Course code: ……. **Plan position:** ……

A. INFORMATION ABOUT THE COURSE

B. Basic information

Name of course	Plant genetics and embryology
Field of studies	Biotechnology, Agriculture
Level of studies	First
Profile of studies	Academic
Form of studies	Full time
Specialty	
Unit responsible for the field of studies	Faculty of Agriculture and Biotechnology
Name and academic degree of teacher(s)	Dorota Olszewska, PhD, Aleksandra Niklas-Nowak, PhD
Introductory courses	Basic knowledge of biology.
Introductory requirements	Basic laboratory skills.

C. Semester/week schedule of classes

Semester	Lectures (W)	Auditorium classes (Ć)	Laboratory classes (L)	Project classes (P)	Seminar (S)	Field classes (T)	Number of ECTS points
Winter/summer			30				6

2. LEARNING OUTCOME

No.	Learning outcomes description	The reference to the learning outcomes of specific field of study	The reference to the learning outcomes for the area
KNOWLEDGE			
W1	Has knowledge of inheritance and variability of traits, gene interaction, gene coupling.	K_W09	R1A_W05
W2	He knows the basic technologies used in traditional plant breeding and in vitro cultures.	K_W19	R1A_W04 R1A_W05
W3	Student has knowledge of developmental and experimental embryology in the area of its application in the creation of gametic and somatic embryos.	K_W1	R1A_W01
W4	On successful completion of the course student knows *in vivo* and *in vitro* methods of haploid induction applied to improve cultivated and garden plants.	K_W19	R1A_W04 R1A_W05
SKILLS			
U1	Performs problem and research tasks under the supervision of an academic teacher, correctly interprets the results and draws conclusions.	K_U04	R1A_U04

U2	He can assess the benefits of using biotechnological methods in the genetic improvement of crops.	K_U19	R1A_U05 R1A_U06
U3	On successful completion of the course student knows how to start and carry out research in the field of polyembryony *in vivo*, induced androgenesis and gynogenesis in *in vitro* cultures.	K_U20	R1A_U06 R1A_U07
U4	He uses basic techniques of haploid induction in the process of genetic stabilization of crops, makes embryological preparations.	K_U15	R1A_U06
SOCIAL COMPETENCES			
K1	Understands the need to learn and develop knowledge, and recognizes the need to improve their competences.	K_K01	R1A_K01 R1A_K07
K2	He can work individually and in a team.	K_K02	R1A_K02

3. TEACHING METHODS

A. Traditional methods used ***

Laboratories

B. Distance learning methods used ***

Synchronous method (classes conducted in a way that ensures direct interaction between the student and the teacher in real time, enabling immediate flow of information, the method can be used only if it is provided for in the study plan for a given cycle of education): remote lecture in the form of videoconference, remote discussion.
Asynchronous method used as an auxiliary (a method that does not ensure direct interaction between the student and the teacher in real time, used only as an auxiliary / complementary method): online educational videos, online multimedia presentations.

4. METHODS OF EXAMINATION

Test

5. SCOPE

Lectures	
Laboratories	Mendelian inheritance of traits, multiple alleles, the phenomenon of lethality and pleiotropy, chi-square test, sex-linked traits, gene linkages, chromosome mapping, inheritance and variability of quantitative traits, population genetics. *In* vitro induced androgenesis – media preparation, sterilization. Genotype differences in androgenic response - selection of plant material on the basis of microspores development. Anthers and microspores culture induction. Polyembryony experiment – frequency in the context of genotype characteristics. Micro- and macrosporogenesis – obserwations using light microscope.

6. METHODS OF VERIFICATION OF LEARNING OUTCOMES

LEARNING OUTCOME	Form of assessment					
	Oral examination	Written exam	Colloquium	Project	Presentation	Laboratory classes
W1 – W4		x			x	x
U1 – U4		x			x	x

K1		x			x	x
K2					x	x

7. LITERATURE

Basic literature	Winter P.C., Hickey G.I., Fletcher H.L., 2002. Instant Notes in Genetics. BIOS Scientific Publishers Limited Hayes H.K., 2007. Methods of Plant Breeding. Read Books.
Supplementary literature	Current scientific literature and Internet sources

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 1B	30
	Supervision hours	10
Student's own work	Preparation for classes	30
	Reading assignments	40
	Other (preparation for exams, tests, carrying out a project etc)	40
Total student workload		150
	Number of ECTS points	6