SATBAYEV UNIVERSITY

«APROVED BY»

Abetov A. E.   signature of the head the department

«_____»   20__ г.

SYLLABUS
Magnetic exploration

(name of discipline)

for specialty
5B070600- Geology and exploration of mineral deposits
3 credits

Session: 7, 2019-2020 academic year

Алматы, 2019

Institute of Geology, mining and oil and gas
Department Of Geophysics

1. Information about teachers::

lecturer
Abish Sharapatovich
Office time, кабинет: 514, monday14:20-16:15;
tuesday10:00-10:50,15:25-16:25, thursday 16:30-17:20
Email a.sharapatov@satbayev.university

assistant
Nazerke Assirbek
(laboratory classes)
Wednesday 12:10 – 14:05, audience 523
E-mail: n.assirbek@satbayev.university

2. Course objective: study of the theory, methods and techniques of geomagnetic field measurement, processing technology, geological interpretation and graphical representation of magnetic data.

3. Course description: The content of the course provides for the theory and practice of studying Geomagnetism, methods and techniques of field measurement work, as well as computer technology processing, geological interpretation of magnetic data and graphical construction of magnetic data results.

4. Prerequisites:
✓ Physics Of The Earth
✓ Geophysical methods of prospecting and exploration of mineral deposits
✓ Educational and industrial practice

5. Postrequisites:
✓ Externship
✓ Diploma work (project)

6. List of references

Basic literature	Additional literature
[1] Novikov K. V. Magnetic Exploration. Part 1. - M. 2013. 141 p.	[3] A. A. Logachev, V. P. Zakharov Magnetic Exploration. - L.: Nedra, 1979. 352 p.
[2] ECOD on discipline «Magnetic Exploration» – Almaty: KazNTU, 2009. 57 p.	[4] Magnetic Exploration: Handbook of Geophysics. /Ed. by V. E. Nikitskiy, Y. S. Glebovskiy. - M.: Nedra, 1990.

7. Calendar and thematic plan

Week	The topic of the lecture	Topic of laboratory work	Reference to the literature	Tasks	Term of delivery
1	Introduction. Magnetic method of prospecting and exploration of MD. Experimental data on The earth's magnetic field (EMF).		[1] Introduction, 5-14 p. [2] Introduction 10-14 P.	Oasis Montaj system (Geosoft, Canada): functions, capabilities, operating procedures	2- week
2	EMF elements on different coordinate systems. The composition of EMF and the nature of the terms. Maps of the normal field. Variation and gradient of the magnetic field	Determination of the values of the normal EMF model IGRF (international geomagnetic field Reference).	[1] 2 Chapter, 15-27 P. [2] 14-20 p.		3- week
3	Anomalous magnetic field, its classification. Magnetic potential of simple sources, physical body. Poisson's theorem and its aplication.		[1] 2 Chapter, 28-56 p. [2] 20-25 p.	IWS: Magnetic properties of rocks and ores.	4- week
4	General provisions of the theory of magnetization of geological bodies. Types of magnetization. Magnetic properties of rocks and minerals.	Determination of the values of corrections for variation and normal gradient of EMF according to the empirical model IGRF-2015 in the Oasis Montaj system.	[1] 3 Chapter, 57-78 p. [2] 25-29 p.		5- week
5	Factors affecting the magnetization of bodies (external field, mineral composition, demagnetization coefficient, temperature).		[1] 3 Chapter, 78-103 p. [2] 29-33 p.	IWS: Geological analogues of regular geometric shapes	6- week
6	The method of magnetic surveys. The research stage. The scale of the observations. Observation network. Ground, underground, hydromagnetic and aeromagnetic surveys. Features of their conduct. Measured elements of EMF.	Magnetometers. Types, specifications and principles of operation of magnetometers.	[1] 4 Chapter, 104-113 p. [2] pages 33-38 p.		7- week
7	Determination of shooting accuracy. Types of measurement. The technique of measurement. Magnetometers.		[1] 4 Chapter, 113-127 p. [2] 38-41 p.	Preparation for BC 1.	8- week
8	The first interim assessment				
9	Processing of results of field observations and their image. Requirements for the construction of magnetic survey maps.	PGM: methods of construction, aplication	[1] 5 Chapter, 128-137 p. [2] 41-46 p.		10- week
10	The concept of PGM and their purpose. Construction of PGM.		[1] 5 Chapter, 137-183 p. [2] 46-53 p.	IWS: field calculation Formulas for bodies of regular geometric shape.	11- week
11	The solution of a direct problem of magnetic prospecting. Analytical method of solution. The dependence of anomalous curves on the shapes of bodies, on the angle of magnetization.	The solution of a direct problem of magnetic prospecting.	[1] 6 Chapter, 184-199 p. [2] 53-59 p.		12- week

12	Transformation of the magnetic field. Types, goals and objectives of transformation of the observed magnetic field.		[3] 5 Chapter, 309-324 p.	IWS: field calculation Formulas for bodies correct forms	13- week
13	Solution of the inverse problem of magnetic prospecting. Ways to solve it. Qualitative and quantitative interpretation of magnetic data. Construction of maps (schemes) based on the results of magnetic exploration.	Transformation of the magnetic field. Quantitative interpretation of magnetic data	[1] 7 Chapter, 200-266 p. [3] 7 Chapter, 357-397 p.	IWS: solution of the inverse problem of magnetic prospecting by analytical method.	14- week
14	Results of aplication of magnetic prospecting in the solution of problems of ore, oil and gas Geology and in other researches.		[4] 8 Chapter, 218-227 p. Chapter 9, 237-253 p.	Preparation for BC 2.	15- week
15	2 Midterm				
	Exam				

* *In the calendar-thematic calendar changes are possible taking into account holidays*

8. Tasks and brief guidelines for their implementation:

✓ Tasks (independent work and practical exercises) are performed in order to consolidate the lecture material, topics 3, 5 the columns "Calendar-thematic plan". The jobs are provided with guidance and relevant literature http://sso.kaznitu.kz .

✓ **Independent work of student (IWS):**
The vyponenie jobs are provided with guidance and relevant literature http://sso.kaznitu.kz .
✓ **Laborators work:**
The order of execution of laboratory works given the guidelines at the beginning of each job at http://sso.kaznitu.kz.
✓ **Midterm:**
Boundary control (1, 2) is based on the materials of lectures, practical works and ISW, passed at the time of its implementation.
✓ **Exam:**
Examination questions are asked on the basis of lectures, laboratory work and ISW. The answers to the 3 questions of the ticket must be correct, complete and unambiguous.

9. Work evaluation criteria

Assessment according to the letter system	The digital equivalent assessment	Criterion
A	95 – 100	Correct, complete, unambiguous answer
A -	90 – 94	Incomplete/definite answer
B +	85 – 89	1 error
B	80 – 84	1 error, incomplete/ambiguous response
B -	75 – 79	1 error, incomplete, ambiguous response
C +	70 – 74	2 errors
C	65 – 69	2 errors; incomplete / ambiguous answer
C -	60 – 64	2 errors; incomplete, ambiguous answer
D +	55 – 59	3 errors
D	50 – 54	3 errors; incomplete / ambiguous answer
F	0 – 49	Wrong answer

* *It is possible to receive bonus points for performing additional tasks*

10. Policy for late delivery of works
It is envisaged to reduce the score for late delivery of work.

11. Attendance policy
The student should not be late and miss classes, for missing more than 20% of classes for a disrespectful reason, he is not allowed to the session.
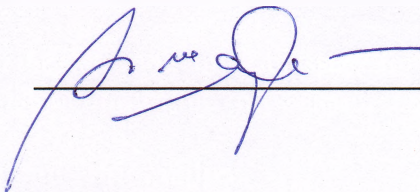
12. Academic conduct and ethics policy
Tolerance and respect for other people's opinions are observed. Objections with all should be formulated in the correct form. Plagiarism and other forms of dishonest work are unacceptable. Prompting and cheating during boundary controls, exams, passing the exam for another student are not allowed. A student convicted of falsifying any course information will receive a final grade of "F".

Within the framework of training in the discipline, any corruption manifestations in any form are unacceptable. The organizer of such actions (teacher, students or third parties on their behalf) bear full responsibility for violation of the laws of the Republic of Kazakhstan.

Considered at the meeting of the Department of "Geophysics", Protocol N 1 of «14» August 2019 y.

Composers: _____ **A. Sharapatov**