Al-Farabi Kazakh National University
Faculty of Biology and Biotechnology

Department of Biodiversity and Bioresources

APPROVED by
Dean of the Faculty
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Zayadan B.K.
" " ________ 2018

EDUCATIONAL-METHODICAL COMPLEX OF DISCIPLINE

PGR 5207

«Plant Population Genetics»

Specialty "6M061300-Geobotany"

Educational program "6M061300-Geobotany "

Course – 1
Semester – 1
Number of credits – 3

Almaty 2018

Educational-methodical complex of the discipline is made by candidate of biological sciences, Professor Turuspekov Y.K.

Based on the working curriculum on the specialty

6M061300-Geobotany

Considered and recommended at the meeting of the Department of Biorecourses and Biodiversity from «28» august 2018, protocol № 1

Head of Department ____________ Kurmanbayeva M.S.

Recommended by Methodical Bureau of the Faculty

«___» ______________ 2018, protocol № ___

Chairman of the Method Bureau of the Faculty ____________ Kulbayeva M.S.

AL-FARABI KAZAKH NATIONAL UNIVERSITY
Faculty of Biology and Biotechnology
Department of Biodiversity and Bioresources

Syllabus
Plant Population Genetics
6M061300-Geobotany
Fall semester, 2018-2019 academic year

Academic course information

Discipline's code	Discipline's title	Type	No. of hours per week			Number of credits	ECTS
			Lect.	Pract.	Lab.		
	« Academic course information»	BC (basic compo nent)	2	1		3	

Lecturer	Turuspekov Yerlan, Professor	Office hours	Scheduled
e-mail	yerlant@yahoo.com		
Telephones	394 80 06		

Academic presentation of the course	**The training course** « Plant Population Genetics» is elective course in the educational program of master specialty 6M061300 – Geobotany. **The aim of the course:** The major purpose of the course is to learn importance and principles of population genetics of organisms and gain theoretical and practical knowledge related to thorough description of plant populations, learning major tools and technologies behind genetic evaluation of population structures. 1. systemically represent and understand the specifics of the scientific knowledge of plant population genetics 2. demonstrate an understanding of the plant population structure 3. to critical assessment of scientific literature, preparation of scientific presentations and research proposals related to population genetics 4. technologies (including new generation technologies) utilized in evaluations of the level of genetic diversity in plant species 5. form a systematic approach to the study of plant biodiversity as a wide range of disciplines in earth sciences 6. share the results obtained from the scientific research community, to engage in dialogue, to defend the point of view; 7. work in a team; 8. evaluate the genetic diversity of the plant populations
Prerequisites	Botany, Genetics, Molecular Biology and Bioinformatics.
References and Resources	**References** **The basic literature:** 1. Freeman S., Herron J. Evolutionary analysis. Upper Saddle River, NJ 07458, USA 207, 576p 2. Pevsner J. Bioinformatics and Functional Genomics. Maryland, USA 2009. 992. 3. Rogstad, SH; pelikan, S. Genetic Diversity in Establishing Plant Populations : Founder Number and Geometry. 1st ed. Enfield, NH : CRC Press, 2011. 1st ed. ISBN: 9781578087211. p. 4. Lönn, M. (1994). Genetic variation in plant populations and its relation to

	environmental and population parameters / by Mikael Lönn. Uppsala : Acta Universitatis Upsaliensis ; Stockholm : Distributor, Almqvist & Wiksell International, 1994. 5. Hazzouri, KM; Purugganan, MD; Flowers, JM. Population Genomics of Plant Species. 2014. 311 p. ISBN: 978-0-12-417182-4. 6. Brigham, CA; Schwartz, MW. Population viability in plants : conservation, management, and modeling of rare plants / C.A. Brigham, M.W. Schwartz (eds.). Berlin ; New York : Springer, c2003., 2003. (Ecological studies: v. 165). ISBN: 3540439099.
Academic policy of the course in the context of university moral and ethical values	**Academic Behavior Rules:** Compulsory attendance in the classroom, the impermissibility of late attendance. Without advance notice of absence and undue tardiness to the teacher is estimated at 0 points. Submission of assignments (Independent work of students, midterm control, laboratory tasks, projects and etc.) prior to the deadlines. The violation of submission deadlines leads to the deduction of penalty points. **Academic values:** Academic honesty and integrity: independent performance of assignments; inadmissibility of plagiarism, forgery, cheating at all stages of the knowledge control, and disrespectful attitude towards teachers. (The code of KazNU Student's honor) Students with disabilities may receive advice via ... E- address, phone ...
Evaluation and attestation policy	**Criteria-based evaluation:** assessment of learning outcomes in correlation with descriptors (verification of competence formation during midterm control and examinations). **Summative evaluation:** evaluation of the presence and activity of the work in the classroom; assessment of the assignment, independent work of students, (project / case study / program / ...) The formula for calculating the final grade.
Calendar (schedule) the implementation of the course content (Appendix 1)	Weekly description of lecture topics, practical / seminar / laboratory / project work , assignments for independent work of students; an indication of the topic scope and grading scheme, including an assessment of the control task. Summary and analysis of the curriculum content after the first half of the semester (midterm control 1) in the form of a scientific essay / system-oriented analysis of scientific issues of studied topics / presentation of individual case studies / evaluation of personal contribution to the development of a group project assignment, and others.

Calendar (schedule) the implementation of the course content:

Week / date	Topic title (lectures, practical classes, Independent work of students)	Number of hours	Maximum score
1	2	3	4
1	**Lecture 1.** Introduction to Population Genetics.	2	
	Laboratory work 1. History of plant population genetics. Vocabulary of PG.	1	10
2	**Lecture 2.** Plant speciation. Selection and Mutations	2	
	Laboratory work 2. The role of hybridization in plant speciation.	1	10
3	**Lecture 3.** Botanical assessment of flora diversity.	2	

	Laboratory work 3. Preparation of herbarium specimen	1	10
	IWST. Consultation and acceptance of IWS's tasks № 1: Overview of scientific literature for plant taxonomy.		10
4	**Lecture 4.** Botanical assessment of flora diversity	2	
	Laboratory work 4. Assessment of diversity and conservation status of rare plants. DNA extraction and purification	1	10
5	**Lecture 5.** The importance of studying DNA	2	
	Laboratory work 5. The features of plant genomes	1	10
	IWST. Consultation and acceptance of IWS's tasks № 2: DNA barcoding markers: types and applications		10
6	**Lecture 6.** Molecular plant taxonomy	2	
	Laboratory (practice) studies 6. Molecular techniques to assess plant diversity. DNA barcoding protocols	1	10
7	**Lecture 7.** Plastid genome evolution	2	
	Laboratory work 7. Hyper variable regions of chloroplast markers	1	10
	IWST. Consultation and acceptance of IWS's tasks № 3: Variation in nucleotide sequences in plant population		10
Collecting scores (seminars, laboratory works and IWS)			**100**
8	**Lecture 8.** Complexity of Plant Genomes	2	
	Laboratory work 8. Features of plant species genomes: examples and application in practice	1	8
Midterm Exam			**100**
9	**Lecture 9.** Polymorphism of DNA markers and their use in PG studies	2	
	Laboratory work 9. Features of different types of DNA markers	1	8
	IWST. Consultation and acceptance of IWS's tasks № 4: NCBI databases: types and application		8
10	**Lecture 10.** Pairwise sequence alignment	2	
	Laboratory work 10. Comparative analysis of different methods in pairwise sequence alignment	1	8
11	**Lecture 11.** Whole genome sequencing in plant population studies	2	
	Laboratory work 11. New generation technologies	1	8
	IWST. Consultation and acceptance of IWS's tasks № 5: Chloroplast genomes: diversity, evolution, and applications in population genetics		10

12	**Lecture 12.** Bioinformatics in population genetics	2	
	Laboratory work 12. Common software packages: basic rules of use	1	8
13	**Lecture 13.** Construction of molecular evolutionary phylogenetic trees	2	
	Laboratory work 13. Basic bioinformatics principles in construction of trees	1	8
	IWST. Consultation and acceptance of IWS's tasks № 6: Understanding Evolutionary Trees. Steps in constructing an evolutionary tree		8
14	**Lecture 14.** Conservation of biological resources	2	
	Laboratory work 14. GenBanks and their role in conservation of genetic resources	1	8
15	**Lecture 15.** Practical applications of Population Genetics	2	
	Laboratory work 15. Conservation of genetic resources ex situ	1	8
	IWST. Consultation and acceptance of IWS's tasks № 7: Intra- and inter population variability using polymorphic DNA markers		10
Collecting scores (seminars, laboratory works and IWS)			**100**
Final exam			**100**

Dean of the Faculty Zayadan B.K.

Chairman of the Faculty Methodical Bureau Kulbayeva M.S.

Head of the Department Kurmanbayeva M.S.

Lecturer Turuspekov Y.K.