care se referă la studiul individual.

<sup>12</sup> Suma (3.5.) dintre numărul de ore de activitate didactică directă (NOAD) și numărul de ore de studiu individual (NOSI) trebuie să fie egală cu numărul de credite alocate disciplinei (punctul 3.7) x nr. ore pe credit (3.6.)

<sup>13</sup> Numărul de credite se calculează după formula următoare și se rotunjește la valori vecine întregi (fie prin micșorare fie prin majorare)

$$\text{Nr. credite} = \frac{\text{NOCpSpD} \times C_c + \text{NOApSpD} \times C_A}{\text{TOCpSdP} \times C_c + \text{TOApSdP} \times C_A} \times 30 \text{ credite}$$

Unde:

- NOCpSpD = Număr ore curs/săptămână/disciplina pentru care se calculează creditele
- NOApSpD = Număr ore aplicații (sem./lab./pro.)/săptămână/disciplina pentru care se calculează creditele
- TOCpSdP = Număr total ore curs/săptămână din plan
- TOApSdP = Număr total ore aplicații (sem./lab./pro.)/săptămână din plan
- C<sub>c</sub>/C<sub>A</sub> = Coeficienți curs/aplicații calculate conform tabelului

Coeficienți	Curs	Aplicații (S/L/P)
Licență	2	1
Master	2,5	1,5
Licență lb. străină	2,5	1,25

<sup>14</sup> Se menționează disciplinele obligatoriu a fi promovate anterior sau echivalente

<sup>15</sup> Tablă, videoproiector, flipchart, materiale didactice specifice, platforme on-line etc.

<sup>16</sup> Tehnică de calcul, pachete software, standuri experimentale, platforme on-line etc.

<sup>17</sup> Competențele din Grilele aferente descrierii programului de studii, adaptate la specificul disciplinei

<sup>18</sup> Din planul de învățământ

<sup>19</sup> Creditele alocate disciplinei se distribuie pe competențe profesionale și transversale în funcție de specificul disciplinei

<sup>20</sup> Titluri de capitole și paragrafe

<sup>21</sup> Expunere, prelegere, prezentare la tablă a problematicii studiate, utilizare videoproiector, discuții cu studenții (pentru fiecare capitol, dacă este cazul)

<sup>22</sup> Discuții, dezbateri, prezentare și/sau analiză de lucrări, rezolvare de exerciții și probleme etc.

<sup>23</sup> Demonstrație practică, exercițiu, experiment etc.

<sup>24</sup> Studiu de caz, demonstrație, exercițiu, analiza erorilor etc.

<sup>25</sup> Alte tipuri de activități practice specifice

<sup>26</sup> Legătura cu alte discipline, utilitatea disciplinei pe piața muncii

<sup>27</sup> CPE – condiționează participarea la examen; nCPE – nu condiționează participarea la examen; CEF - condiționează evaluarea finală; N/A – nu se aplică

<sup>28</sup> Se va preciza numărul de teste și săptămânile în care vor fi susținute.

<sup>29</sup> Cercuri științifice, concursuri profesionale etc.

<sup>30</sup> Se particularizează la specificul disciplinei standardul minim de performanță din grila de competențe a programului de studii, dacă este cazul.