Module Handbook on the degree program
BSc 60710400 Ecology and Environmental protection
(water sector option)

MGD 1.1 Humanities Module	
Module designation	XT1115- Foreign language
Semester(s) in which the module is taught	1,2
Person responsible for the module	Begov F.R.-Dosent
Language	English
Relation to curriculum	Compulsory
Teaching methods	Practical.
Workload (incl. contact hours, self-study hours)	Total workload: 450 hours. Contact hours: 180 hours: - Practical - 180 Private study including examination preparation, specified in hours[1]: 270 hours.
Credit points	15
Required and recommended prerequisites for joining the module	English (school program)
Module objectives/intended learning outcomes	As a result of mastering the discipline, the student: - Knows and understands the main linguistic phenomena, grammatical and syntactic structures, and lexical units of a foreign language - Understands the main points of clear standard information in a foreign language on various topics usually related to work, study, leisure, etc . -Can communicate in a foreign language in situations that usually arise at work, study, vacation, etc., or while staying in the country of the language being studied; in oral and written communication, when working with literature in a foreign language. - Able to express critical judgments in a foreign language in: dialogical speech communication in most situations that arise during a stay in the country of the language being studied; - Participates without prior preparation in dialogues in a foreign language on a familiar/interesting topic, expounds the plot of a book or movie, and expresses his attitude to it. - Able to write simple, coherent texts in a foreign language on familiar or interesting topics; personal letters informing them of their experiences and impressions. - Able to participate in a conversation in a foreign language; present himself using descriptive expressions - Can accurately use a set of constructs associated with familiar, regularly occurring situations. - Can speak and express his thoughts in a foreign language, 0 start, maintain, and finish a conversation on familiar discussion topics..
Content	Teaching non-philological education students the important aspects of language: grammar, lexicon and discourse analysis, and developing the skills of their correct use in communication.
Exams and assessment formats	Two oral Midterm assessments (20 minutes each) and one final oral exam (40 minutes), short computer-based quizzes, take-home written assignments
Study and examination requirements	Requirements for successfully passing the module e.g. the final grade in the module is composed of 60% performance on exams, 10% quizzes, 10% take-home assignments, 10% in-class participation. Students must have a final grade of 60% or higher to pass

Reading list	1."English vocabulary in use" Elementary (third edition). 2.Soil Security. Volume 4.September 2021 3.Oxford word skills (Basic) 4.Atmospheric Environment. Part A. General Topics. Volume 27, Issues 17–18 December 2010. 5.Renewable and Sustainable Energy Reviews. Latest issue Volume 154. 2021. 6.Oxford English grammar course basis. 7.Practical grammar Level 1. 8.Tactics for listening Second edition
Module designation	OYT 1105 The modern history of Uzbekistan-
Semester(s) in which the module is taught	1
Person responsible for the module	Mamadaminova Bakhtigul Abdupattaevna - Doctor of Philosophy in historical sciences, PhD, associate professor; Botirova Halima Eshmamatovna - Doctor of Philosophy in historical sciences, PhD, associate professor.
Language	Uzbek, Russian, English
Relation to curriculum	Compulsory
Teaching methods	lecture, seminar
Workload (incl. contact hours, self-study hours)	Total workload: 150 hours Auditorium Hours: Lecture - 40 hours. Practical training - 20 hours Private study - 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	Not required
Module objectives/intended learning outcomes	As a result of appropriation of the subject, students: will have an idea and knowledge about the causes of the political, social, economic crisis situation during the former Union; will have an idea and knowledge about the work carried out on the way to gaining the independence of the state; a new period has begun in the history of Uzbekistan since the ears of independence and will have an idea and knowledge about the specific aspects of this period. Analysis of historical processes, study socio-economic, political processes that are important in the new history of Uzbekistan; study the modern history of Uzbekistan, the place of Uzbekistan in the world community in modern processes from the point of view of historicity and objectivity; study issues such as being able to apply the idea of national independence, being able to express their reaction to the processes taking place around them, understanding the place of history in the development of society and human outlook, and the connection between the events that are happening today and important events in history.

Content	Theoretical and methodological principles of the modern history of Uzbekistan. Theoretical and methodological bases of learning science. Opinions of Sh.M. Mirziyoyev, The President of the Republic of Uzbekistan on the role and lessons of historical memory in educating a spiritually mature person. Level of difficulty: 2 Formation and development stages of Uzbek statehood. The concept of statehood. Social, political, and economic dependence of Uzbekistan on the center and its consequences. The policy of repression and violence of the Soviets and its essence. Level of difficulty: 3 Socio-political processes in Uzbekistan on the eve of independence. The establishment of the independent Republic of Uzbekistan and its historical significance. Changes in the political system. Level of difficulty: 2 Uzbekistan's unique path of independence and development. Uzbekistan's choice of a unique development path. "Uzbek model" of development and its specific features. Parliamentary system and reforms in Uzbekistan. Level of difficulty: 2 The development of the Constitution of the Republic of Uzbekistan and the additional changes introduced. The purpose, tasks and methods of studying the Constitution of the Republic of Uzbekistan, the concept of the constitution. Economic reforms, formation of private ownership. Development of market relations in Uzbekistan. Social changes in the Republic of Uzbekistan. Level of difficulty: 4 Reforms implemented in the field of education in the Republic of Uzbekistan. Development of science in the ears of independence. The concept of development of the higher education system of the Republic of Uzbekistan until 2030. Level of difficulty: 3 Reforms implemented in the field of irrigation in Uzbekistan during the ears of independence. Quality changes in irrigation systems in Uzbekistan. Priorities identified in the concept of water management development of the Republic of Uzbekistan for 2020-2030. Level of difficulty: 4 Spiritual and cultural development in Uzbekistan during the ears of independence. Revival of national customs, values and traditions. State policy on ensuring stability in inter-ethnic and inter-religious relations in Uzbekistan. Level of difficulty: 3 Reforms implemented in the socio-economic and political life of the Republic of Karakalpakstan during the ears of independence. Changes in the field of agriculture in Karakalpakstan. To study the solution of ecological problem processes at the international level. Level of difficulty: 2 Uzbekistan's international relations and its place in the world community. Uzbekistan's policy of ensuring peace and stability in the region. Level of difficulty: 5 Reforms implemented in new Uzbekistan. Development strategy of new Uzbekistan for 2022-2026. Level of difficulty: 4 Increasing the position and influence of the Republic of Uzbekistan in international rankings and indexes. Adoption of state policy, legal-normative documents on "Improving the position of the Republic of Uzbekistan in international rankings and indexes and introducing a new mechanism of systematic work with them in state bodies and organizations." Level of difficulty: 4
Exams and assessment formats	Mid-term control (3 questions) will be conducted in the form of written work, 80 minutes will be allocated for the exam. 80 min will be allocated for the final control, the final exam will be conducted on the basis of oral questions and answers.

Study and examination requirements	Requirements for successfully passing the module the final grade in the module is composed of 60% performance on exams, midterm control (20%), take-home assignments (10%), in-class participation (10%). Students must have a final grade of 60% or higher to pass.
Reading list	1. Mustaqil O‘zbekiston tarixi. Mas’ul muharrir A.Sabirov. - Toshkent: Akademiya, 2013. 2. Новейшая история Узбекистана. Руководитель проекта и редактор. M.A.Rahimov. - Tashkent: Adabiyot uchqunlari, 2018. 3. Rasulova N. O‘zbekistonning eng yangi tarixi. 1-qism. - Toshkent, 2021. - 186 bet. 4. O‘zbekistonning eng yangi tarixi. R.H.Murtazayeva, A.A.Ermetov, A.A.Odilov. - Toshkent, 2023. 5. Mirziyoyev Sh.M. Milliy taraqqiyot yo‘limizni qat’iyat bilan davom ettirib, yangi bosqichga ko‘taramiz. T. 1. - Toshkent: O‘zbekiston.. 2017. 6. Mirziyoyev Sh.M. Buyuk kelajagimizni mard va oliyjanob xalqimiz bilan birga quramiz. - Toshkent: O‘zbekiston. 2017. 7. Mirziyoyev Sh. Yangi O‘zbekiston taraqqiyot strategiyasi. To‘ldirilgan ikkinchi nashri. - Toshkent: “O‘zbekiston” nashriyoti, 2022. - 416 bet.
Module designation	MG1105- Engineering and computer graphics
Semester(s) in which the module is taught	1
Person responsible for the module	Nasritdinova Umida Akhmadjonovna Urishev Adkhamjon Ergashalievich
Language	Uzbek, Russian
Relation to curriculum	Main
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total workload: Auditorium Hours: Lecture - 20 hours. Practical training - 40 hours. Independent education - 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	Higher Mathematics (Department of Analytical Geometry)

Module objectives/intended learning outcomes	As a result of appropriation of the subject, students will: ***Know and understand:*** *- general principles of "engineering and computer graphics" students' worldview expansion, formation of them as specialists,* *- existing classifications of developing logical and spatial imagination and increasing intelligence;* *- The student learns about the laws and rules of general technical sciences in the science of drawing geometry, about the rules of problems that can be used a lot in engineering practice, in modeling natural processes, phenomena and devices,* ***Having the skills to:*** *- reasonable analysis;* *- to teach students the theoretical basis of geometrical methods necessary for searching for optimal solutions of technical and economic problems and choosing the best ways of their implementation;* *- reasonable analysis;* *- to teach students the theoretical basis of geometrical methods necessary for searching for optimal solutions of technical and economic problems and choosing the best ways of their implementation;* ***Formation of competences:*** *- formation of skills to work in CAD and CAE programs necessary for a modern engineer;* *- to provide technical knowledge necessary for the reduction of compulsory and optional subjects related to general professional and specialization in educational plans;* *-To teach how to correctly describe technical ideas graphically* *- the student learns to create methods of creating images of figures in space on surfaces in general, or to solve and check related spatial problems based on the given image of figures;* *- It is necessary to have the skills of accurate solutions about the drawings of bodies on the plane based on the rules of the known law.* *"Engineering and computer graphics" subject expands the worldview of students, forms them as experts, develops logical and spatial imagination, increases intelligence; to teach students the theoretical foundations of geometric methods necessary for modeling natural processes, phenomena and devices, for reasonable analysis, for searching for optimal solutions to technical and economic issues, for choosing the best ways of their implementation, to form the skills to work in CAD and CAE programs necessary for a modern engineer, to provide technical knowledge necessary for the reduction of compulsory and elective subjects of the general professional and specialty curriculum, in particular, it teaches how to graphically describe technical ideas.*
Content	*The purpose of science and the basics of creating images-projections. Difficulty level: 2* *Plotting and reading a dot. Difficulty level: 2* *Methods of Projection of a Straight-Line Section Difficulty Level: 2* *Surfaces and its types. Difficulty level: 2* *Methods of drawing reconstruction. Difficulty level: 2* *Curves and surfaces. Difficulty level: 2* *Geometric drawing and projection drawing. Difficulty level: 2*
Exams and assessment formats	One mid-term examination (80 minutes each) and a final written and oral exam (60 minutes), a short-computerized test and written homework

Study and examination requirements	*Requirements for ready transition from science* *The total maximum marks will be the sum of the final exam (40%) and the Midterm (60%). To pass the subject, a student must score 60% or more of the allotted points*
Reading list	*1. U. A. Nasritdinova, U. D. Edilboev, A. E. Urishev muhandislik va kompyuter grafikasi. O'quv qo'llanma. TIIQXMMI 180 sahifa. 2021 yil.* *2. U. A. Nasritdinova "Kompyuter grafikasi". O'quv qo'llanma., "TIIQXMMI". Toshkent. 2020-180 b.* *3. U. A. Nasritdinova, U. D. Edilboev Muhandislik va kompyuter grafikasi. O'quv qo'llanma. "TIIQXMMI" Milliy tadqiqot universiteti. Toshkent-2022., 180 st.* *4. А. Валиев. Рисунок (геометрический рисунок) Т.: ризограф ТДГУ, 2013.*
Module designation	AFK 1104 Analytical and Physcolloid Chemistry,
Semester(s) in which the module is taught	1
Person responsible for the module	Komilov Bakhrom Jamoldinovich. Doctor of philosophy in chemical sciences, Ph.D., Associate Professor
Language	Uzbek, Russian
Relation to curriculum	Main Chemistry
Teaching methods	Lecture, practical training, laboratory
Workload (incl. contact hours, self-study hours)	Total workload: 120 hours Auditorium hours: 60 hours Lecture - 20 hours Practical training - 20 hours Laboratory - 20 hours
Credit points	4
Required and recommended prerequisites for joining the module	Chemistry

Module objectives/intended learning outcomes	As a result of appropriation of the subject, students will: -Know and understand theoretical basis of modern analytical and physico-colloidal chemistry. -Know main phenomena, laws, regularities of chemistry, their application in technology and life, and the impact of natural processes on life. -Know basic concepts and laws of chemistry. Classification of chemical reactions and inorganic compounds. D.I. Mendeleev's periodic law and the periodic table of elements. Atomic structure and quantum numbers. -Know general chemical foundations of analytical chemistry. -Know classification of chemical reactions and inorganic compounds. -- Know Alitic group cations and anions from D.I. Mendeleev's periodic table of chemical elements. -Can interprate the "Chemical" behavior of the subject matter, the basic laws of physical chemistry, aggregate states of matter, chemical thermodynamics, chemical kinetics, the doctrine of solutions, electrochemical processes, colloidal chemical systems, methods and methods of their preparation, optical, molecular kinetic, electrokinetic properties - Can interprate the concept of "ability to react". - Be able to use his knowledge in professional work and have analytical thinking skills. - Be able to solve issues by applying the laws of physical and colloidal chemistry to reveal the new essences of living nature, Solutions. Melting process. Solubility, concentrations of solutions. - Be able to quality analysis. Analytical groups of cations. description of 1st, 2nd, 3rd, 4th, 5th analytical group cations, opening reactions, reactants and different aspects. Be able to use description of analytical groups of anions and opening reactions. Be able to apply fundamentals of quantitative analysis. Methods of tensile and volumetric analysis. Modern methods and methods of physical chemical analysis;

Content	Analytical chemistry is a science that studies the theoretical foundations and methods of chemical analysis. The practical task of analytical chemistry is to determine the composition of substances or their mixtures. Qualitative analysis: Qualitative analysis and its methods. Analytical reaction methods. Quality reactions and their requirements. Specificity and sensitivity of analytical reactions. Chemical containers, tools and equipment used in quality analysis by semi-micro method. Work procedure in the laboratory of analytical chemistry. Safety technique. *Level of difficulty: 3.* Theoretical issues: Law of mass action. Electrolytic solutions. Fundamentals of the theory of electrolytic dissociation. Chemical reactions in aqueous solutions. Ionic reactions. Ionization of water. Buffer solutions. Calculation of the pH of buffer solutions. Division (classification) of cations and anions into analytical groups. *Level of difficulty: 4.* General characteristics of the first analytical group of cations: reactions of group I cations and their analysis procedure. Reactions of K^+ cation. Reactions of Na^+ cation. Reactions of NH^{4+} cation. Reactions of Mg^{2+} cation. Analysis of the mixture of cations of analytical group I. Questions and exercises. *Level of difficulty: 3.* II analytical group cations: Equilibrium in heterogeneous systems. Solubility multiple. Factors affecting sediment formation. Dissolution of the precipitate. General description of cations of analytical group II. Effect of group II reagent on second group cations. Ba^{2+} cation detection reactions. Sr^{2+} cation determination reactions. Reactions to determine the Ca^{2+} cation. Procedure for analyzing the mixture of group I-II cations. Questions and exercises. *Level of difficulty: 4.* Ill analytical group cations: general description of group III. Hydrolysis of salts. Colloid systems. Complex compounds. Oxidation-reduction theory. Amphotericity. Reactions of Fe^{3+} and Fe^{2+} cations. Reactions of Mn^{2+} cation. Reactions of So^{2+} and Ni^{2+} cations. Reactions of Al^{3+} cations. Reactions of Sr^{2+} cations. Reactions of Zn^{2+} cations. Some cations from the mixture of group III cations ($Fe^{3+,}$ $Fe^{2+,}$ $Mn^{2+,}$ $So^{2+,}$ Ni^{2+}) determination. Analysis of the mixture of cations of analytical group I, II and III. Questions and exercises. *Level of difficulty: 4* IV analytical group cations: Oxidation potential. General description of group IV cations. Reactions of the Si^{2+} cation. Effect of group IV cations common reagent (H_2S). Questions and exercises. *Level of difficulty: 3* Cations of analytical group V: effect of general reagent of analytical group V cations. Reactions of Ag^+ cation. Reactions of Rb^{2+} cation. Reactions of Hg^{2+} cation. Questions and exercises. *Level of difficulty: 3* Anions: Classification of anions. II analytical group anions. Reactions specific to Cl^- anion. Reactions specific to the J^- anion. III analytical group anions. Questions and exercises. *Level of difficulty: 4* Quantitative analysis and its tasks: Quantitative analysis and its tasks. Analytical scales. Damper scale weighing technique. *Level of difficulty: 2*
Exams and assessment formats	E.g.: Two midterms (20 minutes each) and a final oral exam (40 minutes), a short, computerized test and written homework are provided.

Study and examination requirements	Requirements for successfully passing the course. E.g.: The total maximum score will be the sum of the points allocated to the final exam (60%), midterm (20%), homework (10%) and classroom activity (10%). To pass the subject successfully, the student must score 60% or more of the allotted points.
Reading list	1. М. Миркомилова. Аналитик кимё. Олий ўқув юртлари талабалари учун дарслик. “Ўзбекистон”. Тошкент, 2001, 416 б. 2. M.T. Gulamova, Sh.Q. Norov, N.T. Turabov. Analitik kimyo. O'quv qo'llanma. "Voris-nashriyot". Toshkent, 2009, 319 б. 3. T. E. Brown, H.E. JR LeMay, B. Bursten, C. Murphy. Chemistry the Central Science. Textbook. “Prentice Hall”. New York, 2002, pp 516. 4. S.O. Akhmetova, S.O. Abilkasova. Physical and Colloid chemistry. Laboratory manual. “Zhaniya Poligraph”. Almaty, 2019, pp 139. 5. Seyda Bucak, Deniz Rende. Colloid and Surface Chemistry A Laboratory Guide for Exploration of the Nano World. “CRC Press”. London & New York, 2014, pp 230. 6. Frederick Hutton Getman. Laboratory Exercises in Physical Chemistry. „BiblioLife”. New York, 2008, pp 248. 7. Sh.P. Nurullayev, A.J. Xoliqov, J.S. Qayumov. Analitik, Fizikaviy va Kolloid kimyo. “IQTISOD-MOLIYA”. Toshkent, 2018, 269 б. 8. Raymond Chang, John W. Thoman (Jr.). Physical Chemistry for the Chemical Sciences. “University Science Books”. Dulles, 2014, pp 951. 9. O. Fayzullayev. Analitik kimyo. Darslik. "Yangi asr avlodi".Toshkent, 2006, 478 б. 10. O. Fayzullayev. Analitik kimyo. Amaliy-laboratoriya mashg'ulotlari uchun. "Yangi asr avlodi". Toshkent, 2006, 448 б. 11. K.R. Rasulov. Analitik kimyo. Darslik. "G'afur G'ulom nomidagi nashriyot-matbaa ijodiy uyi". Toshkent, 2004, 570 б. 12. O.M. Yoriyev. D.A. Karimova. Fizikaviy kimyo. O'quv qo'llanma. "Tafakkur bo'stoni". Toshkent, 2003, 240 б. 13. T.M. Boboyev, H. Rahimov. Fizikaviy va kolloid kimyo. Darslik. "G'afur G'ulom nomidagi nashriyot-matbaa ijodiy uyi". Toshkent, 2004, 504 б.
Name of the module/subject and identification in the curriculum.	1104 Physics
Semester in which science is taught	2
The teacher responsible for the module	Sapaev Ibrokhim. B., Ph.D., Associate professor
language of education	Uzbek, Russian
Relation to curriculum	Compulsory/elective / specialization Names of other study programs with which the module is shared
Teaching methods	e.g. lecture, lesson, lab work, project, seminar, etc.
Workload (incl. contact hours, self-study hours)	Total load: 120 hours Auditorium Hours: Lecture - 30 hours; Practical training - 20 hours Laboratory - 10 hours Independent education - 60 hours

Credit points	4
Required and recommended prerequisites for joining the module	Mathematical analysis, analytical geometry

Module objectives/intended learning outcomes	After mastering the discipline, the student To know and understand: - Distinguishing natural phenomena in physics, studying the properties of matter and space, their laws, and seeing the main fundamental laws in practice. General physics course to acquire knowledge from departments of mechanics, molecular physics, electricity and magnetism, optics, atomic and nuclear physics. -terminology in the field of physics and equipment (instruments) used in physics research, to know the difference between one-, two- and three-atom molecules and degrees of freedom. -the basic phenomena of physics and sections of physics, the fundamental concept of mechanics is that of motion of a body with respect to other bodies. - the subfield of physics, developed in classical mechanics, which describes the motion of points, bodies (objects), and systems of bodies. - Mechanical Phenomenon, Electromagnetic Phenomenon, Optical and Atom nuclear, to see changes in the characteristics of processes in different environments. - the to develop students' ability to apply physical formulas in the problems of specialization and general professional sciences in the curriculum of physics. - the basics of physics knowledge, the patterns, and principles of physics, the dynamics and statics, formation, and interaction, and evolutionary development. - the basics of math knowledge, and theoretical and practical analysis of physical problems. To be able to: - to know the formulas for uniform motion and nonuniform motion, apply the rule of vectors in dynamics problems, and be able to apply Newton's laws and their problems. - Knowledge of magnetic fields created by permanent and artificial magnets in electromagnetic problems, forces in magnetic fields. - Understand the different and similar aspects of variable and constant current sources and use them in problems. - To understand optical phenomena, to be able to distinguish optical devices, and to understand the principle of operation, to understand the working mechanism of lenses, and telescopes. - To know the location of active and passive devices in electric circuits, to be able to apply the laws Krieghoff's laws to electric circuits, to understand the mechanism of electric current passing in different environments, ability to apply formulas and physical laws of capacitors and resistors in series and parallel. - Know the different and similar aspects of metals, semiconductors, and dielectrics, and understand the current flow mechanisms in them, Graphical explanation of changes in electrical conductivity of metals, semiconductors, and dielectrics with temperature. - to teach students basic physical solution methods necessary for the reasonable analysis of experimental results, various natural processes, phenomena, the search for optimal solutions to technical and economic issues, and the selection of the best ways of their implementation; is to develop students' ability to apply physical formulas in the problems of specialization and general professional sciences in the curriculum of physics. To form competences in: - Mainly performing various physical processes and phenomena together with the teacher in laboratory classes.; - measuring the physical, The student independently measures and determines the density of various solid objects; - Creating an electric circuit using small variable and constant and alternating current sources in laboratory conditions.; - The student independently determines the focal length of converging and diverging lenses, thereby understanding the mechanism of operation of optical devices.; - implementing and using basics and features of statistics and dynamics in routine professional activities;

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Topic1.Physical foundations of classical mechanics. Progress and kinematics of rotational motion, Newton's laws. Dimensions of physical quantities. Space and time. Kinematic definitions of movement. Equation of motion. Mass and momentum. Newton's 1st law and the concept of inertial calculus. Newton's 2nd law. Level of difficulty: 4. The fundamental equation of forward motion dynamics. Newton's 3rd law. The law of conservation of momentum. Elastic properties of solids. Elastic deformation. Work and energy. The law of conservation of energy in mechanics. Level of difficulty: 5. 2nd topic. Dynamics of rotational motion of a solid body, Fluid mechanics, Vibrations Moment of force and moment of inertia of a rigid body. Steiner's theorem. Impulse moment. The law of conservation of angular momentum. Hydrostatics of an incompressible fluid. Level of difficulty: 4. Viscous fluid hydrodynamics. Harmonic vibrations. Equation of mechanical harmonic vibrations. Vibration is the energy of a moving body. Mathematical and physical pendulum. Damping and forced vibrations. Level of difficulty: 5. 3rd topic. Fundamentals of molecular - kinetic theory, Thermodynamics laws. Heat capacity of gases, Real gases Ideal gas law. Molecular-kinetic theory of gases. The basic equation of the molecular-kinetic theory. Molecular-kinetic meaning of temperature. The average kinetic energy of a molecule. Heat action. Macroscopic parameters. Equation of state. Internal energy. Level of difficulty: 4. Amount of substance and its unit of measure. Equilibrium states and processes. Concept of ideal gas. Explanations. Ideal gas equation of state. Gas constant. Work performed on the change in gas volume. Laws of thermodynamics. Real gases. Van der Waals equation. Topic 4. Electric charge and electrostatic field, Static electricity so, the magnetic field. Electric charge. law of conservation of electric charge. Coulomb's law. Electric field. Electrical capacity. Capacitors. Electric field energy. Electric conductors, dielectrics, and semiconductors. Conditions for the presence of electricity. Ohm's law for part of a circuit. Ohm's law for the Berk chain. Dependence of electrical conductivity on temperature. Concept of superconductivity. Level of difficulty: 5. The electric current in space. Superposition principle for magnetic fields. Bio-Savar-Laplace law. The magnetic field for DC and AC conductors, solenoids, and toroids. Full current law. The phenomenon of electromagnetic induction. Faraday's law. Lens rule. Inductance. Self-induction. Magnetic energy of current. Magnetic field energy density. Level of difficulty: 4. Topic 5. Geometrical and interpretive optics, the structure of the atom and an atomic nucleus. Concept of optical medium. Calculation of the interference landscape. Interferometers. The phenomenon of light diffraction. Huygens-Fresnel rule. Simple examples of Fresnel diffraction. The principle of holography. Natural and polarized light. Internal and external photo effect. Einstein's equation. Methods of measuring radiation doses. Biological effects of radioactive radiation. Level of difficulty: 4.

Exams and assessment formats	e.g. two oral Midterm assessments (20 minutes each) and one final oral exam (40 minutes), short computer-based quizzes, take-home written assignments
Study and examination requirements	Students who successfully pass the science The total maximum points will be the sum of the points allocated to the final exam (60%), Midterm control (20%), homework (10%), and activity in classroom activities (10%). To pass the subject, the student will be allocated 60% of points and above. must collect the amount.
List literature for reading.	1. Douglas S.G. “Prosses a General Source”-USA: 2010 y. 712 p. 2. Abduraxmonov A. “Fizika kursi” T.: 2011. 1-qism-237 b, 2-qism,-316 b 3. O.Qodirov “Fizika kursi” T.: O‘zbekiston Milliy kutubxonasi nashriyoti.2006.1- qism 210 bet, 2 - qism 260 bet, 3- qism 230 b. 4. Volkenshteyn V. S. “Umumiy fizika kursidan masalalar to‘plami” T.: O‘qituvchi. 2008. -437 b. 5. F.Rajabov va boshqalar. “Oliy matematika”. 2007 y. Toshkent, “O‘zbekiston”. 400 b. 6. Z.F.Beknazarova “Fizika fanidan masalalar yechish” bo‘yicha o‘quv qullanma, TIKXMMI, 2019 yil, 205 b. 7. YO.Toshmurodov, Z.F.Beknazarova “Fizika fanidan laboratoriya ishlari”ni bajarish bo‘yicha o‘quv qullanma, (o‘zbek) TIKXMMI, 2020 yil, 234 b.
6.Module designation	MK1103 – Introduction to speciality
Semester(s) in which the module is taught	1
Person responsible for the module	Phd, Razzakov Ruslan, Shipilova Kamila.
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture - 10, practical lessons – 20, self-learning – 60, hours
Credit points	3
Required and recommended prerequisites for joining the module	To master the course, Bachelor Students must have basic knowledge in “General ecology ", “Biology”, “Chemistry”.

Module objectives/intended learning outcomes	After mastering the discipline, the student know the history of the Ministry of Ecology, the legal basis for the activities of the Ministry of Ecology, Environmental Protection and Climate Change, know the main tasks and activities of the Ministry of Ecology, Environmental Protection and Climate Change know the structure of the Ministry of Environment, central apparatus and organizational structure. To be able to: understands the concepts of environmental legislation, rights, functions and activities, international environmental organizations. To form competences in: the student is qualified to apply methods of analyzing processes related to the field of ecology and environmental protection to make decisions on environmental problems.
Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	The purpose, subject, and tasks of the subject" introduction to the specialty". The relationship of science with other sciences. The level of difficulty:1 History of the Ministry of Ecology, Environmental Protection, and climate change. fundamentals of legal activity. Functions and duties of the ministry. Structure of the ministry (central apparatus and organizational structure, departments) The level of difficulty:1 Acquaintance with existing regulatory documents in the field of Ecology, Environmental Protection and climate change the level of difficulty:2 Responsibility for violations in the field of Ecology and Environmental Protection.Types of liability for an offense. Code of administrative responsibility of the Republic of Uzbekistan, Criminal Code The level of difficulty:3 International organizations in the field of Ecology and Environmental Protection. International cooperation in the field of radiation application, WWF, UNESCO, UNEP, FAO The level of difficulty:4
Exams and assessment formats	Two written midterm assessments (30 minutes each), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % midterm control tests. Students must have a final grade of 60% or higher to pass
Reading list	1. Rustambaev M. va b. Ekologiya Toshkent 2011. 2. Russell K. Monson. Ecology and the Environment. USA. 2014 3. Nigmatov A. Ekologiya huquqi. -Darslik – T.: Noshir 2012 4. Nicholas P. Cheremisinoff. Handbook of Solid Waste Management and Waste Minimization Technologies. Book. 2003. https://doi.org/10.1016/B978-075067507-9/50000-0 5. www.eco.gov.uz
Module designation	MAT1109 Higher Mathematics
Semester(s) in which the module is taught	1 semestr
Person responsible for the module	Senior teacher Normuminov Bakhodir
Language	Uzbek, Russian
Relation to curriculum	Mandatory
Teaching methods	Lecture, practical training , independent education

Workload (incl. contact hours, self-study hours)	Total workload: 270 Contact hours: lecture – 60, practical lessons – 60, self-learning – 150, hours
Credit points	9
Required and recommended prerequisites for joining the module	Basic Algebra, Geometry, Informatics
Module objectives/intended learning outcomes	After mastering the discipline, the student To know and understand: - elements of linear algebra; - analytic geometry; - mathematic analysis; - theory of complex numbers; - derivative of functions, indefinite and definite integrals, multivariable functions and series in solving practical problems related to ecology sector To be able to: - to choose convenient methods of solving differential equations and use them in process analysis, to know solutions to problems; - using mathematical symbols to express quantitative and qualitative relations of objects; - derivative of a function, indefinite and definite integral, use of multivariable functions and series in solving practical problems. To form competences in: - deep practical and theoretical knowledge, application of mathematical concepts in practice; - able to mathematically analyze statistical data. - to be able to build a mathematical model problem of watersector and find its solution using mathematical research methods. - solving optimization problems of ecology sector.
Content	Matrices and operations on them, determinants and their main properties. Methods of solving the system of linear algebraic equations. Level of difficulty: 2 Elementary problems of analytic geometry in plane and space. Level of difficulty: 3 Algebra of vectors. A straight line in space and their equations in different forms. Level of difficulty: 2 Mathematical analysis. Differential calculus. Concept of indefinite integral. The main methods of integration. Definite integral and its applications. Calculating the definite integral. Applications of the definite integral to geometric and mechanical problems. Level of difficulty: 4 Theory of multivariable functions. Partial derivative, full differential. Application of full differentials in approximate calculations. Determining the extreme of a multivariable function. Determining tangent plane and normal to a curve in space. Directional derivative. Gradient. Level of difficulty: 4 Ordinary differential equations and methods of solving. Higher order differential equations. System of linear differential equations. Level of difficulty: 5 Number and functional series. Power series. Taylor and Maclauren series and their applications. Expanding a function to a Fourier series. Level of difficulty: 5

Exams and assessment formats	One written midterm assessments (80 minutes), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass
Reading list	1. B.Xudayarov "Matematikadan misollar va masalalar to‘plami" Toshkent " O’zbekiston" 2018. 304 b. 2. T.Ergashev "Differensial tenglamalar" Toshkent "O’zbekiston" 2023 yil. 320 b. 3. Peter W. O'neil. Advanced engineering mathematics. 2010. Claudio Canuto, Anita Tabacco. Mathematical Analysis I, (II). Springer-Verlag, Italia, Milan, 2015. 4. Sh.Alimov, R.Ashurov “Matematik analiz” I qism. Tashkent, "Mumtoz so’z", 2018. -583 b. 5. А.Б.Соболев, А.Ф.Рыбалко Математика: учебное пособие. – Екатеринбург: ГОУ ВПО УГТУ-УПИ, 2004. – 180 с.
Module designation	TIL 1105 Uzbek (Russian) language
Semester(s) in which the module is taught	2
Person responsible for the module	Koshnazarova Malohat Alimovna
Language	In Uzbek
Relation to curriculum	Basic
Teaching methods	practical training
Workload (incl. contact hours, self-study hours)	Total load:150 Audience hours: Practical training - 60 hour Independent education - 90 hour
Credit points	5
Required and recommended prerequisites for joining the module	No

Module objectives/intended learning outcomes	As a result of mastering the discipline, the student: - Knows and understands the main linguistic phenomena, grammatical and syntactic structures, and lexical units of a Uzbek (Russian) language - Understands the main points of clear standard information in a foreign language on various topics usually related to work, study, leisure, etc . -Can communicate in a foreign language in situations that usually arise at work, study, vacation, etc., or while staying in the country of the language being studied; in oral and written communication, when working with literature in a Uzbek (Russian) language. - Able to express critical judgments in a Uzbek (Russian) language in: dialogical speech communication in most situations; - Participates without prior preparation in dialogues in a foreign language on a familiar/interesting topic, expounds the plot of a book or movie, and expresses his attitude to it. - Able to write simple, coherent texts in a foreign language on familiar or interesting topics; personal letters informing them of their experiences and impressions. - Able to participate in a conversation in a foreign language; present himself using descriptive expressions - Can accurately use a set of constructs associated with familiar, regularly occurring situations. - Can speak and express his thoughts in a foreign language, 0 start, maintain, and finish a conversation on familiar discussion topics.
Content	The goal of teaching science is to develop the competence of applying the acquired knowledge and skills in the process of communication and work based on the communicative-speech principle of teaching for students to work in everyday, scientific and professional fields. Improving students' written speech in Uzbek and increasing literacy. The task of science is to develop students' speech competence; formation of skills of effective use of field terms in oral and written speech; creating the skills of writing, editing and analyzing text related to specialization; consists of forming the skills of creating field documents, including filling and formalizing electronic documents.
Exams and assessment formats	One midterm control (15 minutes each) and final oral exam (10 minutes)
Study and examination requirements	Students who successfully pass the science The total maximum points will be the sum of the points allocated to the final exam (60%), Midterm control (20%), homework (10%) and activity in classroom activities (10%). To pass the subject, the student will be allocated 60% of points and above. must collect the amount.
Reading list	1. M. Aminov, A. Madvaliyev, N. Mahkamov, N. Makhmudov, Y. Odilov. Doing business in the state language. Practical guide. "Publishing Office of Uzbekistan". - Tashkent, 2021. 2. Azimova, K. Mavlonova, M. Jabborova, Sh. Tursunov. Uzbek literary language workbook. Study guide. -Tashkent, 2021.- 121 p. 3. M.A. Koshnazarova The use of the Uzbek language in the field. Study guide. - Tashkent: MTU "TIQXMMI", 2023.
Module designation	Philosophy– FAL 2105
Semester(s) in which the module is taught	3 semesters

Person responsible for the module	Nazarov Qiyamiddin Normirzaevich - Doctor of Philosophy, professor; Alimukhamedova Nodira Yadgarovna – Doctor of Philosophy in philosophical sciences (PhD)
Language	Uzbek, Russian, English
Relation to curriculum	Basic
Teaching methods	lecture, seminar, private study
Workload (incl. contact hours, self-study hours)	Total workload: 150 hours Auditorium Hours: Lecture - 40 hours. Practical training - 20 hours Self study - 90 hours
Credit points	5 credits
Required and recommended prerequisites for joining the module	History of Uzbekistan
Module objectives/intended learning outcomes	After mastering the discipline, the student Knows and understands: - to have a comprehensive idea of the processes and events occurring in nature and society, - interrelationship and difference between national cadres, culture and mass culture, interrelationship and difference between culture, mass culture and mass lack of culture, - logical forms and rules of correct thinking, - on the basis of the study of the history and rich spiritual heritage of views on morality, about the social and moral importance of modern manners - moral rules and their observance Having the skills to: - introduction of legal and ethical norms regulating the attitude of a person to a person, society, environment in professional activity. - making reasonable independent decisions in one's professional activity. - to have a scientific vision and belief about a healthy lifestyle. - to have the qualification of physical self-improvement. - to be aware of the global problems of the world. - to be able to distinguish fundamental globalization from other aspects of globalization. - independent analysis of social problems and processes. - to study private, national, regional problems, to be able to forecast social processes. Formation of competences: - Being loyal to the motherland, believing in universal and national values, - to feel connected to events, events and processes happening in the society and to actively participate in them, - social adaptability, continuous self-development physically, spiritually, mentally, intellectually, and creatively, - striving for perfection, independent study and learning throughout life, regularly improving cognitive skills and life experience independently, - refers to acquiring the skills of alternative assessment of one's own behavior and ability to make independent decisions.

Content	Philosophy and its role in society. Basic issues, structure, functions of philosophy. The emergence of philosophy and its importance in the development of society. Stages of development of philosophical thinking: Eastern philosophy. The emergence of mystical ideas and philosophical knowledge in the ancient East. Western philosophy. The role of ancient Western philosophy in human life. Difficulty level: 3 Being (Ontology). Existence, existence and reality. The dialectic of existence and nonexistence. Classification of forms of existence. Development philosophy. The concept of law. Types of laws. Basic laws of philosophy. Difficulty level: 5 Philosophy of knowledge (epistemology). The essence and main criteria of the cognitive process. Classification of approaches to the process of knowledge: essence of utopiamism, skepticism and agnosticism. Philosophy of society. The essence of the concept of society and the stages of its development. Views on the emergence of society. Difficulty level: 3 Logic. Logical forms and laws of thought. Subject and structure of formal logic. Forms of thought: understanding, judgment and conclusion. A general logical description of inference. Structure of conclusion. Types of conclusions. A simple strict syllogism, its structure, axioms and general rules. Difficulty level: 5 Proportion of culture and civilization. Importance of cultural communication. Human philosophy (Philosophical anthropology). Classification of views on the essence of man in the history of philosophy. Philosophy of values (axiology). The meaning of the concept of value and its general description. The history of the formation of the theory of value. Types of values. Difficulty level: 2 Moral philosophy (Ethics). The essence and importance of ethics. The main areas of modern ethics. Professional ethics. Problems of professional ethics. Professional ethics and work ethics. Philosophy of sophistication (Esthetics). The essence of aesthetic perception of the world. Evolution of aesthetic views in the history of philosophy. Effect of aesthetic taste and aesthetic perception of the world on personality development. Philosophy of globalization and sustainable development. The essence of processes of globalization, globalism and sustainable development. Criteria and levels of global problems. Global crime and the need for international cooperation in its prevention. Level of difficulty: 3 World experience of fight against corruption. The meaning of the concept of corruption and its historical roots. Classification of the state of corruption in the world. Anti-corruption policy of Uzbekistan. The need for a systematic approach in the fight against corruption. Level of difficulty: 2
Exams and assessment formats	To fully master the theoretical and methodological concepts of science, to be able to correctly reflect the results of analysis, to independently monitor the studied topics and to complete the tasks given in the intermediate control forms, to pass the final control in the form of oral question and answer.
Study and examination requirements	Requirements for successfully passing the module. the final grade in the module is composed of 40% performance on exams, midterm control (60%), Students should have a final grade of 60% or higher to pass.

Reading list	1. Nazarov Q.N., Qalqonov E.T., Qandov B.M. va boshqalar. Falsafa asoslari. – T.: “O’zbekiston faylasuflari milliy jamiyati” nashriyoti, 2018. 2. Davronov Z., Shermuhamedova N, Qahharova M, Nurmatova M, Husanov B, Sultonova A. Falsafa. – Toshkent: TMU, 2019 3. Shermuxamedova N.A. Falsafa. – T.: Noshir, 2012. – 1207 b 4. Abdulla Sher. Axloqshunoslik. Darslik. –T.: O‘zbekiston faylasuflar milliy jamiyati, 2016. 5. Abdulla Sher. Estetika (Nafosat falsafasi). Darslik. – Toshkent: O’zbekiston, 2015.
Module designation	JTS1102-Physical education and sports
Semester(s) in which the module is taught	1
Person responsible for the module	Norkobilov Mukhiddin, dotsent Khodjanov Aziz, dotsent Odilova Feruzahon, assestent
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	practical lesson
Workload (incl. contact hours, self-study hours)	Total workload: 60 hours Contact hours: 30 -Practical lessons - 30 hours -Self-learning - 30 hours
Credit points	2
Required and recommended prerequisites for joining the module	Not available
Module objectives/intended learning outcomes	To know and understand• • educating and sports, various types of competition and increasing participation are likely to be succesfull • implementation og the latest achievements of the scientific and technical development in physical training • achievements of students in sport To able to • to know and take advantage of that it is possible to increase the effectiveness of education by giving students physical conditioning and the formation of practical skills about physiological health; • the student must have the skills of continuous organization and implementation of labor activity with physical activity.

Content: The discipline includes. The level of difficulty: (1 – low, 5 high):	The purpose of physical education is to form a person's physical culture. Preparation of a person for social and professional activities. To follow a healthy lifestyle. Ensures regular physical fitness. To know the scientific and practical basis of physical culture and healthy lifestule. Self-discipline. Formation of the need to regularly engage in physical exercises. Maintenance and strengthening of health in the field of physical education. Spiritual perfection. Development and improvement student's abilities for the future profession. To gain experience in the creative use pof physical education and sports training to achieve and sports training to achieve life and professionalgoals. The goals and objectives of physical education of students are basic concepts in the field of physical education and sports, special theoretical knowledge, knowledge about physical development, training training, teaching the means and methods of helping to improve skills and abilities, self-physical perfection, Organization of mass wellness activities and their independent use. It is a science capable of initiatively and competently solving the issue of physical education of students in the comprehensive development of the main physical qualities of the movement (agility, strength, endurance, agility, agility) and promoting their physical maturation and growth.
Exams and assessment formats	To fully master the theoretical and methodological concepts related to science, be able to correctly reflect the results of the analysis, independently observe about the processes being studied and carry out tasks and tasks assigned in intermediate forms of control, submit a written work on final control.
Study and examination requirements	Students of successful transition from science The maximum points to be summed will consist of the final exam (40%), the interval control (60%), the sum of the points to be separated. In order to successfully pass the subject, the student must score 60% of the allocated points and collect a high score in it.
Reading list	1. To'xtaboev N.T. Jismoniy tarbiya mutaxassislarining kasbiy mahoratini rivojlantirish. O'quv-uslubiy qo'llanma. T.: 2010 y. – 71 b. 2. Qudratov R., /Yengil atletika. darslik – T.: 2012 y. 3. Rafiyev H.T., Yengil atletika va uni o'qitish metodikasi. Darslik – T.: 2012 y. 4. Geyger A.I., Po'latxo'jayeva M.I. Suzish nazariyasi va uslubiyati T-2015 5. Korbut V.M., Voljin V.I., Israilova R.G. Suzish O'zDJTI 2017 6. Normurodov A.N., /Yengil atletika va uni o'qitish metodikasi, -T.: 2011 y. 7. Norkobilov M.N. Jismoniy tarbiyava sport nomli O'quv qo'llanma. T.: 2021 y.
Module designation	PR1102- Educational and introductory practice
Semester(s) in which the module is taught	2
Person responsible for the module	Associate professor, PhD Razzakov Ruslan, PhD Shipilova Kamila
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	practical lesson
Workload (incl. contact hours, self-study hours)	Total workload: 60 Contact hours: practical lessons – 60.
Credit points	2

Required and recommended prerequisites for joining the module	Introductory to speciality
Module objectives/intended learning outcomes	After completing the internship, the student: -knows and will be able to explain the organizational structure and schemes of enterprises, departments and services with the implementation of labor protection. - knows the safety rules for the production of instrumental, technological, field work; - understands the social significance of his future profession, have a high motivation to perform professional activities - knows how to prepare a practice report. - processing and interpreting the results of measuring the level of environmental pollution -practical application of basic knowledge on nature management, nature protection.
Content: The discipline includes the following topics.	During the educational and familiarization practice, students get acquainted with the activities of organizations and centers under the Ministry of Ecology, Environment and Climate Change for two weeks: The educational and familiarization practice consists of two stages: Stage I. Acquaintance, observation work. During the initial period of practice, students get acquainted with the work plan, the internship schedule, as well as with the head of the practice, the responsible person appointed by the management and centers, and are instructed on the safety of the enterprise. Students attend special enterprises under an agreement with the head of the practice. During the practice, following the instructions, students begin to perform the tasks of the first stage and get acquainted with the departments and their functions in management. They get acquainted with laboratory equipment and chemical devices, as well as instruments. They get acquainted with the process of assessing and analyzing the quality of atmospheric air, soil and water. Students keep a diary for the period of internship, write down processes familiar to them, the results of observations and conclusions in the diary. A diary is the main document for writing a report in which daily observations are recorded. The student records in detail in his diary every process in which he participated during the practice period. After each process is completed, the supervisor signs the diary. Stage II. Preparation of the practice report. At the end of the internship, the student prepares a report in writing and defends the report written by him at the department. The report should contain information about the specific work performed by the student during the internship period, a brief explanation of the sections of the practice object (section, laboratory, etc.), the organization of their activities, issues of life safety, conclusions and suggestions of the student based on the results of the internships.
Exams and assessment formats	Following the results of the internship , students are required to: • provide an internship diary • prepare and protect reports based on the collected data. The final practice is defended at a meeting in the presence of a commission appointed by the head of the graduating department. The student is given 10 minutes to report on the results of the practice. Then he can be asked questions about the internship program, after which the commission gives the student a score on a 100-point system.

Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% defence of the internship report, 40 % participation in the internship, 20% completion of the internship diary and report. Students must have a final grade of 60% or higher to pass
Reading list	1. Saloxiddinov A.T.,Xolmirzaeva M.I.,Valiev X.I. «Ekologiya» Toshkent, 2014 y. 2. Ergashev A. E. va boshqalar. Barqaror taraqqiyot asoslari (Основы устойчивого развития). На узбекском и русском языках. Бактрия Пресс, Ташкент, 2016, 296б 3. Holmo‘minov J., “Ekologiya va qonun”, Toshkent, “Adolat”, 2000 y. 4. https://eco.gov.uz/ru/ 5. https://www.csak.uz/ru/ 6. https://eco-service.uz/ 7. https://ecomarkaz.uz/
Module designation	EAM2106 - Ecology and environmental protection
Semester(s) in which the module is taught	3
Person responsible for the module	Prof., Dr. Karimov Baxtiyar, Associate professor, PhD Razzakov Ruslan, PhD Shipilova Kamila
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, practical lesson, laboratory work, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture - 30, practical lessons – 20, laboratory work- 10, self-learning – 90, hours
Credit points	5
Required and recommended prerequisites for joining the module	Biology and Microbiology, Analytical and Physcolloid Chemistry, Physics, Mathematics.

Module objectives/intended learning outcomes	To know and understand: - fundamentals of environmental science and nature protection. - ecosystem concepts and functioning, interaction between the human socity and wildlife - Particularities of ecosystem functioning under conditions of arid climate; -sustainable use and protection of natural resources - non-living and living components, species, populations, , their evolutionary origin, development and mechanisms of interaction; -structure and functioning of biosphere and its components To be able to: - select up-to-date methods and to be able to plan field research for the correct assessment of the impact of the agriculture and water economy sector development on natural ecosystems, the ecological state estimation of the environment, - to understand the pros and cons of anthropogenic impact on the surrounding environment, natural and agroecosystems, as well as on human society and to propose scientifically-based solutions to mitigate, reduce and eliminate negative effects. - to evaluate negative impacts on the natural environment and formulate conclusions and recommendations on the biodiversity and environmental protection. To form competences in: -natural and anthropogenic factors influencing surrounding environment, and their formation. -patterns of the circulation of matter and energy in the biosphere and its practical applications, -impact assessment on habitats of living and non-living ecosystem components of natural and artificial ecosystems.

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Introduction to the discipline "ecology " the science of ecology, its goals, objectives, history, significance, connection with other disciplines. A brief overview of the state of the environment Level of difficulty : 1 Basic ecological concepts. Basic ecological concepts: species and population, biotope, transport chains and complexes, ecological system, biocenosis, biogeocenosis. Level of difficulty : 2 Natural resources, their classification, use of natural resources. The concept and classification of natural resources. Renewable and non-renewable resources. Level of difficulty : 2 Ecology of the hydrosphere.The concept of the hydrosphere. Types and reserves of hydrosphere resources on earth, their territorial distribution and placement.The role and importance of water resources in the ecological system and human life. The influence of environmental factors on water resources and changes in them. Level of difficulty : 3 Environmental factors of the environment and features of their interaction. Abiotic factors – light, temperature, humidity, meteorological factors (pressure, wind, precipitation); biotic factors -competition, predation, parasitism, symbiosis, mutualism, cannibalism Level of difficulty : 3 Flora, biodiversity and ecological significance. General characteristics of the flora of Uzbekistan, the flora of Uzbekistan, the natural and ecological significance of flora, wild, ornamental and agricultural crops, cultural and weed relations, the influence of environmental and anthropogenic factors on the flora. Level of difficulty : 3 Wildlife (fauna), biodiversity and ecological significance. General characteristics of the animal world, biodiversity, resources, description of the fauna of Uzbekistan, the role of animals in ecosystems and for humanity, wild, domesticated and parasitic animals and the relationship between them, the influence of environmental and anthropogenic factors on the animal world. Level of difficulty : 3 The role of nature reserves, national parks, nature reserves and other specially protected natural areas in the preservation of natural landscapes and biological resources. Level of difficulty : 3 Biological balance and succession in natural ecosystems, its essence and causes of disturbance. The essence of biological equilibrium in natural ecosystems. Homeostasis and the state of succession. The main causes, consequences and ways to restore the biological imbalance. Level of difficulty : 4 The ecosystem of the Aral Sea, the problem of its ecological crisis, causes, present state and future. The history of the origin, ecological and economic significance of the Aral Sea for the territory of Central Asia. Level of difficulty : 4 International cooperation in the field of ecology, environmental protection and climate change.Directions of international cooperation in the field of ecology, environmental protection and climate change. Level of difficulty : 3 Responsibility in the field of ecology, environmental protection and climate change. Types of liability for violation of legislation in the field of ecology, environmental protection and climate change. Level of difficulty : 4 The following topics are recommended for practical classes: 1. Getting to know the nature and climate of Uzbekistan. Level of difficulty : 2 2. Environmental quality standards: familiarization with permissible standards, types, sizes of pollutants. Level of difficulty : 2 3. Study of the calculation of the amount of pollutants in the atmospheric air. Level of difficulty : 2 4. Acquaintance with the existing water resources of Uzbekistan. Level of difficulty : 3 5. Types of wastewater and water accounting. Level of difficulty : 4

Exams and assessment formats	One written midterm assessment (30 minutes), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass
Reading list	1. Sultonov P.S. Ahmedov B.P. Ekologiya va atrof muhitni muhofaza qilish asoslari. Toshkent 2007. – 235 b 2. Рустамбаев М. и др. Экология Тошкент 2011.-345 б 3. Russell K. Monson. Ecology and the Environment. USA. 2014 – 675 p 4. Ergashev A., Ergashev T. «Ekologiya, biosfera va tabiatni muhofaza qilish", Toshkent, YAngi avlod, 2005y. 434 b 5. O'zbekiston Respublikasi Qizil kitobi/Красная книга Республики Узбекистан, v 2-t. - T.: "Chinor ENK",2019 y.
Module designation	AJM2105 – Information technologies and mathematical modeling of processes
Semester(s) in which the module is taught	3
Person responsible for the module	Aynakulov Sharofiddin Abdujalilovich, head teacher
Language	In Uzbek and Russian languages
Relation to curriculum	Main
Teaching methods	Lecture, practical training, laboratory training
Workload (incl. contact hours, self-study hours)	Total load: 150 Lecture: 20; Practical training: 30; Laboratory training: 10 Independent education: 90.
Credit points	5
Required and recommended prerequisites for joining the module	Higher mathematics, physics, English, Russian
Module objectives/intended learning outcomes	Science fulfills the tasks of teaching students how to effectively use information technologies in solving special problems.
Content	The subject of "Information technologies and mathematical modeling of process" is to acquaint students with the theoretical foundations of information technologies, their information, technical, mathematical, software, and to form students' knowledge, skills, and abilities on the effective use of information technologies in solving issues of ecology and environmental protection in water management.

Exams and assessment formats	25% of the points allocated to the assessment of students' knowledge for IC are allocated to the assessment of students' independent work (out of the total 60 points for IC, 45 points are given for theoretical and practical knowledge, 15 points are given for independent work). Also, questions on subjects listed in the subject syllabus on student independent education are also included in FC assignments.
Study and examination requirements	In order to successfully pass the subject, the student must score 60% or more of the allotted points.
Reading list	1. Abdullaev Z.S., WEB Textbook on "Mathematical Modeling of Information Technologies and Processes". 2022 2. Z.S. Abdullaev, M. Yusupov, B.O.Rakhmankulova, Sh.A. Aynakulov. Applied information technologies. (Study guide) Tashkent, TIIAME, 2018 - 317 p 3. Rakhmankulova B.O., Ziyaeva Sh.K., Kubyashev K.E. Mathematical modeling of information technologies and processes. T.: 2021 4. The President of the Republic of Uzbekistan “On measures to improve the quality of education in the field of mathematics and develop scientific research” Decision No. PD-4708 of May 7, 2020. lex.uz 5. Sh.M.Mirziyoev "Strategy of actions on the five priority areas of development of Uzbekistan" Tashkent, "Uzbekistan”, 2017 yil. “Gazeta.uz”. 6. Yuldashev U.Yu., Bakiev R.R., Zokirova F.M. Informatics and information technologies. Electronic textbook. 7. B. Rakhmankulova Methodical guide for practical and laboratory training in information technology and mathematical modeling of processes TIIAME, 2021 -114 p 8. B. Rakhmankulova Methodical guide for conducting practical training in information technologies and mathematical modeling of processes TIIAME, 2022 9. B. Rakhmankulova Methodical guide for conducting laboratory training in information technologies and mathematical modeling of processes TIIAME, 2022
Module designation	TUP2103 - Soil Science
Semester(s) in which the module is taught	3 - semester
Person responsible for the module	Candidate of biological sciences, associate professor, Khakberdiev Obid Eshniyozovich. Doctor of philosophy of agriculture, associate professor. Khaitbaeva Jamila Umarovna.
Language	Uzbek, Russian
Relation to curriculum	Main
Teaching methods	For example: Lecture, practical training, laboratory, independent work.
Workload (incl. contact hours, self-study hours)	Total download: 120 Auditorium Hours: Lecture .20. clock; Practical training 20 hours Laboratory 20 Independent education 60
Credit points	4- credits

Required and recommended prerequisites for joining the module	General chemistry, higher mathematics, physics.
Module objectives/intended learning outcomes	To know and understand: - the essence of the soil formation process, the general scheme, - the structure, morphology, biology, living conditions and farming laws of plants, - have ideas and knowledge about soil properties, cultivated types of crops, To be able to: - the main factors and conditions affecting soil formation, - the organic part of the soil, chemical composition, soil structure, soil properties, ways of their moderation, - soil fertility, soil classification, soil water regime, -scientific basis of crop rotation and organization procedure, - basic soil treatment, before and after planting, - to have skills about the main agricultural crops To form competences in: - placement of plants, use of water-saving irrigation methods and techniques, - to be able to use the achievements of modern farming in all areas of agriculture, - use of modern resource-saving techniques and devices, taking into account the characteristics of the soil, to obtain a high and high-quality harvest from agricultural crops
Content	Morphological signs and structure of the soil. Soil layer structure, genetic layers, and main morphological features. Soil color, inclusions, and structure. Stages of soil profile development. Difficulty level: 2 Physical and chemical properties of soil. Soil density, solids density, chemical, radioactivity properties. Soil compaction, subsidence, viscosity, ductility, plasticity, and hardness. Importance of physical and chemical properties of soil. Difficulty level: 2 Soil organic matter and fertility. The organic part of the soil, soil humus, chemical changes that occur outside the cells of living organisms, the processes of changing organic residues with the participation of soil animals, the functions of soil organic matter. Difficulty level: 3 Organic and mineral fertilizers. The importance of fertilization. Importance, composition, types of organic fertilizers, period of application to the soil, procedure, and norms. Siderate fertilizers, their use. Importance, composition, types of mineral fertilizers, period of application to the soil, procedure, and standards. Difficulty level: 4 Watering plants. Water requirements of plants. Biological basis of irrigation. Irrigation and seasonal irrigation norms. Irrigation procedures and methods. Modern irrigation methods. Difficulty level: 5
Exams and assessment formats	To fully master the theoretical and methodological concepts related to science, be able to correctly reflect the results of the analysis, independently observe about the processes being studied and carry out tasks and tasks assigned in intermediate forms of control, submit a written work on final control.
Study and examination requirements	Students of successful transition from science The maximum points to be summed will consist of the final exam (40%), the interval control (60%), the sum of the points to be separated. In order to successfully pass the subject, the student must score 60% of the allocated points and collect a high score in it.

Reading list	1. Музафарова Е. Н. «Биотехнология” 358 стр. 2022 г. 2. P.Mirxamidova, A.Q.Vaxobov, H.Davranov, G.S.Tursunboeva. Mikrobiologiya va biotexnologiya asoslari. Toshkent-2013. 3. Ostonaqulov T.E., Xamdamov I.X., Ergashev I.T., Shermuxammedov K.H., Biologiya va genetika, Darslik, Toshkent, 2014. - 355b. 4. Ксенофонтов Б. «Охрана окружающей среды: Биотехнологические основы» 2016 г.. 5. Музафарова Е. Н. «Экологическая биотехнология» 118 стр. 2022 г.
Module designation	AMB2103 Environmental biotechnology
Semester(s) in which the module is taught	3
Person responsible for the module	Associate professor.PhD Jamila Khaitbaeva
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, practical lesson, lab works, self-leaning.
Workload (incl. contact hours, self-study hours)	Total workload:150 Contact hour: lecture-20, practical lesson 30, lab works-20, self-leaning-90 hours
Credit points	5 credits
Required and recommended prerequisites for joining the module	General chemistry, higher mathematics, physics

Module objectives/intended learning outcomes	To know and understand: -structure and morphology of the prokaryote, bacterial dimensions. -structure of prokaryotic films, cell wall, cytoplasmic membrane, cytoplasmic, bacterial nucleus, bacterial proliferation, and growth, -characteristic of individual phases, microorganisms and their classification, microorganism metabolism, development -directions and achievements of modern biotechnology, gene and cell engineering, the main directions of biotechnological research for the purposes of Environmental Protection To be able to: -methods for solving the energy of microorganisms, aerobic respiration, the connection between microorganisms and the environment, -the influence of external factors on microorganisms, the variability and progeny of microorganisms, -genotype, phenotype and microorganism variability, the ecology of biosphere and microorganisms, the laws of distribution of groups of microorganisms in soil, atmophere and water, molecular directions of Biotechnology, -Plant Genetic Engineering and transgenic plants, agricultural raw materials processing methods based on biotechnology, methods of enzyme and protein engineering, -environmental and genetic safety of the use of growth control substances, problems in the field of Biotechnology in Uzbekistan, -ensuring the circulation of organic substances by biotechnological methods, biogas and waste-free production can know and use technologies To form competences in -assessment of the place of microorganisms in the biogeochemical activity of microorganisms and the circulation of substances in nature, -ammonification, nitrification, denitrification, bilushi and ability to use the mechanism of azotofization, evaluation of the systematics of viruses, -the use of waste-free production technologies, the use of bacterial fertilizers in increasing soil fertility, -the use of biosyncrasizers and biosensors in solving various issues
Content	The importance of biotechnology in environmental protection, the purpose and tasks of biotechnology. The purpose and function of the science of biotechnology in environmental protection. stages of development. Difficulty level: 2 Cell and tissue culture engineering. Modern methods of studying the cell, the origin of multicellular organisms, the doctrine of plant and animal tissues. Cultivation (maintenance) of cells and tissues outside the body. Evolution of cells and tissues. Difficulty level: 3 Genetic engineering. The goals and objectives of genetic engineering. Stages of obtaining a transgenic plant in genetic engineering. Methods of transformation in obtaining transgenic plants. Other modern methods used in obtaining biotechnological crops. Difficulty level: 2
Exams and assessment formats	To fully master the theoretical and methodological concepts related to science, be able to correctly reflect the results of the analysis, independently observe about the processes being studied and carry out tasks and tasks assigned in intermediate forms of control, submit a written work on final control.

Study and examination requirements	Students of successful transition from science The maximum points to be summed will consist of the final exam (40%), the interval control (60%), the sum of the points to be separated. In order to successfully pass the subject, the student must score 60% of the allocated points and collect a high score in it.
Reading list	1. Muzafarova E. N. "Biotechnology" 358 str. 2022 g. 2. P. Mirkhamidova, A.Q. Vakhobov, H. Davrov, G.S. Tursunboeva. Fundamentals of microbiology and biotechnology. Tashkent-2013. 3. Ostonakulov T.E., Khamdamov I.X., Ergashev I.T., Shermukhammedov K.H., Biology and genetics, textbook, Tashkent, 2014. - 355b. 4.Ksenofontov B."Okhranaokrujayutsheysredi: Biotechnologicheskie Osnovi" 2016 G. 5. Muzafarovae. N. "Ekologicheskaya biotechnology" 118 str. 2022 g.
Module designation	GID 2105 Hydraulics
Semester(s) in which the module is taught	3
Person responsible for the module	Doctor of technical sciences, professor Arifjanov A.M., Doctor of Philosophy in technical sciences. Apakxujaeva T. U.
Language	Uzbek, Russian
Relation to curriculum	Main
Teaching methods	Lecture, practical training, seminar
Workload (incl. contact hours, self-study hours)	Total workload 150 Auditorium Hours: Lecture – 30 hours. Practical training - 10 hours Seminar -20 hours self-learning – 90
Credit points	5
Required and recommended prerequisites for joining the module	Physics, Mathematics, Terrestrial Hydrology, Theoretical Mechanics

Module objectives/intended learning outcomes	- about the laws of liquids in equilibrium and motion and their application in solving technical problems, physical properties of liquids and their practical use, bodies in liquids and their interaction; to have an idea about hydraulic processes in environmental protection, hydraulic devices and hydraulic machines, agricultural and construction machines. - determination of hydrostatic pressure, hydrostatic pressure force, types of fluid movement, hydraulic elements of flow, laminar and turbulent flow patterns of fluid, laws of fluid movement in pipes and hydraulic machines and hydraulic parameters, determination of the effect of hydraulic processes in environmental protection, resistances and their determination know their styles and be able to use them. - methods of determining fluid consumption in simple and complex pipes, holes and tubes, calculation of hydrostatic pressure force affecting hydraulic machine elements, performing hydraulic calculation of pressure systems and hydraulic machines, performing hydraulic calculation of pipes and pipe systems in modern methods, impact of hydraulic processes on the environment must have secret assessment skills.
Content	It is to teach students the basics of hydraulics, the laws and processes of fluid in equilibrium, movement, and the hydraulic calculation of water management structures, and to develop the skills of practical application.
Exams and assessment formats	One midterm (30 minutes) and final oral exam (60 minutes), short, computerized test, written homework, and self- study
Study and examination requirements	Requirements for successfully passing the module. The total maximum score will be the sum of the points allocated to the final exam (60%), Midterm (24%), homework (24%) and classroom activity (12%). In order to successfully pass the subject, a student must score 60% or more of the allotted points.
Reading list	1.Зуйков А.Л. «Гидравлика», учебник, Москва, 2014 г., 517 с. 2.Латипов Қ.Ш., Арифжанов А.М., Файзиев Х., «Гидравлика», Тошкент. ТАҚИ, 2015й. -388б 3.А.Арифжанов, Т.Апакхужаева. Гидравлика. -Ташкент. Файласуф, 2019б. – 224б. 4.А.Арифжанов, Қ.Рахимов, А.Ходжиев Гидравлика. Тошкент. ТИМИ 2016й. – 189б. 5.Арифжанов А.М. Гидравлика (гидростатика). Тошкент. ТИҚХММИ 2022й. – 137б. 6.А.М. Арифжанов, Х.Файзиев, А.У.Тошхожаев Гидравлика. Тошкент. ТАҚИ 2019й. – 157б. 7.Латипов Қ.Ш., Арифжанов А.М., Файзиев Х., «Гидравлика», Тошкент. ТАҚИ, 2015й. – 121б. 8.Philip M. Gerhart Andrew L. Gerhart John I. Hochstein Fundamentals of Fluid Mechanics. ISBN 978-1-119-08070-1 (Binder-Ready Version). USA 2016 9.Philippe Gourbesville • Jean Cunge Guy Caignaert Advances in Hydroinformatics. ISBN 978-981-10-7217-8. Springer Nature Singapore Pte Ltd. 2018 10. T. Kaletova, A. Arifjanov “Hydromechanika”, Nitra, 2019y, -160 pages.
Module designation	BMB2104 “Biology and microbiology”
Semester(s) in which the module is taught	3

Person responsible for the module	Sindarov Obidjon Kholdarovich- PhD, teacher
Language	Uzbek, Russian
Relation to curriculum	Elective specialisation
Teaching methods	Lecture, lesson, lab works.
Workload (incl. contact hours, self-study hours)	Total workload: 120 hours Lecture- 30 hours Lesson- 20 hours, Lab works- 10 hours. Self-study- 60
Credit points	4
Required and recommended prerequisites for joining the module	“Chemistry”, “Higher mathematics” and “Physics”
Module objectives/intended learning outcomes	The purpose of teaching science is to provide students with knowledge about the biological laws of organisms, obtaining high yields from agricultural crops, agrotechnology, protecting plants from diseases and pests, primary sources, biology, morphology, physiological of microorganisms. and biochemical properties and the laws of their distribution in nature, the influence of external environmental factors on microorganisms, their metabolism, the role of microorganisms in the natural fixation of carbon, nitrogen, phosphorus, increasing the productivity of agricultural crops, improving their quality and ecological purity, protecting nature from pollution and it consists of creating skills for the application of these methods in all other branches of agricultural production. The task of science is to teach students about the characteristics of living matter, the unity and diversity of the organic world, the history of the emergence and development of life on earth, the morphology, distribution, reproduction, nutrition and classification of microorganisms, external environmental factors affecting microorganisms, microorganisms in nature. its role in the process of metabolism, the use of isolated plant cells and the technology of growing isolated plant cells and tissues, the clean extraction of substances produced in plant cells, the external environmental factors that affect microorganisms , to know and be able to use the methods of sterilization used in microbiology, the methods of isolating microorganisms from natural substrates, and to reveal the place and importance of the human life by forming the views of the scientific world.

Content	Organic world, evolution, features of biological formation of matter, methods of reproduction and development of life, dynamic and statistical laws in nature, biological differences, laws of transmission of signs and characteristics and their use in practice, biological processes and the birth of organisms to have an idea and knowledge about the genetic and statistical analysis of the data obtained (knowledge). To have decision-making skills on solving problems related to ecological and environmental pollution issues (skills); Must have competence in the morphology, distribution, reproduction, nutrition and classification of microorganisms, metabolism of microorganisms in nature, methods of assessing damage of microorganisms in environmental ecology (qualification).
Exams and assessment formats	Two oral Midterm assessments (20 minutes each) and one final oral exam (40 minutes), short computer-based quizzes, take-home written assignments
Study and examination requirements	Requirements for successfully passing the module. The final grade in the module is composed of 60% performance on exams, 10% quizzes, 10% take-home assignments, 10% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	1. Michael L. Cain Steven A. Wasserman Jane B. Reece Lisa A. Urry Peter V. Minorsky Robert B. Jackson CAMPBELL BIOLOGY (January 1, 2011). 2. Uma Shankar Singh, Kiran Kapoor. Introductory microbiology. Oxford book company. Jaipur. India. Edition 2010. Printed at: Mehra offset press, Delhi. P. 316 3. T.E. Ostonaquloq, I.X. Xamdamov, I.T. Ergashyev, K.K. Shermuhammedov Biologiya va genetika T-2014. 4. Zufarov M.A va boshqalar. Mikrobiologiyadan laboratoriya mashg`ulotlari. O`quv qo`llanma. ToshDAU nashriyoti, 2014. -116 b.
Module designation	UT2204 - Basics of toxicology
Semester(s) in which the module is taught	3
Person responsible for the module	Prof., Dr. Bakhtiyor Karimov.
Language	Uzbek, English
Relation to curriculum	Elective
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 120 Contact hours: lecture - 30, practical lessons – 30, self-learning – 60, hours.
Credit points	4 ECTS
Required and recommended prerequisites for joining the module	To master the course, Magister Students must have basic knowledge in “Biology”, “General ecology”, and “Environmental Protection”, “Physics”, “Organic and Inorganic chemistry”, “Analytical and Physcolloid Chemistry”, “Analytical chemistry”.

Module objectives/intended learning outcomes	To know and understand: - theoretical concepts about molecular, ecological, and industrial toxicology, toxicokinetics, toxicodynamics, toxicometry. - various classes of contaminants with specific and non-specific toxic futures and methods of their analyses and ecotoxicological evaluation. - the role and pathways of pollutants and compounds in the environment (in the non-living and living ecosystem components) and food chains. To be able to: - to work with contaminated with toxic elements and compounds non-living and biotic objects of the external environment, take samples of ecosystem components from contaminated natural and artificial environments and prepare for chemical-ecotoxicological analysis. - Provide information and knowledge of toxicodynamics and toxicometry features in cases of pollution with toxic chemicals. To form competences in: - implementing and using basics and features of toxicodynamics and toxicometry of toxic chemical contamination in routine professional activities. - assessing and predicting ecotoxicological situation and toxic pollution consequences. - applying methods of bioindication and biotesting of polluted sewage, soil, and air to control environmental quality.
Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Chemical factors and topical (priority) pollutants, their classification. Major contaminants of aquatic environment. Xenobiotics. Inorganic, organic, natural and synthetic toxicants. Geographic and biotic migration. Ecotoxicokinetics: mobility of pollutants in the surrounding environment. Background levels of toxic elements in the environment. The Basic Laws of toxicology. Acute and chronic (chronic) toxicity. Xenobiotics and biogeocenoses. The main toxicometric parameters. Ecotoxicodynamics and ecotoxicometry of contaminants. Intoxication process and ecotoxicity. Basic toxicometry parameters. Dose – effect interrelationships. The fate of pollutants in environment. Ecological norms of technogenic man-made pollution of natural ecosystems, regulation of environmental pollution. Maximum permissible environmental load.
Exams and assessment formats	Two written midterm assessments (30 minutes each), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass.

Reading list	1.John Timbrell, Frank A. Barile. Introduction to Toxicology. Edition4th Edition. First Published 2023. eBook Published 27 February 2023. Pub. LocationBoca Raton Imprint CRC Press., 316p. eBook ISBN9781003188575. DOI: https://doi.org/10.1201/9781003188575 2.A textbook of modern toxicology / edited by Ernest Hodgson. (North Carolina State University). —4th ed. Wiley-Interscience, John Wiley & Sons, 2011 3.Sylvia Moes, Kees van Gestel, Gerko van Beek. 2021.Environmental toxicology, an open online textbook. 824p. https://maken.wikiwijs.nl/147644/. 4. "Токсикология [Электронный ресурс] / Жуленко В.Н., Таланов Г.А., Смирнова Л.А. ; под ред. В.Н. Жуленко.- М.: Колос, С., 2013. - (Учебники и учеб. пособия для студентов высш. учебных заведений)." – 5.http://www.studentlibrary.ru/book/ISBN9785953206495.html Information sources: 6. www.nature.uz
Module designation	ETJ2204 - Basics of energy saving
Semester(s) in which the module is taught	3
Person responsible for the module	Prof., Dr. Maria Radkevich Associate professor, PhD Shipilova Kamila
Language	Uzbek, Russian
Relation to curriculum	Elective
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 120 Contact hours: lecture - 30, practical lessons – 30, self-learning – 60, hours
Credit points	4
Required and recommended prerequisites for joining the module	Ecology and environmental protection, physics, mathematics

Module objectives/intended learning outcomes	To know and understand: − priority areas of energy saving in various spheres of public production. − modern methods of energy efficiency and energy conservation management. − technical means of control and rational use of energy resources. − principles of energy saving in their practical activities; To be able to: − carrying out a technical and economic assessment of energy-saving measures. − the use of technical means to control the use of energy resources. − providing measures to save fuel and energy resources in the implementation of a specific technological process; To form competences in: − implementation of energy analysis and audit of energy management in production. − provision of rational use of fuel and energy resources, implementation of rationing and accounting of energy consumption in production. − promotion of knowledge in the field of the environment and energy conservation at all levels of industrial production management.

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	The subject, its tasks and content. The need for knowledge of energy problems for future specialists. Basic concepts. (Classification of energy resources. Primary energy resources. Renewable and non-renewable energy resources.) The role of energy in the development of human society and the level of its civilization. Efficiency of energy use and consumption in various countries and the Republic of Uzbekistan. Comparative characteristics of the energy intensity of the gross national product by industry in the world and the Republic of Uzbekistan. Level of difficulty: 2 The main sources of energy. Types of fuel (solid, liquid, gaseous, nuclear). Ratio and caloric content. Conditional fuel. Brief description of the fuel and energy complex. Characteristics of the fuel and energy complex of the Republic of Uzbekistan, prospects for its development. Electric power and thermal power engineering. Energy security. Analysis of consumption of fuel and energy resources by industry in the Republic of Uzbekistan. Level of difficulty: 2 Thermal and nuclear power plants, hydroelectric power plants (HPPs). Typical schemes of thermal power plants and nuclear power plants. Steam turbine condensing power plants and thermal power plants with combined heat and power generation. Power plants with gas turbine and combined–cycle gas plants, Small thermal power plants - as the most economical and promising ways to generate energy. Small hydropower potential and possibilities of use in the Republic of Uzbekistan. Level of difficulty: 2 The system and structure of energy conservation management in Uzbekistan. Directions for improving the energy sector management system. Goals and means of implementing energy policy. General directions and priorities of energy-saving policy. Principles of the state policy of energy saving (regulatory and legislative acts in the Republic of Uzbekistan). Methods of implementation of the state energy saving policy (socio-psychological, administrative, financial and economic, etc.). General characteristics of energy and energy saving programs in the Republic of Uzbekistan. Level of difficulty: 2 Determination of the cost of energy production. The structure of energy production costs. Determination of the cost of energy in its combined production. Energy tariffs, tariffs for thermal and electric energy. Economic and tariff policy in the energy sector. The mechanism of tariff formation in a regulated market economy. Fundamentals of energy management and audit. The concept of energy management. Tasks and functions of energy management and audit. Stages of the energy audit. Energy passport of the consumer. Level of difficulty: 4 The energy balance of the enterprise and the basics of rationing the consumption of energy resources the concept of the energy balance of the enterprise. Components of the energy balance. Types of energy balances. Goals and objectives of the energy balance. Energy balance indicators. Analysis of energy balances. Methods of energy accounting. Fundamentals of rationing the consumption of energy resources. The concept of energy consumption norms. Classification and development of energy consumption standards. The most effective areas of energy saving activities. Problems of energy saving in industry. Economic efficiency of energy-saving measures in industry. Heat losses in buildings and structures. Thermal insulation of buildings. Regulation of the thermal regime of buildings and structures. Secondary energy resources, their classification and use. Level of difficulty: 3 Reduction of fuel costs in road and rail transport. Electrification of transport: advantages, disadvantages, problems. Energy saving in construction. Energy saving standards. Thermal insulation and its significance. Energy-efficient houses. Methods of energy saving in agriculture. The use of animal husbandry and crop production waste, as well as waste heat. Introduction of heat pumps and ventilation system control devices, construction of biogas plants, improvement of control and

Exams and assessment formats	One written midterm assessment (30 minutes), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass
Reading list	1. Vesma V. Energy Management Principles and Practice. 2nd ed. — BSI, 2012. XX, 90 p. — ISBN 978 0 580 74019 0. 2. Stolten D., Scherer V. (ed.) Transition to Renewable Energy Systems: Energy Process Engineering. Wiley-VCH Verlag GmbH & Co. KGaA, 2013. 977 p. 3. Куашнинг Ф. Системы возобновляемых источников энергии. Технология - Расчеты – Моделирование. Учебник / Пер. с немецкого. — Астана, 2013. — 432 с.: 280 цв. ил., 113 табл. — ISBN 978-601-302-032-7. 4. Мансуров В. А. Основы энергосбережения: учеб.-метод. пособие. – 2-е изд., перераб. – Минск : БГМУ, 2013. – 60 с.
Module designation	IG2105 Engineering geodesy
Semester(s) in which the module is taught	4
Person responsible for the module	Abdurakhmonov Sarvar Narzullayevich, technical sciences Doctor of Philosophy (PhD), associate professor, Jumanov Azamat Norbutaevich, technical sciences Doctor of Philosophy (PhD), associate professor, etc Abdiramanov Rashid Duschanovich, senior teacher
Language	Uzbek and Russian
Relation to curriculum	Main
Teaching methods	Lecture and practical training
Workload (incl. contact hours, self-study hours)	Total load: 150 Auditorium hours: 60 Lecture 20 hours; Practical training 30 hours Laboratory training 10 hours Independent Tali 90 hours[2]:
Credit points	5
Required and recommended prerequisites for joining the module	Higher mathematics Geography Informatics

Module objectives/intended learning outcomes	As a result of mastering the subject, the student: - the main types of engineering-geodetic works: understanding of plan and height engineering-geodetic networks, topographic-geodetic research works, geodetic planning works, geodetic works performed in the alignment and construction of linear structures, geodetic construction network, building search; should know the geodetic work performed in the design and construction of industrial, hydromeliorating and hydrotechnical structures, the geodetic work performed in determining the deformation of engineering structures, and the solution of engineering-geodetic problems; - determination of scales, conventional signs, topographic maps, their graph and nomenclature, measurement of location elements using geodetic measuring instruments; - geodetic equipment processing, measurement methods and results; - drawing up the project of the construction object, carrying out topographic photography, moving the designed buildings and structures to their place, carrying out geodetic control and measurement during their construction, observing their deformation during the use of the structures by geodetic methods; - should have the ability to make topographical plans and profiles of the place
Content	to independently carry out geodetic measurements on the surface of the earth, to create plans and profiles of the place, as well as to study the theoretical foundations of geodetic measurements performed on the surface of the earth in solving engineering-geodesy issues in various fields; national economy, arming students with the necessary knowledge to perform independent measurement work using geodetic instruments, study the methods of drawing up plans and profiles of the place and develop measurement results aimed at systematic improvement, measurement results and teaching the effective use of graphics. drawings in solving engineering-geodesy problems in various sectors of the national economy.
Exams and assessment formats	There is one midterm (80 minutes) and a final written exam (80 minutes), a short computerized test and written homework.
Study and examination requirements	Students who successfully passed the subject The total maximum score awarded will be the sum of the points allocated to the final exam (60%), midterm (20%), homework (10%) and class activity (10%). To pass the subject, the student must score 60% or more of the specified points.
Reading list	1. S.N. Abdurakhmonov Engineering geodesy. "TIIAME" National Research University, 2022. 351 p. 2.H.J. Khaitov, A.N. Inamov. Engineering geodesy. "TIIAME" National Research University, 2022. 495 p 3. A. Suyunov Engineering geodesy. Tashkent. 2021.-359 p. 4. Abdullaev T.M., Inamov A. N., Lapasov J.O. Engineering geodesy geodetic works in the construction of hydrotechnical facilities. TIIAME, 2019. 152 p. 5. Sh.K. Avchiev. Practical geodesy. Varis publishing house 2010. 350 p. 6. G.G. Poklad. Workshop on geodesy. Academic project, Moscow, 2015, 486 p.
Module designation	Engineering constructions and nature conservation facilities IMI2105
Semester in which science is taught	4
Responsible teacher of the module/full name, degree and title	Muslimov Turavoy, a senior teache Vafoeva Ozoda Safoevna, PhD.

In which language to be taught	Uzbek
Its place in the curriculum	Main
Teaching methods	Lecture and practical training
Study load (by types of classroom hours and independent study hours)	Total load: 150 Auditorium hours: 60 Lecture - 20 hours; Practical training 30 hours Laboratory 10 hourse Self-education -90 hourse
Number of credits allocated to the subject	5
List of prerequisite subjects	Construction materials, soil mechanics, Soil and foundations, Theoretical mechanics, Resistance of materials, construction mechanics, hydraulic structures
Expected Learning Objectives	- various types of engineering constructions and their areas of application; physical-mechanical properties of the main materials used in the construction of engineering constructions and structural elements to have an idea about their stress states under the influence of external loads; - calculation methods of engineering constructions; basic requirements for engineering constructions; Knowing and being able to use the current regulatory documents in the design, construction and use of engineering structures. - to be able to correctly choose materials for the construction of engineering structures; methods of connecting structural elements; to design and calculate metal, wooden, reinforced concrete and other structures; to analyze the structures of buildings and structures and to determine their optimal solutions; to have skills in determining the technical and economic indicators of structures need
The content of science	Materials used in construction, issues related to the design, construction and analysis of their technical condition. Engineering structures Attaching metal construction elements Reinforced concrete structures. Properties and classifications of concrete and reinforcements used in the preparation of reinforced concrete structures Construction of reinforced concrete elements working in bending and compression and calculation of their strength Filtration procesest. Anti-filtration measures . Anti-flood constructions. Flood protection structures. Nature protection facilities.
Exams and assessment format	One midterm and final oral exam (40 min.)
Study and examination requirements	Students who successfully pass the science E.g.: The total maximum score will be the sum of the points allocated to the final exam (60%), Midterm (20%), homework (10%) and classroom activity (10%). In order to successfully pass the subject, a student must score 60% or more of the allotted points.

References	1. Бакиев М., Муслимов Т. "Инженерные сооружения", Т. 2013, 215 стр. 2. Сайдуллаев К. Шукурова К. Металлические конструкции. Т. "Наука и техника", 2010, 270 стр. 3. Ул. Вафоева, Вафоева О.С. Учебное пособие "Инженерные конструкции" для кафедры металлических конструкций Ташкент, 2018 4. В.С. Федоров, Я.И. Швидко, В.Е. Левицкий "Строительные конструкции" учебник Москва 2018г 5. Двухтомное руководство NAWY "Проектирование бетонных конструкций", 2016 г. 6. Муслимов Т.Я., Методические указания по выполнению курсовых проектов по предмету "Инженерные сооружения", Т. 2018.
Module Designation	EMI2105 Assessment of the strength and reliability of ecological objects
Semester(s) in Which the Module Is Taught	4
Person Responsible for the Module	Khudaynazarov Sherzod Ochilovich, candidate of technical sciences, associate professor
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, Practical Training, Laboratory
Workload (Including Contact Hours and Self-Study Hours)	Total Load: 150 hours Auditorium Hours: Lecture: 20 hours Practical Training: 30 hours Laboratory: 10 hours Independent Education: 90 hours
Credit points	5
Required and Recommended Prerequisites for Joining the Module	Higher Mathematics, Physics,Descriptive Geometry, Engineering and computer graphics, Ecology and environmental protection

Module Objectives/Intended Learning Outcomes	The student must know the classification of environmental objects, the main directions, types, factors influencing the strength and reliability of environmental objects, the reasons for the loss of strength and reliability of environmental objects, the forces acting on environmental objects, the mechanics of environmental objects, the equilibrium states of environmental objects, kinematics of a point and a rigid body, dynamics of environmental objects, movement of environmental objects under the influence of static and dynamic forces, basic dynamic characteristics of environmental objects, methods for assessing the strength, rigidity, stability and reliability of structural elements of environmental objects. The student must have the skills to check the equilibrium state of environmental objects under the influence of a system of arbitrary forces, determine the coupling reaction forces of structural elements of environmental objects, determine the center of gravity of elements of environmental objects, determine the trajectory equation, speed and acceleration of environmental objects according to the law of motion, evaluate strength, rigidity, stability and reliability of elements of environmental objects. The student must have the competence to bring environmental objects into a free state, check their equilibrium state, determine the main vector and main moment of environmental objects under the influence of an arbitrary system of forces, determine the main kinematic characteristics of environmental elements, determine the dynamic characteristics of elements of environmental objects, study stress deformed states of various environmental objects, check the strength, rigidity, stability and reliability of elements of environmental objects, analyze the results obtained, find optimal design solutions, apply the acquired knowledge when creating new structures.
Content	The purpose of teaching science is to develop the knowledge, skills and qualifications of the student, to determine the factors influencing the strength and reliability of environmental objects, to find the reasons for the loss of strength and reliability of environmental objects, to draw up general laws of mechanical movement of environmental objects, to establish a methodology for calculating and assessing strength and rigidity , sustainability and reliability of elements of environmental objects, buildings and structures. The task of science in the formation of knowledge, skills and qualifications in a student is to check the equilibrium state of environmental objects, determine the main kinematic characteristics of the elements of environmental objects, determine the dynamic characteristics of the elements of environmental objects, test the strength, rigidity, stability and reliability of the elements of environmental objects, the formation of independent decision-making skills problems arising in the course of industrial and scientific activities, development and expansion of mental abilities, worldview of the future engineer.
Exams and Assessment Formats	Two written midterms (60 minutes each), a final oral exam (40 minutes), a short computerized test, and written homework are provided.
Study and Examination Requirements	Excellent: Ability to think creatively, apply acquired knowledge in practice, explain the essence, have imagination, independently solve given problems, and exercise independent judgment and decision-making. Good: Ability to apply acquired knowledge in practice, solve problems using examples, observe, explain concepts, and possess imagination. Satisfactory: General answers to questions, explanation of concepts, knowledge, and the ability to imagine. Unsatisfactory: Failure to answer questions or provide a clear vision.

Reading List	1. "Mechanics of Materials" by Russell C. Hibbeler. – 2016, 896 pages. 2. "Mechanics of Materials" by Ferdinand P. Beer, E. Russell Johnston Jr., John T. DeWolf, and David F. Mazurek. 2014, 896 pages. 3. "Mechanics of Materials" by Timothy A. Philpot – 2017, 880 pages. 4. Meriam J.L., Kraige L.G. Engineering Mechanics. Statics. Kinimatics. Dynamics. 2012. 5. Alan Darbyshire. Mechanical Engineering. BTEC National Engineering Specialist Units/ 2010. 6. Mirsaidov M., Khudoinazarov Sh., Abdumuminov E., Ashirov B. Examples and Problems from the Resistance of Materials. Tashkent, Adabiyot, 2023. - 335 p.
Module designation	GG2104 Geology and Hydrogeology
Semester(s) in which the module is taught	4 semesters
Person responsible for the module	Associate professor Farrukh Kattakulov Associate Professor, PhD Satbay Nurjanov Assistant Shovkat Nortaev
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total load : 150 Lecture - 20 hours; Practical training 20 hours Laboratory 20 hours Independent training 60 hours
Credit points	5 credits
Required and recommended prerequisites for joining the module	Physics, Chemistry, Geodesy

Module objectives/intended learning outcomes	To know and understand: - about the shape and dimensions of the land, - composition and structure of the earth's crust, geological processes and events, - chemical composition, physical properties and laws of motion of underground waters. - specificity of the regime and balance of underground water in irrigated lands. - geological and engineering - geological phenomena and processes common in irrigated fields and construction sites To be able to: - specificity of geological and hydrogeological conditions, quantitative methods of assessment of underground water flows, - methods of predicting changes in hydrogeological conditions, geological and hydrogeological maps, and research results, - hydrogeological indicators of underground water flows and aquifers and their use in solving reclamation issues, - negative events and processes related to the implementation of water management and reclamation measures, their prevention and prediction, - basic physical and physical-mechanical parameters of soils necessary for calculating structural and hydraulic parameters of hydromelioration networks To form competences in: - organization of observations on deformation and displacement of engineering structures. - methods of creating maps and sections, conducting hydrogeological and engineering geological explorations. - methods of processing and using search results, soil- hydrogeological-ameliorative conditions of irrigated areas. - work with soil, hydrogeological and engineering-geological tools to assess the melioration condition of land reclamation and water management facilities. - geological and hydrogeological maps and research results. - Hydrogeological indicators of underground water flows and aquifers and their use in solving reclamation issues. - negative events and processes related to the implementation of melioration and water supply measures. - basic physical and physical-mechanical parameters of soils, equipment of wells. - opening of water horizons, water horizons, construction of wells, filters, preparation of filters, calculation of basic parameters.

Content	Contents and sections of geology, hydrogeology, and engineering geology. Services and contributions of scientists of our country and scientists of the world in the development of these sciences, relations of geology and hydrogeology with other sciences: 2 The shape and size of the land. The structure of the earth. Geospheres, their composition, state, and properties. Electric, magnetic properties, density, and temperature regime of earth bodies: composition, structure and condition of minerals. Rock-forming minerals and their identification (study) methods. The concept of rocks and their formation. Structure and texture of rocks, genetic classes. Classification of igneous rocks. Sedimentary rocks. Metamorphic rocks: 2 Endogenous geological processes: Magmatism and its types. Tectonic movements. Tectonic structures-geosynclines, platforms, shields, syneclises, anteclises, slope depressions. Earthquakes. Estimating the strength and power of earthquakes. Distribution of earthquakes in the territory of the Republic of Uzbekistan, their nature, consequences and importance in the construction and operation of hydrotechnical structures:3 Exogenous (terrestrial) geological processes and phenomena: Weathering process. Importance of wind activity in human production activities. Geological activity of running water on the surface of the earth. Geological activity of rain and melted snow water. Flood flows and their consequences. Geological activity of permanent flowing waters-rivers. River valleys, tributaries, and deltas. Alluvial deposits, their types, composition, and characteristics. Karst and suffocation. The influence of human production activities on the direction and consequences of geological processes: 3 Main geological units and rock complexes. Eras (groups), periods (systems), epochs (systems), centuries (floors). The main types of relief and their relationship with the tectonic conditions, geological history and structure of the regions. The concept of geological map and sections. Types of geological maps by content and scale:3 The science of hydrogeology and its tasks Water circulation in nature, hydrosphere. Concept of aeration and water-saturated zones. Rock porosity and its quantitative assessment. Moisture capacity and types of rocks. Classification of rocks according to water permeability: 4 Classifications of underground water according to the condition of its bed. Aeration zone waters. Ground water and suspended seepage water. Ground and suspended seepage waters. The connection of systolic waters with climate, surface, and interlayer pressure waters. Feeding, spreading and consumption of systolic waters. Map of hydroisogypsum and its designation. Water level, mineralization, etc. Interstratified waters Bed conditions, conditions of formation and distribution. Interlayer water basins: 4 Physical and other properties of underground water (color, taste, smell, density, clarity, electrical conductivity, radioactivity, etc.). The main components of groundwater. Assessment of Dissociated Compounds, Colloids, Gases, Microconstituents and Organic Compounds in Groundwater as Drinking Water for Water Supply and Irrigation Purposes:5
Exams and assessment formats	*One written midterm assessments (30 minutes), take-home written assignments and one final oral exam (40 minutes).*
Study and examination requirements	*Requirements for successfully passing the module:* *The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass*

Reading list	*1. T.Davie. Fundamentals of hydrology. Second edition. Madison Avenue, New York, 2008 y. 221 p* *2. Yusupov G.U., Xolbaev B.M. "Geologiya va gidrogeologiya asoslari". – T.: YAngi asr avlodi, 2003. – 301 bet.* *3. Irgashev Yu., Ergashev R. "Geologiya va geomorfologiya". Toshkent, Fan va texnologiyalar 2013.-189 bet.* *4. Ruziyev I.M., Nurjanov S.E., Gapparov F.A. "Injenerlik geologiyasi va gidrogeologiyasi" fanidan o`quv qullanma Toshkent-2021- 256 bet* *5. Рузиев И.М.,Нуржанов С.Е., "Инженерная геология и гидрогеология" учебник ташкент-2022.-220 стр.* *H.A.VILES Synergistic Weathering Processes Reference Module in Earth Systems and Environmental Sciences 2021 Journal / Available online 16 October 2021, 127065 In Press, Journal Pre-proof.*
Module designation	QMI2105, Hydrology, meteorology end basic climatology
Semester(s) in which the module is taught	4
Person responsible for the module	1.Nazaraliyev Dilshod Validjanovich, a candidate of agricultural sciences, docent. 2. Kodirov Sobir Mamadiyorovich, senior teacher
Language	Uzbek, russian
Relation to curriculum	Compulsory
Teaching methods	e.g. lecture, lesson, lab works
Workload (incl. contact hours, self-study hours)	((Estimated) Total workload:150 Lecture and lessons:60 lectures - 20 lessons - 30 lab works - 10 self-study hours -90
Credit points	5 credits
Required and recommended prerequisites for joining the module	Computer graphics and engineering Analytic and physical colloid chemistry Algebra Physics Engineering geodesy Hydraulics Hydrology and hydrogeology

Module objectives/intended learning outcomes	Student must understand: - formation laws of water bodies, methods of hydrological and meteorological research, water reserves in nature, their distribution and balance, natural and chemical properties of terrestrial waters, basin and network of water bodies, formation of water basin and network , knowledge of the factors affecting the water basin and network, saturation sources and flow, and hydrological and meteorological regimes; - identification and analysis of water body shape and size indicators, factors affecting the formation of water body flow, methods of expressing water body flow, water body saturation from the climatic point of view and sources of saturation classifications, types, equipment, structure of water measuring stations, water level monitoring, water flow rate measurement, water and turbid discharge consumption and volume determination, having the skills to use existing and modern hydrological and meteorological tools; - Organization of hydrological and meteorological studies and observations, analysis and assessment of water resources formation and its indicators, analysis and assessment of the hydrological and meteorological regime of water bodies. Assessment of factors affecting water bodies, modern hydrological and to have competencies in application of meteorological tools and devices, applying hydrological and meteorological methods, performing water management calculations, solving problems of efficient use of water resources.
Content	The main goal of the science is to familiarize students with the theoretical foundations of land hydrology, meteorology and climatology, as well as the tasks and methods of hydrological and meteorological research and research, to teach students to evaluate the atmosphere and the upper layer of the earth as an environment where water resources are located, to conduct measurement work and to learn measurement consists of developing girdometric research measures in cooperation with field studies in data base and teaching to accurately visualize phenomena and processes occurring in the environment.
Exams and assessment formats	Two oral Midterm assessments (40 minutes each) and one final oral exam (80 minutes), short computer-based quizzes, take-home written assignments
Study and examination requirements	Requirements for successfully passing the module The final grade in the module is composed of 40% performance on exams, 10% quizzes, 10% take-home assignments, 10% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	1.Nazaraliev D.V., Akmalov Sh.B. «Mainland hydrology» tutorial book,Tashkent, 2019.111 p. 2. Melnikova T.N. workbook of hydrology. Maykop – 2012. 153 p. 3. A.V.Savkin, S.V.Fedorov. Hydrology. Tutorial book. – Saint-Petersburg.:2010.-102 p. 4. Robert V. Rohli Anthony. Climatology 3rd edition J. Vega, 5 Wall street, Burlington, MA 01803, USA, 2013. 5. Petrov Yu.V.,Egamberdiev X.T., Aloviddinov M., Xolmatjonov B.M. Climatology. Publishing House Universitet. Tashkent: 2010, 168 p. *6.Nazaraliev D.V, Akmalov Sh.B "QURUQLIKGIDROLOGIYASI" fanidan o'quv qo'llanma Toshkent-2019.-112 bet.* *7. Фатхуллоев А.М, Назаралиев Д.В, Мханна А.И.Н, Хамрокулов Ж.С, "ЭКСПЛУТАЦИОННАЯ ГИДРОМЕТРИЯ" Учебное пособие Ташкент-2022.-165 стр.* *8. Akbarov A, Nazaraliyev D, Hikmatov F, "GIDROMETRIYA"- Toshkent, GMITI nashriyot bo'limi 2015.-129 bet.*
Module designation	ACD2205-AutoCAD
Semester(s) in which the module is taught	5
Person responsible for the module	Kasimov Jakhongir Avlokulovich Nasritdinova Umida Akhmadjonovna

Language	Uzbek, Russian
Relation to curriculum	Main
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total workload: Auditorium Hours: Lecture - 20 hours. Practical training - 40 hours. Independent education - 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	Information technologies
Module objectives/intended learning outcomes	It includes the theoretical foundations of computer graphics, the basics of vector graphics, 2D and 3D modeling in AutoCAd graphic software, including the working environment of AutoCAd graphic software, standardization of the design process, panels used in 2D design and their classification, panels used in 3D design and their classification, creating layers, creating blocks, designing hydrotechnical structures in the AutoCAD graphic program. Teaches 2D and 3D modeling process algorithms in AutoCAD
Content	Theoretical basis of computer graphics Vector graphics. Graphic software autocad. 2D simulation in autocad graphic software 3D modeling in autocad graphic software 2D and 3D simulation of hydraulic structures in autocad graphic software
Exams and assessment formats	One mid-term examination (80 minutes each) and a final written and oral exam (60 minutes), a short-computerized test and written homework
Study and examination requirements	Requirements for ready transition from science The total maximum marks will be the sum of the final exam (40%) and the Midterm (60%). To pass the subject, a student must score 60% or more of the allotted points
Module designation	MP 3205- Managament psychology
Semester in which science is taught	6
Responsible teacher of the module, degree and title S.N.P, degree and title	Muqumova Dilrabo Inatovna - Doctor of Philosophy in Pedagogical Sciences, PhD, Associate Professor. Mustafoeva Durdona Asilovna - Doctor of Philosophy in Pedagogical Sciences, PhD, Associate Professor
In which language to be taught	Uzbek, Russian
Its place in the curriculum	Not available
Teaching methods	Lecture, practical training

Study load (by types of classroom hours and independent study hours)	Total load: 150 hours Auditorium Hours: Lecture - 30 hours. Practical training - 30 hours Independent education - 90 hours
Number of credits allocated to science	5
This is a list of prerequisite subjects	Professional psychology Engineering psychology
Expected learning outcomes	as a result of the development of the direction of providing professional psychological advice on the issues of choosing a suitable profession according to the needs of the time, the evaluation of professional abilities and, according to the results, - professional consulting assistance to job seekers began to be widely used in labor exchanges, through the science of professional psychology, interpersonal relations - the cohesiveness of the team, about the successful use of the experience gained in the past in forming collectives to understand the psychological environment in it, the perception of the team by its members, the situation of the individual in the team and self-esteem, their complete trust in each other, in particular, in relation to the prospects of the team, the prospects of the individual in the team and the like to have imagination; • development of issues of professional ability and professional skills, as well as issues of formation of these abilities in the process of education and production; It is aimed at finding out the psychological foundations of rational ways of creating labor (professional) skills and qualifications and educating a person with sufficient knowledge and skills about them. • It is aimed at finding out the psychological foundations of rational ways of creating labor (professional) skills and qualifications and educating a person with sufficient knowledge and skills about them.
The content of science	The science of professional psychology has the task of studying a number of problems. These problems are: To study how professional qualities and abilities of workers and employees are formed in the production process; in addition to education, development of issues about the psychological foundations of labor and professional education and upbringing, which are carried out directly in the production itself. It is aimed at finding out the psychological foundations of rational ways of creating labor (professional) skills and qualifications and educating a person with sufficient knowledge and skills about them.
Exams and assessment format	There is one midterm (30 minutes) and a final written exam (80 minutes), a short, computerized test and written homework.
Students who will study and take the exam.	Students who successfully pass the science The total maximum points will be the sum of the points allocated to the final exam (60%), Midterm control (20%), homework (10%) and activity in classroom activities (10%). To pass the subject, the student will be allocated 60% of points and above. must collect the amount.

Literature	1. Kurbanov Sh.E., Seytkhalilov Ya.A. - Upravlenie kachestvom obrazovaniya. T.: Shark, 2004 (russ. yazik.), 2006 (ozb. yazik). 2. Mucumova D.I, Fayzullaev R.X, Jumanov A.A, Yarova S.B training in the subject of" Management Psychology". TIQXMMI MTU, 2022. – 260 b. 3. Khakimova M.F. Professional pedagogy. Tutorial. - T. "Science and technology", 2007. 4. Мукумова Д., Мукимов Б. Психология управления. Учебное пособие. - Т.: 2021.- 319 С. 5. Андреев А.L. Политическая психология. - М.: VES Mir, 2002.-240 С. 6. Базаров Т.Ю. Управление персоналом. Практик. Учеб. пособие. - М.: Юнити-Дана, 2010. - 239 С. 7. Бакирова Г.Х. Психология развития и мотивации персонала: Учеб. пособие. - М.: Юнити-Дана, 2009. - 439 С.
Module designation	SE-2205, Soil Erosion
Semester(s) in which the module is taught	4 semesters
Person responsible for the module	Professor Pulatov A.S.
Language	Uzbek, Russian
Relation to curriculum	Elective This module is not shared with other study programmes
Teaching methods	Lectures and seminars
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 150 hours. Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 30 hours lectures and 30 seminars. Private study including examination preparation, specified in hours3: 90 hours
Credit points	5 credit points
Required and recommended prerequisites for joining the module	Environmental biotechnology, Soil Reclamation, Soil Science and Physics
Module objectives/intended learning outcomes	Key question: what learning outcomes should students attain in the module? The main objective of this module Soil Erosion is to familiarize the master students with the basics of knowledge about soil erosion and to teach them to work with the parts of the soil erosion cycle. - to have an idea about the basics of soil erosion, problems related to erosion, types of erosion, the main ideas of combating soil erosion. - know and be able to use methods of erosion assessment, measures to reduce soil and water erosion, and modeling of various erosion processes. - should have the skills to observe and analyze scientific and technical processes in geoinformation systems;
Content	Soil Erosion introduces the master students to the basics of soil erosion, their manifestations and the impact of erosion on the environment. Also, during the course, examples of combating soil erosion, methods of reducing soil, water and wind erosion were considered.

Exams and assessment formats	Two Midterm assessments (80 minutes each) and one final exam (80 minutes), take-home written assignments
Study and examination requirements	Requirements for successfully passing the module. The final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	Mohammad Jafari, Mohammad Tahmoures, Mohammad Ehteram, Majid Ghorbani, Fatemeh Panahi - Soil Erosion Control in Drylands-Springer (2022)
Module designation	PR2106 Education practice
Semester(s) in which the module is taught	4
Person responsible for the module	Hakberdiev Obid Eshniezovich. Biology Candidate of Sciences, Associate Professor, Khaitbaeva Jamila Umarovna Doctor of Philosophy in Agricultural Sciences, associate professor.
Language	Uzbek, Russian
Relation to curriculum	practice on soil (амалиёт)
Teaching methods	Field practice (дала амалиёти)
Workload (incl. contact hours, self-study hours)	Total workload:30
Credit points	1
Required and recommended prerequisites for joining the module	General chemistry, higher mathematics, physics
Module objectives/intended learning outcomes	After completing the internship, the student The mossy, general scheme of the soil dressing process, plant structure, morphology, biology, living conditions and agricultural laws; knowledge of soil properties, imagination, and knowledge about the types of crops being grown. Skills: The main factors and conditions affecting soil formation, the organic part of the soil, chemical composition, soil structure, soil properties, ways to moderate them, soil fertility, soil classification, water regime of the soil, the scientific basis and organization of crop rotation, the ability to have skills on the main, pre-, and post-planting processing of soil, basic agricultural crops Competences: Having competencies on the use of modern resurstejamkor techniques and devices, considering the characteristics of the soil for the placement of plants, the use of methods and techniques of water-intensive irrigation, the ability to apply modern agricultural achievements in all areas of Agriculture, to obtain a high and high-quality harvest of agricultural
Content	Methodological approaches on the formation of soils, morphological signs, physical and mechanical properties of the soil, the formation of the organic part of the soil, salinity levels, factors generating soil erosion, measures to increase fertility, plant life factors and agricultural laws, Scientific Foundations of crop rotation, processing before and after planting in the soil, seed and its application in the production of modern deohistory achievements

Exams and assessment formats	Following the results of the internship, students are required to: • provide an internship diary • prepare and defend reports based on the collected data. The final Internship Report is defended at a meeting in the presence of a commission appointed by the head of the graduating department (20 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% defence of the internship report, 40 % participation in the internship, 20% completion of the internship diary and report. Students must have a final grade of 60% or higher to pass
Reading list	1. O. E. Khakberdiev, R.R. Egamberdiev, J.U. Khaitbaeva "Asas of Soil Science and Plant Science" Tashkent 2022. 2. O. Ramazanov, S. Bouriev "Melioration soil science" Tashkent 2019. 3. Sh. Kholikulov, P. Farov, I. Bobokhojaev "Soil Science" Tashkent 2011. 4. Ramazanoa A., Bouriev S "Soil Science and farming" - harmonious Faiz media, T. 2018. 5. Egamberdiev R.R. Educational guide" fundamentals of Crop Science " Tashkent 2022. 6. O.E. Khakberdiev, Dadakhojaev A. Educational guide "soil science" Tashkent 2023.
Semester(s) in which the module is taught	4 semester (1 week)
Person responsible for the module	Abdurakhmonov Sarvar Narzullayevich, (PhD), associate professor, Jumanov Azamat Norbutaevich (PhD), associate professor, Abdiramanov Rashid Duschanovich, senior teacher.
Language	Uzbek and russian
Relation to curriculum	Compulsory
Teaching methods	Engineering geodesy (Field practice)
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 30
Credit points (Field practice)	1 credits
Required and recommended prerequisites for joining the module	Higher mathematics; Geography; Informatics

Module objectives/intended learning outcomes	After completing the internship, the student Formation of the necessary practical skills for carrying out studies on engineering geodesy of qualified specialists in the field of "Ecology and environmental protection (water sector option)". - Consolidation of the acquired theoretical knowledge on "Engineering geodesy". - study of geodetic measurement methods in field conditions. - gaining experience in performing the main types of geodetic measurements and observations. - to have the ability to use modern geodetic tools and technical equipment. - organization of geodetic measurements and observations. - learning to process and analyze the obtained results. - drawing up a practical report based on the research work carried out and carried out in the field.
Content	To independently carry out geodetic measurements on the surface of the earth, to create plans and profiles of the place, as well as to study the theoretical foundations of geodetic measurements performed on the surface of the earth in solving engineering-geodesy issues in various fields; national economy, arming students with the necessary knowledge to perform independent measurement work using geodetic instruments, study the methods of drawing up plans and profiles of the place and develop measurement results aimed at systematic improvement, measurement results and teaching the effective use of graphics. drawings in solving engineering-geodesy problems in various sectors of the national economy.
Exams and assessment formats	The report and its drawing applications are created with the group team. Each member of the group writes a separate report chapter and participates in drawing applications. The completed report and drawing applications are reviewed and discussed together with the group members, each group member signs the report, and then submits it to the head of practice for verification. The defense of the report is carried out in front of the commission members. According to the instructions of the commission, each member of the group will give a report on some parts of the report and will answer questions about the whole report. The student is evaluated according to the results of the defense and the quality of the report.
Study and examination requirements	A student must score at least 60% out of 100% of the total allocated marks as successfully pass the internship.
Reading list	1. H.J. Khaitov, A.N. Inamov. Engineering geodesy. "TIIAME" National Research University, 2022. 495 p 2. A. Suyunov Engineering geodesy. Tashkent. 2021.-359 p. 3. Abdullaev T.M., Inamov A. N., Lapasov J.O. Engineering geodesy geodetic works in the construction of hydrotechnical facilities. TIIAME, 2019. 152 p. 4. Sh.K. Avchiev. Practical geodesy. Varis publishing house 2010. 350 p. 5. G.G. Poklad. Workshop on geodesy. Academic project, Moscow, 2015, 486 p.
Semester(s) in which the module is taught	4(four week)
Person responsible for the module	Associate professor, PhD Razzakov Ruslan, PhD Shipilova Kamila

Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	practical lesson ecology and environmental protection
Workload (incl. contact hours, self-study hours)	Total workload: 120 Contact hours: practical lessons – 120.
Credit points	4
Required and recommended prerequisites for joining the module	Ecology and environmental protection, Environmental biotechnology, Analytical and Physcolloid Chemistry, physics.
Module objectives/intended learning outcomes	After completing the internship, the student knows the professional activities of inspectors performing their work and job responsibilities. knows methods for controlling production processes related to the use of nature and its resources. - be able to use methods, technologies, equipment and application skills for collecting, sorting, cleaning, processing, and recycling industrial waste. -Be able to apply current regulations in the field of environmental protection. - Able to apply measures and draw up protocols in case of environmental violations - knows how to use regulatory legal acts and draw up protocols in professional activities. - be able to use laboratory and portable equipment in its activities - safety rules when conducting field and laboratory biological research;
Content: The discipline includes the following topics.	The educational practice is carried out after the end of the summer session in the second year, after studying in the third and fourth semesters the theoretical course of the discipline “Ecology and Environmental Protection”, soil science, engineering geodesy and is intended to consolidate theoretical knowledge and master industry-specific, instrumental, and experimental methods for studying natural ecosystems. Before starting work on a practical assignment received from the department, the student becomes familiar with his responsibilities at the place of practice (location of the area, climatic conditions, main ecosystems), undergoes an introductory safety briefing and on-the-job training, then together with the internship supervisor draw up a calendar plan for the internship, approve it with the head of the practice and, at the end of the practice, with marks on the completion of the work, present it to the head of the practice from the department along with a report on the practice. Performs all types of work provided for by the internship program and calendar schedule in a timely manner. Systematically provides the manager with information about the work performed (keeps records of observations, research results, etc.). Collects necessary materials for preparing accounting documentation. At the end of the internship, he submits to the department a report on the implementation of the internship program, certified in the prescribed manner by the head of the department.

Exams and assessment formats	Following the results of the internship, students are required to: • provide an internship diary • prepare and defend reports based on the collected data. The final Internship Report is defended at a meeting in the presence of a commission appointed by the head of the graduating department (20 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% defence of the internship report, 40 % participation in the internship, 20% completion of the internship diary and report. Students must have a final grade of 60% or higher to pass
Reading list	1.O‘zbekiston Respublikasining «Tabiatni muhofaza qilish to‘g‘risida»gi qonuni 2. Экологик нормативлар лойиҳаларини ишлаб чиқиш ва келишиш тартиби тўғрисидаги Низоми. 21.01.2014 й. 3. O‘zbekiston Respublikasi Qizil kitobi /Красная книга Республики Узбекистан, в 2-т. - T.: “Chinor ENK”, 2009 y. 4. Вазирлар Маҳкамасининг 2020 йил 7 сентябрдаги 541-сонли Атроф-муҳитга таъсирни баҳолаш механизмини янада такомиллаштириш тўғрисида қарори 5. Vazirlar Mahkamasining 2021-yil 12-apreldagi O‘zbekiston Respublikasi hududida atrof tabiiy muhitni muhofaza qilishning iqtisodiy mexanizmlarini yanada takomillashtirish to‘g‘risidagi 202-son qarori 6.https://eco.gov.uz/ru/legislation/index?legislationCategoryId=1&page=5&per-page=6
Module designation	EH 3105 Environmental lagislation
Semester(s) in which the module is taught	5
Person responsible for the module	Nazarov Kholmurod, candidate of legal sciences, associate professor
Language	Uzbek, Russian
Relation to curriculum	Main
Teaching methods	Lecture, practical exercise
Workload (incl. contact hours, self-study hours)	Total load: 150 Audience hours: Lecture-30 hours. Practical training 30 hours Independent Education 90 hours
Credit points	5 credits
Required and recommended prerequisites for joining the module	Ecology and environmental protection, Fundamentals of environmental impact assessment, Fundamentals of jurisprudence.

Module objectives/intended learning outcomes	Educational results/ Professional competencies The student should know: • the rules of the modern normative-legal approach aimed at solving the problems of legal protection of ecology and the environment, mutual stability of man with the natural environment, and security problems; directions of current environmental policy of our state and international organizations; principles of legal analysis of the main issues of environmental policy; main environmental legal indicators; to have an idea about the amount of current and perfect expenses in the use of nature and environmental protection (knowledge); • directions of scientific research in the field of environmental law; methods of legal assessment of the use of natural resources, including water and land resources, and their management; mechanisms of legal adjustment of environmental relations; to know and be able to use environmental laws and legal documents in solving social problems in the field of ecology, including the use of natural resources (skills). normative legal documents of national and international level, their contents and essence, materials of international environmental conferences and summits; Must have the skills to participate in the evaluation and implementation of the environmental policy of the Republic of Uzbekistan and its main directions, to promote environmental knowledge (qualification).
Content	The purpose of teaching the subject is to arm future bachelor specialists with legal knowledge in the field of environmental protection, rational use of natural resources and ensuring the ecological safety of the population, to familiarize them with the essence of the norms of Uzbekistan and international law, to introduce them to the views of the legal world. is enrichment. The task of the science is to form experience and skills in solving the practical issues of effective use of natural resources in the field of ecology and environment, their protection and ensuring the safety of the population at the level of current demand, as well as in solving international and state-level issues related to various natural resources. It is the formation of theoretical knowledge, practical skills, methodical approach to environmental legal events and processes, and scientific worldview.
Exams and assessment formats	Full mastery of the theoretical, methodological, and legal concepts of science, ability to correctly reflect the results of analysis, independent observation of the studied processes and completion of tasks and assignments given in the forms of interim control, submission of written work for final control.
Study and examination requirements	Students who successfully pass the science The total maximum marks will be the sum of the final exam (40%), Midterm (60%), and allotment points. To pass the subject successfully, the student must score 60% or more of the allotted points.

Reading list	1.Исмоилхўжаев Б.Назаров Х. Экология ва сув хуқуқи фанидан ўқув қўлланма. Тошкент – 2021 й -209 бет. 2 Салохиддинов А.Т.Маматов С.А. ва бошқалар. Атроф-муҳитга бўлаётган таъсирни баҳолаш,Т. Chinor ENK,2013,120 бет. 2.Юсуф Шодиметов, Жуманазар Холмўминов Экологик ҳуқуқ. Олий ўқув юртлари муассасалари учун дарслик, “Фан ва технология” нашриёти,Chinor ENK,2015.- 511б. 3.Усмонов М.Б.,Рустамбоев М.Х.ва бошқалар.Экология ҳуқуқи.Олий ўқувюртлари ҳуқуқшунослик мутахассисликлари учун дарслик, Т.2006-361 с 4.Нарзуллаев О.Х.Халқаро экологик ҳуқуқ Тлшкент ТДЮИ,2007 168б.
Module designation	GIS-51106 Basics of Geoinformation systems
Semester(s) in which the module is taught	5 semesters
Person responsible for the module	Professor Pulatov A.S.
Language	Uzbek, Russian
Relation to curriculum	Compulsory / This module is shared with study program Environmental science (international land and water management)
Teaching methods	Lecture and seminar
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 150 hours. Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 30 hours lectures and 30 hours seminars. Private study including examination preparation, specified in hours4: 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	Geography, Cartography

Module objectives/intended learning outcomes	Key question: what learning outcomes should students attain in the module? The main object of this module is to organize the data of the geo-information system of environmental protection, agriculture, and water management, to collect, store, manage, process, statistical analysis, modelling, description of spatial-geographical data and to prepare a database necessary for all sectors of the national economy based on them. identify the most effective ways to improve land use, improve map assessment and economic justification methods, and identify ways to increase their effectiveness. To have an idea about the ArcGIS program, metadata, spatial data infrastructure, data movement models. - map projection and geolinking, visualization of geographic data, projection of unprojected data sets, data re-projection, effects of various projections on geometric properties. - know and be able to use global positioning systems, spatial data infrastructure, add text and graphics to the map, select objects, use graphic symbols and attributes, present the map. - should have the skills to work with the ArcGIS computer program, perform geometric correction and geolinking of images, perform vector and raster operations and give them an understanding and description;
Content	Geoinformation Systems are computer technologies under expert control designed for real-world cartography and analysis of phenomena occurring on our planet and in our own lives and activities.
Exams and assessment formats	two Midterm assessments (80 minutes each) and one final exam (80 minutes), take-home written assignments.
Study and examination requirements	Requirements for successfully passing the module the final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	1.Chang K.T., 2011. Introduction to Geographic Information Systems. Fourth Edition. McGRAW – HILL International Edition.
Module designation	IST3105 Drinking water supply
Semester(s) in which the module is taught	5- semester
Person responsible for the module	Associate professor, PhD Malokhat Abdukodirova
Language	Uzbek, Russian
Relation to curriculum	Mandatory
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture - 30, practical lessons – 30, self-learning – 90, hours
Credit points	5
Required and recommended prerequisites for joining the module	Geology and hydrogeology, Geodesy, hydraulics, pumping and pumping stations

Module objectives/intended learning outcomes	know and be able to know the general principles of calculation and design of drinking water supply facilities, - the existing classification of building types, - scientific and technological foundations of the design of drinking water supply systems, - about the factors affecting the basic hydraulic and structural dimensions of drinking water supply systems Be able to select methods and means of drinking water purification. - performing calculations of elements of treatment facilities. - drawing up schemes of drinking water treatment facilities; independent design of the water supply system. - be able to apply the calculation of elements of water supply networks. - graphical representation of engineering networks of water supply systems. - performing hydraulic and structural calculations of networks and structures of drinking water supply systems. - substantiation of decisions on the construction and design of sustainable water supply and sewerage facilities Formation of competencies in the field of: - the ability to carry out the construction of water supply facilities, - operation, maintenance, and automation of water supply systems, - the main directions and methods of scientific and technical developments in the field of water supply and sanitation, - to study existing water pipelines and structures in order to improve the condition of water supply, - have an idea of the main directions of research work on the development of methods for the preparation of high-quality drinking water. - application of methods for calculating water supply and sanitation systems, - calculation of water intake and treatment facilities from surface and ground sources, as well as their construction, -methods of calculation of the ring water supply network using modern computing technologies, - selection of wastewater treatment systems and special water treatment facilities

Content	The water supply systems and its main. Water supply systems and their classification. The main forms of water supply. Water consumption and its calculation. The concept of the norm of water consumption. Work schedules of water consumption and pumping station. Level of difficulty: 1 Finding and choosing a water source. Assessment of the quality of natural waters. Requirements for the quality of drinking water. Physical, chemical and bacteriological indicators of water quality. Extraction of water from an underground source. Characteristics of groundwater. Underground water extraction facilities. Wells. Pressurized and unpressurized, perfect, and imperfect wells. Vertical and horizontal water intake structures. Level of difficulty: 2 Importance of sanitary control zone and its organization. Dimensions of the sanitary control zone. Organization of a sanitary control zone for the main facilities and networks of the water supply system. Surface water extraction facilities. Types and calculation of water intake facilities. Adaptation facilities of the water supply system. Level of difficulty: 2 Water transportation and distribution. Water supply network. The main forms of water supply to the network. Types of networks - annular and royal water supply networks, their advantages, and disadvantages. Forms of water supply. The theory of the water supply network calculation. Hydraulic calculation of the water supply network with a reservoir and its methods. Water supply systems for fire fighting purposes. Fire extinguishing systems, their types and calculation. Determination of free pressures on the network. Level of difficulty: 3 The concept and tasks of pasture water supply, as well as the main systems. Pastures are the main factors in choosing the form of water supply. Organization of livestock watering points, their placement and equipment. Pastures are the main sources of water supply. Level of difficulty: 4 Enterprise water supply system. Water consumption procedure of enterprises. Forms of direct and circulating water supply to enterprises. Grouped water pipes. The main grouped water pipelines in the republic. Level of difficulty: 5
Exams and assessment formats	To fully master the theoretical and methodological concepts related to science, be able to correctly reflect the results of the analysis, independently observe about the processes being studied and carry out tasks and tasks assigned in intermediate forms of control, submit a written work on final control.
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass
Reading list	1.Maxmudova I.M.,Salohiddinov A.T. “Qishloq va yaylovlar suv ta’minoti”, O’quv qo’llanma.T.:CHINOR ENK,2013.-151b. 2.Maxmudova I.M, Saloxiddinov A.T. Qishloq va yaylovlar suv ta’minoti”, O’quv qo’llanma.T.: Khorazm, 2002. - 136b. 3. Maxmudova I.M. «Улучшения качества природных вод» T. 2015. – 160 c. 4. Maxmudova I.M. «Ichimlik suv ta’minoti» T.: Cholpon, 2019. – 264 c. 5. Water supply. External networks and facilities. RDU 2.04.02-2019
Module designation	SFM3104 Multi-purpose water resources use and protection
Semester(s) in which the module is taught	5
Person responsible for the module	Docent Ravshan Boyirov Senior lecturer Sobit Mamatov

Language	Uzbek, Russian
Relation to curriculum	Main
Teaching methods	Lecture, practical lesson, cours work, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 120 Contact hours: lecture - 30, practical lessons – 30, self-learning – 60, hours
Credit points	4
Required and recommended prerequisites for joining the module	To master the course, undergraduate students must have basic knowledge in Ecology and Environmental Protection, hydraulics, engineering Geodesy, Hydrology, Meteorology, and basic climatology.
Module objectives/intended learning outcomes	As a result of his mastery of science, the student: Know social and economic importance of rational use of Water Resources, water crust of the Earth - water reserves and resources in the hydrosphere, circulation and quantitative indicators of water, distribution and distribution of Water Resources on the world continents, in the Aral Sea basin and Uzbekistan's own water resources, International and national foundations of rational management and effective use of Water Resources, access to theoretical knowledge on the procedure for water use and water consumption in the Republic of Uzbekistan, ; To be able to determine and calculate the norms and amounts of water use for environmental purposes (water sanitation transfer or ecological flow), to calculate the amount of reversible (waste, sewage, drainage and drainage. must have the qualifications to assess water resources, assess water needs, assess the perfect use of Water Resources on the river basin scale and assess their conservation status, analyze, plan the activities to be carried out, manage water resources wisely and organize their effective use.

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Globe water reserves and Water Resources. Distribution of water resources by hydrosphere parts and world continents. Level of difficulty: 1 Cross-border Water Resources. Water resources of the Aral Sea basin. International foundations for the rational management and joint use of Water Resources. Level of difficulty: 2 The aquatic complex and its participants are sectors of the economy. The procedure for supplying water to the participants of the Aquatic Complex. Level of difficulty: 2 Water use in agriculture and animal husbandry in municipal farms, industrial enterprises, energy facilities: Level of difficulty: 3. Water use at fish farms, health facilities, resorts, water transport and water sports facilities: Level of difficulty: 3. Water economy balance. Drawing up and analyzing the balance of the water economy of the river basin: Level of difficulty: 4 Water Resources Conservation. Huquqiy basis for the use of Water Resources and their protection: Level of difficulty: 4 Modern approaches to managing and organizing the use of Water Resources. Integrated management of Water Resources. Basin planning for the use of Water Resources: Level of difficulty: 4 Global climate change. Impact of climate change on water resources and water use: Level of difficulty: 5 Water resources of Uzbekistan - their current use and problems. Water Resources Planning: Level of difficulty: 5 Protection of water resources. Principles of protection of water resources. Legislation in the field of protection of water resources. Level of difficulty: 5
Exams and assessment formats	Two written midterm assessments (30 minutes each), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	1. R. Quentin Grafton, Karen Hussey “Water resources planning and management”, London 2011, Cambridge University Press p.423 2. Valiev X.I., Murodov Sh.O., Xolboev B. “Suv resurslaridan mukammal foydalanish va muhofaza qilish”, Darslik. T. Fan va texnologiya, 2010.- 167 b. 3. Diane Arjoon, Amory Tillmant and Markus Herrmann. Sharing water and benefits in transboundary river basins. hydrol. Earth Syst. Nauk, 20, 2135–2150, 2016. 4. Grafton R.K., Hussey K. Planning and management of water resources. The Cambridge University Express. 2011.
Module designation	KPS 2104- Professional psychology
Semester in which science is taught	8

Responsible teacher of the module, degree and title	Muqumova Dilrabo Inatovna - Doctor of Philosophy in Pedagogical Sciences, PhD, Associate Professor; Mustafoeva Durdona Asilovna - Doctor of Philosophy in Pedagogical Sciences, PhD, Associate Professor
In which language to be taught	Uzbek, Russian
Its place in the curriculum	Not available
Teaching methods	Lecture, practical training,
Study load (by types of classroom hours and independent study hours)	Total load: 150 hours Auditorium Hours: Lecture - 30 hours. Practical training - 30 hours Independent education - 90 hours
Number of credits allocated to science	2
This is a list of prerequisite subjects	Management psychology Engineering psychology
Expected Learning Objectives	As a result of mastering the subject, the student: • as a result of the development of the direction of providing professional psychological advice on the issues of choosing a suitable profession according to the needs of the time, the evaluation of professional abilities and, according to the results, - professional consulting assistance to job seekers began to be widely used in labor exchanges, through the science of professional psychology, interpersonal relations - the cohesiveness of the team, about the successful use of the experience gained in the past in forming collectives to understand the psychological environment in it, the perception of the team by its members, the situation of the individual in the team and self-esteem, their complete trust in each other, in particular, in relation to the prospects of the team, the prospects of the individual in the team and the like to have imagination; • providing students with knowledge of various fields of psychology, including general, personality, age periods, labor, pedagogical, engineering, applied psychology, and teaching them to apply the scientific research methods of these fields in practice, psychological understanding in the field of science, about professions to know and be able to use the methods of increasing the effectiveness of education by forming a stock of theoretical information and practical skills related to understanding, imagination; • the student should have the skills to implement a modern approach to labor analysis, to use basic methods of labor analysis, to apply engineering-psychological assessment systems, to ergonomically design operator workplaces, to plan, organize and implement engineering research.

The content of science	The science of professional psychology has the task of studying a number of problems. These problems are: To study how professional qualities and abilities of workers and employees are formed in the production process; in addition to education, development of issues about the psychological foundations of labor and professional education and upbringing, which are carried out directly in the production itself. development of issues of increasing the labor productivity of people based on the creation and use of the latest technology. development of issues of professional ability and professional skills, as well as issues of formation of these abilities in the process of education and production. It is aimed at finding out the psychological foundations of rational ways of creating labor (professional) skills and qualifications and educating a person with sufficient knowledge and skills about them.
Exams and assessment format	There is one midterm (30 minutes) and a final written exam (80 minutes), a short, computerized test and written homework.
Students who will study and take the exam	Students who successfully pass the science The total maximum points will be the sum of the points allocated to the final exam (60%), Midterm control (20%), homework (10%) and activity in classroom activities (10%). To pass the subject, the student will be allocated 60% of points and above. must collect the amount.
Literature	1. F.R. Abduraxmonov, Z.E. Abduraxmonova Kasb psixologiyasi– Toshkent, 2018. 2. Z.Nishonova, Z. Qurbonova, S. Abdiyev Psixolodiagnostika va eksperemental psixologiya. – Toshkent: 2011 3. P.I. Ivanov, M.E. Zufarova Umumiy psixologiya Toshkent: 2008 4.Goziev E.G Psixologiya metodologiyasi, Toshkent, 2012. 5. Goziev E.G. Sotsial psixologiya, Toshkent, 2013. 6. G‘oziev E. Kasbiy psixologiya: Psixologiya mutaxassisligi uchun darslik; O‘zbekiston Respublikasi OO‘MTV, M.Ulug‘bek nomidagi O‘zMU. - T.: « O‘zbekiston faylasuflari milliy jamiyati» nashriyoti, 2008. — 213 b. 7. Ismailova Z.K., Raupova SH.A., Madazizova D.R., Mustafaeva D.A. Kasbiy psixologiya. O‘quv qo‘llanma, Toshkent, 2020.
Module designation	RS-3205 Remote sensing
Semester(s) in which the module is taught	5 semesters
Person responsible for the module	Professor Pulatov A.S.
Language	Uzbek, Russian
Relation to curriculum	Elective This module is not shared with other study programs
Teaching methods	Lecture and seminar
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 150 hours. Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 30 hours lectures and 30 hours seminars. Private study including examination preparation, specified in hours5: 90 hours
Credit points	5

Required and recommended prerequisites for joining the module	Basics of geoinformation systems, Information technologies and mathematical modeling of processes
Module objectives/intended learning outcomes	Key question: what learning outcomes should students attain in the module? - Basics of remote sensing, basic steps of image analysis, electromagnetic spectrum, computer and software for remote sensing, active and passive methods in remote sensing, concept of vector tracking, microwaves, applications of remote sensing, thermography. - knows and can use the principles of digital image analysis, data filtering, image classification, spectrocopy, correction process of geographical images, vegetation cover index, computer and software for remote object study, remote object study methods. - Must have skills in working with ERDAS IMAGINE computer program and monitoring images;
Content	Remote Sensing is an in-depth study of remote sensing techniques. This subject is aimed at obtaining more extensive information by students, learning the basic concepts and methods (analysis of digital images, correction of images from geometric and atmospheric effects, interaction with geographic information systems).
Exams and assessment formats	Two Midterm assessments (80 minutes each) and one final exam (80 minutes), take-home written assignments
Study and examination requirements	Requirements for successfully passing the module. the final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	(Remote Sensing and Digital Image Processing 11) Vincent Salomonson, Michael J. Abrams, Anne Kahle, William Barnes, Xiaoxiong Xiong (auth.), Bhaskar Ramachandran, Christopher O. Justice, Michael J. Ab. (2011) Jacqueline Le Moigne, Nathan S. Netanyahu, Roger D. Eastman - Image Registration for Remote Sensing-Cambridge University Press (2011).
Module designation	CGR2206-Computer graphics
Semester(s) in which the module is taught	5
Person responsible for the module	Kasimov Jakhongir Avlokulovich Nasritdinova Umida Akhmadjonovna
Language	Uzbek, Russian
Relation to curriculum	Main
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total workload: Auditorium Hours: Lecture - 20 hours. Practical training - 40 hours. Independent education - 90 hours

Credit points	5
Required and recommended prerequisites for joining the module	Information technologies
Module objectives/intended learning outcomes	It includes the theoretical foundations of computer graphics, the basics of vector graphics, 2D and 3D modeling in AutoCAd graphic software, including the working environment of AutoCAd graphic software, standardization of the design process, panels used in 2D design and their classification, panels used in 3D design and their classification, creating layers, creating blocks, designing hydrotechnical structures in the AutoCAD graphic program. Teaches 2D and 3D modeling process algorithms in AutoCAD
Content	Theoretical basis of computer graphics Vector graphics. Graphic software autocad. 2D simulation in autocad graphic software 3D modeling in autocad graphic software 2D and 3D simulation of hydraulic structures in autocad graphic software
Exams and assessment formats	One mid-term examination (80 minutes each) and a final written and oral exam (60 minutes), a short-computerized test and written homework
Study and examination requirements	Requirements for ready transition from science The total maximum marks will be the sum of the final exam (40%) and the Midterm (60%). To pass the subject, a student must score 60% or more of the allotted points
Module designation	ABS3205 Environmental management
Semester(s) in which the module is taught	5
Person responsible for the module	Phd. Aziza Maxsumxanova
Language	Uzbek
Relation to curriculum	selection
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total workload: - 150 hours Auditorium Hours: Lecture - 30 hours. Practical training- 30 hours Independent education - 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	Psychology of management, Landscape design.

Module objectives/intended learning outcomes	Students are provided with theoretical knowledge in Environmental Management, practical skills, methodological approach to economic phenomena and processes and the formation of knowledge, skills and competencies corresponding to the specialty of the direction in terms of the tasks of forming a scientific worldview, the use of management methods depending on the situation. The role of Environmental Management in the enterprise; mechanics of Natural Resource Management and Environmental Protection; manifestation of General Laws and principles of Environmental Management; Environmental Management instruments; structural structure of Environmental Management instruments and their peculiarities; it is necessary to have knowledge about the role of environmental accounting and environmental audit in the Environmental Management System. Knowledge and implementation of environmental requirements for technology and products; selection of economically effective options for measures to protect the environment from industrial pollution: development and justification of plans, programs and environmental projects for the rational use of Natural Resources; Organization of industrial complexes on the principle of "waste of one enterprise-raw materials for another enterprise", ability to apply knowledge in practice; have an idea
Content	Basic and special terms and concepts of environmental management, principles, and methods of organizing and planning the Environmental Management System of an enterprise, internal and foreign experience of an environmental manager, a plan for the rational use of Natural Resources, the development and substantiation of programs and environmental projects, as well as beginner knowledge.
Exams and assessment formats	Educational results are evaluated in a 100-point rating system. One midterm (60 points) and final oral exam (40 points)
Study and examination requirements	Requirements for successfully passing the module. To pass the subject successfully, the student must score 60% or more of the allotted points.
Reading list	1.Gary K. Meffe, Larry A. Nielsen, Richard L. Knight, Dennis A. Schenborn. Ecosystem Management Adaptive, Community-Based Conservation. Textbook. NW, Washington, 2009 y. 365 p. 2.В.И. Коробко Экологический менеджмент: учеб. пособие для студ. вузов . – М.: ЮНИТИ-ДАНА, 2010 г.
Module designation	MM3205 –Mathematical modeling
Semester(s) in which the module is taught	3
Person responsible for the module	Aynakulov Sharofiddin Abdujalilovich, head teacher
Language	In Uzbek and Russian languages
Relation to curriculum	Main
Teaching methods	Lecture, practical training, laboratory training

Workload (incl. contact hours, self-study hours)	Total load: 150 Lecture: 20. Practical training: 30. Laboratory training: 10 Independent education: 90.
Credit points	5
Required and recommended prerequisites for joining the module	Higher mathematics, physics, English, Russian
Module objectives/intended learning outcomes	Science fulfills the tasks of teaching students how to effectively use information technologies in solving special problems.
Content	The subject of " Mathematical modeling " is to acquaint students with the theoretical foundations of information technologies, their information, technical, mathematical, software, and to form students' knowledge, skills, and abilities on the effective use of information technologies in solving issues of ecology and environmental protection in water management.
Exams and assessment formats	25% of the points allocated to the assessment of students' knowledge for IC are allocated to the assessment of students' independent work (out of the total 60 points for IC, 45 points are given for theoretical and practical knowledge, 15 points are given for independent work). Also, questions on subjects listed in the subject syllabus on student independent education are also included in FC assignments.
Study and examination requirements	In order to successfully pass the subject, the student must score 60% or more of the allotted points.
Reading list	1. Abdullaev Z.S., WEB Textbook on "Mathematical Modeling of Information Technologies and Processes". 2022 2. Z.S. Abdullaev, M. Yusupov, B.O. Rakhmankulova, Sh.A. Aynakulov. Applied information technologies. (Study guide) Tashkent, TIIAME, 2018 - 317 p 3. Rakhmankulova B.O., Ziyaeva Sh.K., Kubyashev K.E. Mathematical modeling of information technologies and processes. T.: 2021 4. The President of the Republic of Uzbekistan “On measures to improve the quality of education in the field of mathematics and develop scientific research” Decision No. PD-4708 of May 7, 2020. lex.uz 5. Sh.M.Mirziyoev "Strategy of actions on the five priority areas of development of Uzbekistan" Tashkent, "Uzbekistan”, 2017 yil. “Gazeta.uz”. 6. Yuldashev U.Yu., Bakiev R.R., Zokirova F.M. Informatics, and information technologies. Electronic textbook. 7. B. Rakhmankulova Methodical guide for practical and laboratory training in information technology and mathematical modeling of processes TIIAME, 2021 -114 p 8. B. Rakhmankulova Methodical guide for conducting practical training in information technologies and mathematical modeling of processes TIIAME, 2022 9. B. Rakhmankulova Methodical guide for conducting laboratory training in information technologies and mathematical modeling of processes TIIAME, 2022
Module designation	IM3205 Irrigation and land reclamation

Semester(s) in which the module is taught	6
Person responsible for the module	Mamataliev Adkham Boymirzaevich, Associate professor
Language	Uzbek, Russian
Relation to curriculum	Elective
Teaching methods	Lecture, lesson.
Workload (incl. contact hours, self-study hours)	Total workload: 150 hours. Contact hours: 60 hours: - lecture – 30 hours. - exercise – 30 hours. Private study including examination preparation, specified in hours[6]: 90 hours.
Credit points	5
Required and recommended prerequisites for joining the module	Engineering Geodesy, Physics, Chemistry, Soil Science, Geology and hydrogeology, Hydrology, Hydraulic.

Module objectives/intended learning outcomes	As a result of mastering the discipline, the student: To know and understand: - rational and efficient use of land. - irrigation and irrigation systems. - irrigation regime of agricultural crops. - modern irrigation methods and irrigation techniques. - irrigation networks and their requirements. - water resources, their formation, their rational use. - water sources and their management. - drainage systems. - soil types and their salinity, causes and levels. - causes of salt distribution in soils. - regular increase of soil fertility. - productivity and productivity of agricultural crops through irrigation. - implementation of land reclamation in connection with highly productive agrotechnical measures. - ways to improve land reclamation. To be able to: - design of hydromelioration systems. - design of irrigation network constructions, irrigation equipment hydraulic calculations and cuts. - know and be able to use irrigation erosion and complex measures against it. To form competences in: - full mechanization of work on reclamation areas in agriculture and application of industrial methods in reclamation. - efficient use of water resources. - mastering the issues of full mechanization and automation of reclamation processes, irrigation, and other works. - sanitization of saline lands. - development of new lands. - design, construction, operation, and maintenance of hydromelioration systems. - management of irrigation networks, finding technical and economical options for carrying out water measurement and distribution works in them. - automation of work and improvement of system activity.
Content	Irrigation, irrigation systems, their elements and functions, irrigation regime of agricultural crops, hydromodule zoning of irrigation areas, irrigation methods and irrigation techniques, classification of irrigation systems, main elements, construction and their design. Estimated water consumption of channels. Efficiency value of canals and system, water wastage in canals, hydraulic calculations of canals, construction of irrigation systems, road networks and protective trees, water sources, their characteristics, irrigation by mechanical lifting of water. Drainage reclamation, causes of salinity of irrigated lands, reclamation measures against land salinity, general and private water balance equations of irrigated lands, natural and artificial drainage, hydrotechnical drainage, biological drainage, design of drainage networks.
Exams and assessment formats	e.g. two oral Midterm assessments (20 minutes each) and one final oral exam (40 minutes), short computer-based quizzes, take-home written assignments
Study and examination requirements	Requirements for successfully passing the module. e.g. the final grade in the module is composed of 60% performance on exams, 10% quizzes, 10% take-home assignments, 10% in-class participation. Students must have a final grade of 60% or higher to pass

Reading list	1. Khamidov M.X., Mamataliev A.B. Irrigation and land reclamation. Study guide. Tashkent. TIIAME printing house 2019. -210 p. 2. Begmatov I.A., Shukurlaev Kh.I., Mamataliev A.B. Irrigation and land reclamation. Textbook. -Tashkent: "Ilm-ziyo-zakovat", 2021. -476 p. 3. Khamidov M.X., Shukurlaev X.I., Lapasov X.O. Training manual on practical training in "Agricultural hydrotechnical melioration". -Tashkent: TIMI printing house, 2014. -320 pages.
Module designation	EKM3105 – Environmental monitoring
Semester(s) in which the module is taught	6
Person responsible for the module	Phd., Razzakov Ruslan, Shipilova Kamila
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture - 30, practical lessons – 30, self-learning – 90, hours
Credit points	5
Required and recommended prerequisites for joining the module	Analytical and Phys colloid Chemistry, Physics, Ecology and environmental protection, Soil science, Environmental biotechnology, engineering geodesy, Hydrology, meteorology and basic climatology
Module objectives/intended learning outcomes	As a result of mastering the discipline, the student: To knows and understands: knows about the organization of monitoring of natural objects, including sampling, sample preparation, methods, and types of research. - on the development of environmental measures; - fundamentals of data processing of soil science, climatology, and hydrology in the implementation of environmental monitoring. - fundamentals of landscape science and methods of development of environmental measures. To be able to: be able to develop environmental monitoring programs for various types of economic development of territories. - plan environmental monitoring and assessment activities; - process and analyze monitoring results. - design environmental protection measures. To form competences in: - basic concepts, terms and definitions of environmental monitoring and monitoring of the geological environment; - methods and types of research in the organization and conduct of environmental monitoring in various types of economic development of the territory; - methods of assessing the degree of technogenic transformation of the environment in various types of economic development of the territory;

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Basics of Environmental monitoring and understanding of its elements and identification of its functions. Classification of the Monitoring system. Development of Monitoring programs. Level of difficulty: 1 Global environmental monitoring. Migration of pollution processes and international cooperation. Purpose, objectives of global monitoring. Organization of Global monitoring. Analytical control in Global monitoring. Level of difficulty: 2 National monitoring. Purpose, objectives of national monitoring. Organization of national monitoring. State monitoring in the Republic of Uzbekistan. Level of difficulty: 2 Regional monitoring. Purpose of regional monitoring, functions. Organization of Regional monitoring. Problems of providing drinking water to the population. Level of difficulty: 2 Local monitoring. Purpose of local monitoring, functions. Organization of local monitoring programs. Monitoring of cities. Monitoring of industrial enterprises. Monitoring of polluting sources. Basic concepts, their classification, purpose and organization. Level of difficulty: 2 Environmental monitoring of the background. Types of background monitoring. Features of the formation of a background monitoring system. Level of difficulty: 3 Environmental monitoring of the background. Types of background monitoring. Features of the formation of a background monitoring system. Biospheric reserves. Background monitoring observation posts Monitoring of anthropogenic changes in the environment. Radioactive contamination monitoring. Monitoring cases of potentially dangerous gods. Level of difficulty: 3 Geographic Information System (GAT). The possibilities of Gat in the implementation of environmental processes. Analysis of some mudflats created in the GAT Sox. Level of difficulty: 4 Atmospheric air monitoring. Organization of atmospheric air monitoring. Organization of atmospheric air monitoring in stationary posts. Organization of atmospheric air monitoring at Mobile posts and routes Monitoring of natural waters. Level of difficulty: 4 Groundwater monitoring. Organization of surface water monitoring. Monitoring the quality of natural waters using complex laboratories. Generalization and processing of natural water monitoring results Level of difficulty: 5 The role of international cooperation in conducting environmental monitoring. Level of difficulty: 5 The following topics are recommended for practical classes: Purpose and objectives of environmental monitoring, system and structure Level of difficulty: 1 Calculation of emissions of harmful substances in production plots of various types of Level of difficulty: 1 Calculation of discharges in fuel combustion in technological ovens or boilers Level of difficulty: 2 Calculation of emissions of harmful substances in mechanical processing of metals Level of difficulty:2 Calculation of the emissions of harmful substances in the mechanical processing of wood Level of difficulty: 3

Exams and assessment formats	One written midterm assessment (30 minutes), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass
Reading list	1. Yormatova D., Ubaydullayeva Sh. «Ekologik monitoring», «Fan va texnologiyalar», 2012, 210 b 2. Экологический мониторинг: учебноепособие/ Р.Н. Апкин, Е.А. Минакова.– 2-е изд., испр. и доп. – Казань: Казан. гос. энерг. ун-т, 2015. – 127 с. 3.Хаустов А.П., Редина М.М. Экологический мониторинг. М.: Юрайт. 2016.-637 с. 4. G. Bruce Wiersma Environmental Monitoring CRC Press ISBN 9781566706414. USA, 2013. -238 r. 5. «O‘zbekiston Respublikasida atrof - tabiiy muhit monitoringi Nizomini tasdiqlash to‘g‘risida»gi O‘zbekiston Respublikasi Vazirlar Mahkamasining qarori. 3 - aprel 2002 yil.
Module designation	WM3105 - Waste management
Semester(s) in which the module is taught	6
Person responsible for the module	Prof., Dr. Maria Radkevich
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture - 30, practical lessons – 30, self-learning – 90, hours
Credit points	5
Required and recommended prerequisites for joining the module	Physics, Ecology and environmental protection, Soil science, Environmental biotechnology.

Module objectives/intended learning outcomes	As a result of mastering the discipline, the student: To know and understand: - basics of waste management. - the impact of landfills on the environment and ways to reduce it; - waste management strategies aimed at ensuring environmental safety in the water sector, legal and chemical standards for water, soil and atmospheric air quality. To be able to: - use criteria and scientific bases for assessing the impact of waste on the environment. - use waste control information systems. - use theoretical and practical bases for processing various types of waste. To form competences in: - proposing solutions to the problems of waste handling, transport and utilisation, taking into account the peculiarities of economic and human society development. - determining the damage to the environment caused by landfills and waste dumps. - calculating parameters of waste reclamation and recycling processes

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Basics of waste management. The problem of environmental pollution by waste. Norms and morphology of solid domestic waste formation. Hazard classes of waste. Solid industrial waste. Liquid wastes. Radioactive waste. Level of difficulty: 2. Legislation of the Republic of Uzbekistan and foreign countries in the field of environmental policy and waste management. Legislation in the field of waste management in EU and USA. Types of payments for waste disposal. Basic provisions in the field of waste management. Zero Waste Concept. Waste management strategy in Uzbekistan. Level of difficulty: 2. Theoretical aspects of waste management problems. Problems of formation and waste management on the territory of the Republic of Uzbekistan. Organisation of waste management. Possible directions of restructuring of the state system of waste management. Information systems and software products used for waste management. Level of difficulty: 3. Municipal solid waste (MSW) processing. MSW accumulation. MSW disposal systems. Basic mechanical processes and technologies for MSW preparation and treatment. Importance of mechanical processes and technologies for waste recycling. Basic methods of MSW crushing agglomeration and sorting. Fundamentals of processing of some types of solid waste. Level of difficulty: 4. Problems of MSW storage and disposal. Principles of organisation of household waste dumpsites. Environmental impact of MSW landfills. Composition of biogas. Methods of reducing emissions from MSW landfills. Obtaining biofuel from waste. Obtaining biohumus from domestic waste. Level of difficulty: 3. Use of modern information technologies for waste management. Qualities of decision-making assistance systems in environmental protection activities. Organisation of environmental protection management without using information technologies. Use of automatic information-analytical systems for waste management. Level of difficulty: 3. Problems and possibilities of liquid waste utilisation. Types of liquid waste. Liquid domestic waste. Methods of treatment and disinfection of domestic wastewater. Sewage sludge removal. Transport and disposal of faeces. Assimilation machines. Level of difficulty: 3. Industrial wastes. Methods of calculating waste generation volumes. Methods of production waste management. Ways to reduce waste generation. Radioactive waste management - the experience of European countries. Liquid production wastes and methods of their utilisation. Waste disposal from industrial wastewater. Level of difficulty: 3. Atmospheric air protection from dusty and gaseous emissions from production enterprises and transport. Sources of dust and gaseous emissions at production enterprises. Composition of dust and gaseous emissions. Emissions of harmful substances and dust from road transport. Possibilities of using recovered dusts and gases. Level of difficulty: 3. The following topics are recommended for practical classes: 1. Determination of the morphological composition of household waste. Level of difficulty: 3. 2.Determination of fractional composition of domestic waste. Level of difficulty: 3. 3. Calculation of waste hazard class. Level of difficulty: 3. 4. Determination of the volume of landfill gas emissions. Level of difficulty: 4. 5. Extraction of valuable components from wastewater by ion exchange and electrochemical treatment.Level of difficulty: 4. 7. Calculation of equipment parameters for separation (separation) of waste petroleum products from wastewater. Level of difficulty: 4. 8. Calculation of digester parameters Level of difficulty: 4. 9. Determination of volumes of solid and liquid waste generated at production enterprises. Level of difficulty: 3. 10. Calculation of equipment for processing rubber waste. Level of difficulty: 3. 11. Calculation of the system of vacuum removal of wood waste. Level of difficulty: 4. 12. Calculation of the amount of damage caused to soils as a result of

Exams and assessment formats	One written midterm assessments (30 minutes), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass
Reading list	1. Saleh H.El-D.M., Rahman R.O.A. (Eds.) Management of Hazardous Wastes. ExLi4EvA, 2016. — 181 p. 2. Karthikeyan O.P., Heimann K., Muthu S.S. (Eds.) Recycling of Solid Waste for Biofuels and Bio-chemicals. Springer, 2016. — 422 p. 3. Xi B., Jiang Y., Li M., Yang Y., Huang C. Optimization of Solid Waste Conversion Process and Risk Control of Groundwater Pollution. Springer-Verlag, 2016. — 125 p. 4. Show K.-Y., Guo X. (Eds.) Industrial Waste. InTech, 2012. — 274 p. 5. Kumar E.S. (ed.) Integrated Waste Management. V.II. InTech. 2011. 482 p. 6. Радкевич М.В., Шипилова К.Б. Управление отходами. Учебное пособие. Ташкент: “Malik Print Co”, 2021 й. – 393 с. 7. Коныk О. А. Кузиванова А.В. Технологии переработки твердых отходов: учебное пособие. Сыктывкар: СЛИ, 2013. – 202 с.
Module designation	TIU3104 – Instrumental methods of analyses
Semester(s) in which the module is taught	6
Person responsible for the module	Prof., Dr. Bakhtiyor Karimov.
Language	Uzbek
Relation to curriculum	Mandatory
Teaching methods	Lecture, practical lesson, laboratory work, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 120 Contact hours: lecture - 30, practical lessons – 20, laboratory work – 10, self-learning – 60, hours
Credit points	4
Required and recommended prerequisites for joining the module	To master the course, Magister Students must have basic knowledge in” General ecology and Environmental Protection”, “Physics”, “Analytical and Physcolloid Chemistry”, “Analytical chemistry”.

Module objectives/intended learning outcomes	To know and understand: - theoretical foundations and principles on modern instrumental methods and instruments of physical-chemical analyses, their importance in ensuring environmental sustainability against anthropogenic pollution, their understanding and knowledge of the methodology for planning laboratory and field-stage analytical hydrochemical research of quality of non-living and living components in natural and artificial ecosystems under anthropogenic impact. To be able to: - select and apply most advanced instrumental appropriate methods of chemical analyses to reduce, prevent and reverse the ecological situation and other anthropogenic impacts of irrigation and other rural and aquatic production sectors caused by diversion of contaminants into surrounding environment. - have the skills of collecting, documenting and storing environmental samples, using equipment and maintaining them in accordance with the requirements of maintenance and operation, qualitative and quantitative analysis of external environmental components and statistical processing of the results obtained and conduct other related activities. To form competences in: - selection of a complex of the most advanced and rational instrumental methods of environmental quality analysis, which, if necessary, will be used to assess the state of the environment as a whole accurately and correctly. - estimate the pros and cons of anthropogenic influence on the process of water quality formation, especially under impact of effluents from the fields of agriculture and water economy. - practical applying the knowledge gained in science in the performance of tasks in certain environmental conditions necessary. - analyzing and interpreting the results of field research in order to correspond to requirements of a professional employer of nature protection agencies, head of scientific research, or professional journal - that is, in a case that is acceptable to all, and, writing in an in-depth scientific way, present them in the form of reports, presentations or articles.

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Introduction. Classification of Analytical Chemistry and its methods. Physical methods of analysis. Level of difficulty: 4 Instrumental (physicochemical) methods of analysis, their classification, advantages, and disadvantages. Technical safety. Level of difficulty: 4 Electro-chemical methods of analysis and their classification. Methods for expressing solutions and concentrations. Level of difficulty: 5 Potentiometry techniques of analysis. Comparison and indicator electrodes in potentiometry. Level of difficulty: 5 Membranous (ionselective) electrodes. Indirect potentiometry (ionometry). Potentiometric titration. Conductometry. Electrical conductivity of electrolytes. Indirect conductometry. Conductometric titration. Level of difficulty: 5 Introduction to spectroscopic methods of analysis-electromagnetic radiation (spectrum). Level of difficulty: 5 Scientific basis and classification of spectroscopic techniques. Atomic-spectroscopy techniques. Atom-emission analysis. Level of difficulty: 5 Spectroscopy in visual and ultraviolet radiation spectrum ranges, qualitative and quantitative analysis of atomic-radiation Spectra. Level of difficulty: 4. Portable instruments of analysis in determining the state of the external environment. Introduction, the origin of the need for portable instruments of analysis. Level of difficulty: 4. Portable analysis instruments with monoparameters and multiparameters, their advantages, disadvantages and main manufacturers and suppliers. History of the introduction and use of such instruments in our territory. Level of difficulty: 4. Introduction to chromatography methods, their discovery, development and classification. Level of difficulty: 5. A summary of chromatographic separation theory. Column chromatography. Level of difficulty: 4. Thin layer chromatography. Chromatographic process scheme. Chromatographic peak and its parameters. Level of difficulty: 4. Gas chromatography techniques and equipment. Detectors in gas chromatography. Level of difficulty: 4. Gas-liquid chromatography: features of the chromatography process and apparatus. High efficiency liquid chromatography. Level of difficulty: 4. The following topics are recommended for practical classes: 1. Determination of the concentration of suspended particles in the air of production facilities and cities using the Fluke 983 portable instrument. Level of difficulty: 3 2. Using the Testo 300 / testo 300 LL Gas Analyzer instrument to study the control of the amount of O2, CO and CO2 exhaust gases in the atmosphere and in enterprises. Level of difficulty: 4 3. Field-based study of portable instrument measurement and control methods for concentrations of nitrogen oxides in atmospheric air and exhaust gases. Level of difficulty: 4. 4. Measurement of the concentration of hydrogen sulfide (H2S), sulfur dioxide, methane and ammonia gases in the atmosphere and exhaust gases using a

Exams and assessment formats	Two written midterm assessments (30 minutes each), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass.
Reading list	1.Karimov B.Q. Tahlilning instrumental usullari. Tashkent, TIQXMMI, 2020, 154b. 2.Инструментальные методы анализа: лаборатор. практикум: [учеб.-метод. пособие] / [В. И. Кочеров, И. С. Алямовская, Н. Е. Дариенко, С. Ю. Сараева Т. С. Свалова, А. И. Матерн]; под общ. ред. С. Ю. Сараевой; М-во образования и науки Рос. Федерации, Урал, федер. ун-т. - Екатеринбург : Изд-во Урал, ун-та, 2015. - 96 с. ISBN 978-5-7996-1385. 3.Инструментальные методы анализа веществ и материалов: метод. указания / сост. [И. А. Платонов и др.]. – Самара: СГАУ, 2015. – 36 с. 4.Ельцов И. В., А.А. Нефедов. Словарь специализированных терминов по дисциплине «инструментальные методы анализа». Учебно-методическое пособие. Новосибирский государственный университет, 2013, 62с. 5.Information sources 6. www.nature.uz
Module designation	SWT3104 – Sanitation and wastewater treatment
Semester(s) in which the module is taught	6
Person responsible for the module	Associate professor, PhD Malokhat Abdukodirova Prof., Dr. Maria Radkevich
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 120 Contact hours: lecture - 30, practical lessons – 30, self-learning – 60, hours
Credit points	4
Required and recommended prerequisites for joining the module	Ecology and environmental protection, Environmental biotechnology, Drinking water supply, Multi-purpose water resources use protection

Module objectives/intended learning outcomes	To know and understand: - methods of human and environmental protection from wastewater arising in the process of providing sanitary facilities, technological processes, atmospheric precipitation. - device and principles of calculation of engineering networks and auxiliary equipment of sewerage systems; - principles of techno-economically justified choice of effective sewerage system of settlements and agro-industrial complexes. To be able to: - choose methods and facilities for wastewater treatment. - perform calculations of elements of treatment facilities. - draw up schemes of wastewater treatment facilities, design sewerage systems independently. - calculate elements of sewerage networks. - graphically represent engineering networks of sewerage systems. - select and calculate basic parameters of mechanical, - physical-chemical and biological treatment facilities. To form competences in: - wastewater quality assessment. - calculations of operation mode and parameters of treatment facilities. - carrying out research and analyses of facilities operation and know the principles of rational use of sewerage facilities. - calculations of sewerage engineering systems. - selection of standard equipment for completion of sewerage engineering networks. - graphical representation of engineering networks and treatment facilities.

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Importance and function of sewerage. History of development and current state of sewerage. Basic concepts and terms. Sewerage facilities. Significance of sewerage in solving problems of water resources protection and sanitary-epidemiological safety. The role of sewerage in ensuring the welfare of settlements. Water law. Water law on environmental protection and water resources use. Level of difficulty: 2 Classification of sewerage systems. Classification of sewage systems. Internal and external sewers. General composition and main elements of constructions. Classification of sewerage systems. System-wide and separate systems. Conditions of application, disadvantages, and advantages of systems. Conditions of wastewater discharge into the sewerage system. Level of difficulty: 2 Calculation of municipal and industrial wastewater consumption. Familiarisation with construction regulations. Wastewater rationing in canalised and non-canalised settlements. Non-uniformity coefficients. Dependence of wastewater standard on water consumption rate. Wastewater norms for different industries. Determination of design water consumption. Level of difficulty: 2 Designing external sewerage networks. Tracing of the network. Sewerage facilities. Outdoor sewerage networks. Main parts and elements of external sewerage networks. Sewerage network system. Tracing of the network. Schemes of sewerage networks. Factors in the selection of schemes. Perpendicular, transverse, zonal, radial schemes. Level of difficulty: 2 Hydraulic accounting of sewerage networks. Flow rate, degree of filling and slopes in pipes. Movement of wastewater in a sewerage network. Shapes of cross-sectional surfaces of pipes and channels. Depth of pipe embedment. Basic formulae in performing hydraulic calculation of a tipper sewerage network. Hydraulic friction coefficients, local resistance along the length and width. Finding the water flow rate in the calculated sections. Filling rate of the pipe. Self-cleaning rate in a pipe, minimum slope and diameter. Level of difficulty: 3 Making a longitudinal profile of sewerage networks. Making up a longitudinal section of a grid. Basic rules of sewerage network arrangement. Material of pipes and devices used in the sewerage network. Their disadvantages and advantages. Methods of pipe connection. Level of difficulty: 3 Structures of sewerage networks. Sewerage network structures. Functions and types of observation wells. Crossing of networks with natural and artificial obstacles. Fundamentals of design and calculation of sewage pumping stations. Determination of the pumping station location. Level of difficulty: 4 Composition and characteristics of wastewater. Composition and properties of wastewater. Colloidal, dissolved and insoluble substances in wastewater. Sanitary and chemical analysis of wastewater. Types of contaminants in wastewater. Bacteriological and biological impurities. Classification of industrial wastewater by contamination. Level of difficulty: 3 Determining the required level of wastewater treatment. Determining the concentration of wastewater contamination. Conditions and rules of wastewater discharge into a water body. Process of self-purification of water in nature. Use of wastewater for irrigation. Methods of treatment of municipal wastewater. Installations of mechanical wastewater treatment. Process of self-purification of water bodies. Conditions of wastewater discharge into water bodies. Level of difficulty: 3 ● Methods of wastewater treatment. Method and essence of mechanical

Exams and assessment formats	One written midterm assessment (30 minutes), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass
Reading list	1.Djalilova A.Yu., Xamidov A.O., Abduqodirova M.N. «Kanalizatsiya va oqova suvlarni tozalash» fanidan o'quv qo'llanma. Toshkent – 2012 y -200 bet. 2.Mackenzie L. Davis. Water and Wastewater Engineering: Design Principles and Practice. McGraw-Hill Education: New York, 2010-356p. 3.Абукадирова М.Н., Радкевич М.В., Шипилова К.Б. «Канализация и очистка сточных вод» учебное пособия , Т.2021-240 с 4.Einschlag F.S.G., Carlos L.(eds.) WasteWater: Treatment Technologies and Recent Analytical Developments. InTeOp, 2013. - 204 pages 5.Londong Ing. J. Hentze Abwasserbehandlung. Weiterbildnes Studium Wasser und Umwelt Unterrichtsmaterialen. 5. Auflage. Bauhaus-Universitaet Weimar. 2013. 496 S.
Module designation	EJM 3205 Modeling of ecological processes,
Semester(s) in which the module is taught	6
Person responsible for the module	Doctor of technical sciences, professor Arifjanov A.M., doctor of technical sciences. Samiyev L. N.
Language	Uzbek, Russian
Relation to curriculum	Elective
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total workload: Auditorium Hours: Lecture – 30 hours. Practical training – 30 hours
Credit points	5
Required and recommended prerequisites for joining the module	Physics, Mathematics, Theoretical Mechanics, Hydraulics, Ecology, Water Resources Management, Terrestrial Hydrology

Module objectives/intended learning outcomes	-about the universe as a holistic, physical object and its evolution, about the theoretical unity of the Natural Sciences, its incompleteness and further development, about the principles of proportionality and conservation laws, about their changes in nature and over time, the peculiarities of objects in nature, the principles of the emergence and development of living systems, the ecological principles of Rational Use and conservation of nature, , the interconnectedness of biological components of ecosystems and abiotic and biological factors, methods of scientific research in the field of Ecology and the environment, treatment of natural and okava waters, assessment methods and an idea of the main environmental problems; - theoretical and experimental scientific research methods in the sciences of physics, chemistry, ecology, means and methods of measuring the environment and the harmful effects of human physical, chemical and biological agents, principles of substantiating complex measures to eliminate the negative consequences of the impact of water on the natural environment and agriculture, harmless and resource-efficient technologies in the use of nature. - assessment of the state of the environment and its components, water, soil, air, solving various environmental issues, finding solutions to improve the natural environment and objects, planning the use of nature, performing calculations of damages caused by the pollution of nature and the sharp reduction of its resources, physical and conducting scientific research on hydraulic models, using simple models of various reclamation systems in production conditions. -Must have the skills to determine the need for natural resources and choose technologies for their use, choose technologies for the use of monitoring systems and techniques, justify, and evaluate safe technologies for the use of natural resources in water and agriculture, monitor experimental and production systems and evaluate the obtained results.
Content	The purpose of the science of modeling processes in the ecosystem is to evaluate and predict the consequences of changes occurring in the ecosystem with the help of modeling. In order to achieve this goal, the subject fulfills the tasks of forming the independent calculation of various methods based on the teaching of ecological processes to the students.
Exams and assessment formats	One midterm (30 minutes) and final oral exam (60 minutes), short, computerized test, written homework, and self- study
Study and examination requirements	Requirements for successfully passing the module. The total maximum score will be the sum of the points allocated to the final exam (60%), Midterm (24%), homework (24%) and classroom activity (12%). In order to successfully pass the subject, a student must score 60% or more of the allotted points.

Reading list	1. Арифжанов А.М. Экологик жараёнларни моделлаштириш – Тошкент, 2011.-106 б. 2. Ю.А.Афанасьев и др. Мониторинг и методы контроля окружаюшей среды – М.Издательство МНЭПУ, 2001 – 332 с. 3. Арифжанов А.М. Гидравлик ва гидрологик жараёнларни моделлаштириш. Дарслик. Тошкент. – 2022й. 120б. 4. Hubert Chanson (2004) Environmental Hydraulics of open channel flows (Butterworth –Heinemann: Oxfort, UK), 634pages. 5. Латипов Қ.Ш., Арифжанов А.М., Файзиев Х., «Гидравлика», Тошкент. ТАҚИ, 2015й. -388б 6. T. Kaletova, A. Arifjanov “Hydromechanika”, Nitra, 2019y, -160 pages.
Module designation	Environmental safety. EX4205
Semester(s) in which the module is taught	8
Person responsible for the module	Mirkhosilova Zulfiya Kuchkarovna - doctor of philosophy (PhD) in technical sciences, associate professor.
Language	In Uzbek, Russian languages
Relation to curriculum	Elective
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total workload: 150 hours Auditorium hours: 60 hours Lecture - 30 hours. Practical training - 30 hours Hours of independent study are 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	Biology, geography, chemistry, soil science
Module objectives/intended learning outcomes	To know and understand: - environmental problems in the biosphere, lithosphere, hydrosphere and atmosphere; - classification of hazardous natural processes; - regulatory legal acts in the field of environmental safety. - the procedure for conducting environmental expertise. To be able to: - making decisions to eliminate environmental problems; - methods for calculating the order of operation of dust collecting equipment; - methods of conservation of water resources; - designing the boundaries of the sanitary protection zone. To form competences in: - making decisions to ensure environmental safety; - comparison of the amount of dust and gas with acceptable standards; - solutions for troubleshooting in the environment; - methods for calculating the height of the pipe from which smoke from harmful gases comes out; - methods for calculating the amount of harmful substances in the atmospheric air.

Content:	Basic concepts of environmental safety science. Environmental problems in the biosphere, atmosphere, lithosphere and hydrosphere. Natural dangerous processes. Environmental pollution by various wastes. Level of difficulty:2 Classes related to water structures. Economic use of underground and surface resources in industry. Environmental problems in Uzbekistan. The main directions of ensuring environmental safety. Level of difficulty: 2 Environmental expertise. The ecological situation and the main environmental problems in Uzbekistan. Determination of the boundaries of the sanitary protection zone. Calculation of the height of pipes that emit harmful dust and gases. Calculation of the aerosol of a harmful substance emitted into the atmosphere. Calculation of the concentration of harmful substances emitted by enterprises into the atmospheric air Level of difficulty: 3
Exams and assessment formats	To fully master the theoretical and methodological concepts related to science, be able to correctly reflect the results of the analysis, independently observe about the processes being studied and carry out tasks and tasks assigned in intermediate forms of control, submit a written work on final control.
Study and examination requirements	Students of successful transition from science The maximum points to be summed will consist of the final exam (40%), the interval control (60%), the sum of the points to be separated. In order to successfully pass the subject, the student must score 60% of the allocated points and collect a high score in it.
Literature list	1. T. Khaydarov, Z. Mirkhasilova Ecological safety. Mannual, 2021. 2. S. Gazinazarova, I. Akhmedov, A. Khojiyev. Environmental safety. Mannual, 2015. 3. Mustafoyev S., Artykov S., Suvanov R. General ecology. T.: "Science", 2010, 294 p.
Module designation	GME 3205, Hydrometry
Semester(s) in which the module is taught	6
Person responsible for the module	1. Nazaraliyev Dilshod Validjanovich, a candidate of agricultural sciences, docent. 2. Mansurov Safar Raxmankulovich PhD for technical sciences, senior teacher 3. Kodirov Sobir Mamadiyorovich, senior teacher
Language	Uzbek, russian
Relation to curriculum	elective
Teaching methods	lecture, lesson, lab works
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload:150. Lecture and lessons:60 lectures - 20 lessons - 30 lab works - 10. self-study hours -90
Credit points	5 credits
Required and recommended prerequisites for joining the module	Computer graphics and engineering, Chemistry, Algebra, Physics, Geodesy, Hydraulics, Hydrology and hydrogeology, Hydrology, Meteorology and Basic climatology

Module objectives/intended learning outcomes	- Knowledge: familiarity with information, theory and/or subject knowledge - Skills: cognitive and practical abilities for which knowledge is used - Competences: integration of knowledge, skills, and social and methodological capacities in working or learning situations7 Students know that/know how to/are able to understand: - regulations of river flow formation, hydrological research methods, water reservoirs, their distribution and balance, natural and chemical properties of terrestrial waters, river basin and network, formation of river basin and network, river basin and network knowledge of influencing factors, sources and flow of saturation and hydrological regimes. - to determine and analyze the data on the form and size parameters of rivers, the factors influencing the formation of river flow volume, the methods of expressing the river flow, the classification of river saturation from the climatic point of view and according to the sources of saturation, to acquire the skills of types, equipment, structure of water gauging stations, water level observations, water flow rate measurement, water and turbidity discharge and volume determination, current and modern hydrometric tools;
Content	The purpose of teaching of this course is student have to understand methodology and technology of measuring the main parameters of water resources, the geographical location and condition of water resources on the planet Earth, the assessment and analysis of factors affecting them, and the ability to apply them in practice.
Exams and assessment formats	Two oral Midterm assessments (40 minutes each) and one final oral exam (80 minutes), short computer-based quizzes, take-home written assignments
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 60% performance on exams, 10% quizzes, 10% take-home assignments, 10% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	1. Akbarov A.A., Nazaraliev D.V., Xikmatov F.Kh. «Hydrometrics» manual, Tashkent, 2015,154 p. 2. Hydrology: tutorial book for higher education / V. H. Mikhailov, S. A. Dobrolyubov. – M.; Berlin: Direct-Media Publishing House, 2017. – 752 p. 3. Melnikova T.N. workbook. Maykop – 2012. 153 p.
Module designation	SM+A 3205 Statistical methods and analysis
Semester(s) in which the module is taught	6 semesters
Person responsible for the module	Professor Pulatov A.S.
Language	Uzbek, Russian
Relation to curriculum	elective This module is not shared with other study programs
Teaching methods	Lecture and seminar
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 150 hours. Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 30 hours lectures and 30 hours seminars. Private study including examination preparation, specified in hours8: 90 hours

Credit points	5
Required and recommended prerequisites for joining the module	Mathematics, Physics
Module objectives/intended learning outcomes	Key question: what learning outcomes should students attain in the module? - collecting, managing, describing data, and preparing them for analysis and conclusions. - to have an idea about the relationship of events and the law of probability and different manifestations of random changes. - know and be able to use modelling methods to analyze general statistics and statistics of ecosystems, compare model parameters and justify results. - being able to explain the errors of ecological models; should have the skills to evaluate the quality and results of ecological models and to select the sample size for it;
Content	As a result of the study of this module, graduate students are required to know about ecological systems, their changes because of various influences, to model these changes based on physical and mathematical formulas, to implement models through computer programs and to draw conclusions based on the results.
Exams and assessment formats	Two Midterm assessments (80 minutes each) and one final exam (80 minutes), take-home written assignments
Study and examination requirements	Requirements for successfully passing the module the final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	1. Richard L. Scheaffer, III William Mendenhall, R. Lyman Ott, Kenneth G. Gerow - Elementary Survey Sampling-Cengage Learning (2011) 2. Gema Fernández-Avilés, José-María Montero (auth.), Emilio Porcu, José–María Montero, Martin Schlather (eds.) - Advances and challenges in space-time modelling of natural events (2012)
Module designation	PR3108 - Qualification Internship
Semester(s) in which the module is taught	6
Person responsible for the module	Associate professor, PhD Razzakov Ruslan, PhD Shipilova Kamila
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	practical lesson
Workload (incl. contact hours, self-study hours)	Total workload: 240 Contact hours: practical lessons – 240.
Credit points	8

Required and recommended prerequisites for joining the module	Introduction to specislity, Ecology and environmental protection, Environmental law, Sewerage, and wastewater teatment, Environmental monitoring, Waste managament.
Module objectives/intended learning outcomes	After completing the internship, the student To knows and understands: - development and implementation of processes for quality control of production and environmental control of activities. - planning of production processes and resources necessary for the implementation of production processes and environmental control. To be able to: - be able to develop methods and mechanisms for monitoring and assessing the quality of production processes. - control of production processes for compliance with the requirements of environmental protection and labor safety. - implementation of engineering and design solutions. - quality management in the production process. To form competences in: - organization of the work of the team of performers. - making managerial decisions in the face of different opinions. - organization and management of the work of the main design, technological or production unit. - drawing up a plan for the work performed and monitoring this work, planning the resources necessary to perform the work, evaluating the results of their work. -must be able to control the compliance of production processes with the requirements of the environmental and labor safety control system.

Content: The discipline includes the following topics.	The internship is carried out after the end of the sixth semester in the third ear, after studying the theoretical course of the discipline Environmental Monitoring, Waste Management, Environmental Law, Sewerage and Wastewater Treatment and is designed to consolidate theoretical knowledge and master profile, instrumental and experimental methods for studying natural ecosystems. The objectives of the practice are to study the organization's activities in the field of ecology, environmental protection and climate change, environmental features of the area and mastering the professional skills of conducting environmental field research and processing field material. For internship, students work daily according to the schedule for 6 hours in accordance with the calendar plan. For the successful completion of the production practice, each student is attached to a specialist from production. Students are distributed by the leader from the university to the district inspections of ecology and environmental protection. Before starting work on the assignment in practice received from the department, together with the head of practice from the organization, draws up a calendar plan for the internship, approves it from the head of practice from the university, the student gets acquainted with his duties at the place of practice (location, climatic conditions, basic ecosystems, the presence of a manufacturing enterprise in the area), undergoes an introductory safety briefing and briefing at the workplace, conducts oncology and study with regulatory environmental documentation. Performs all types of work provided for by the program of industrial practice and the calendar schedule, in a timely manner. Systematically provides the manager with information about the work performed (keeps records of observations, research results, etc.). Collects the necessary materials for the preparation of documentation. At the end of the internship, he submits to the department a report on the implementation of the internship program, certified in the prescribed manner by the head of the department.
Exams and assessment formats	Following the results of the internship, students are required to: • provide an internship diary • prepare and protect reports based on the collected data. The final practice is defended at a meeting in the presence of a commission appointed by the head of the graduating department. The student is given 10 minutes to report on the results of the practice. Then he can be asked questions about the internship program, after which the commission gives the student a score on a 100-point system.
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% defence of the internship report, 40 % participation in the internship, 20% completion of the internship diary and report. Students must have a final grade of 60% or higher to pass

Reading list	1.O‘zbekiston Respublikasining «Tabiatni muhofaza qilish to‘g‘risida»gi qonuni 2. Экологик нормативлар лойиҳаларини ишлаб чиқиш ва келишиш тартиби тўғрисидаги Низоми. 21.01.2014 й. 3. O‘zbekiston Respublikasi Qizil kitobi /Красная книга Республики Узбекистан, в 2-т. - T.: “Chinor ENK”, 2009 y. 4. Вазирлар Маҳкамасининг 2020 йил 7 сентябрдаги 541-сонли Атроф-муҳитга таъсирни баҳолаш механизмини янада такомиллаштириш тўғрисида қарори 5. Vazirlar Mahkamasining 2021-yil 12-apreldagi O‘zbekiston Respublikasi hududida atrof tabiiy muhitni muhofaza qilishning iqtisodiy mexanizmlarini yanada takomillashtirish to‘g‘risidagi 202-son qarori 6.https://eco.gov.uz/ru/legislation/index?legislationCategoryId=1&page=5&per-page=6
Module	
Module designation	AMT4110 - Environmental impact assesment
Semester(s) in which the module is taught	7,8
Person responsible for the module	Phd, Razzakov Ruslan, Shipilova Kamila.
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, practical lesson, cours work, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 300 Contact hours: lecture - 50, practical lessons – 70, self-learning – 180, hours
Credit points	10
Required and recommended prerequisites for joining the module	To master the course, Bachelor Students must have basic knowledge in” Ecology and Environmental Protection”, “Waste managament”, “Sewerage and wastewater treatment”, “Environmental monitoring”, “Instrumental methods of analysis".

Module objectives/intended learning outcomes	As a result of mastering the discipline, the student: To knows and understands: - Knows how to characterize the state of the environment. - knows the basics of environmental impact assessment, is able to understand, present and critically analyze basic information in the field of ecology, environmental protection and climate change - Knows the natural conditions and properties of environmental components, changes in the state of the environment, the nature, scale and significance of impacts, the scheme for determining the importance of impacts. - Assesses and makes decisions on the environmental impact, considering the role of assessment in the decision-making system To be able to: - knows and can solve global and regional geoecological problems; owns methods of landscape and geoecological design, monitoring and expertise - Knows the natural conditions and properties of environmental components, changes in the state of the environment, the nature, scale and significance of impacts, the scheme for determining the significance of impacts. - Makes decisions about the environmental impact using an assessment in the decision-making system. To form competencies in: - possess methods of environmental design and expertise, methods of processing, analysis and synthesis of environmental information and use theoretical knowledge in practice - analyzes the compliance of pre-project stages and post-project stages with the general principles of EIA. - can conduct monitoring and environmental audit using regulations and the results of strategic environmental assessment and strategic assessment;

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Basics of Environmental impact assesment. The purpose, objectives and main directions of the science of Environmental impact assesment. Level of difficulty: 1 Basic concepts and principles of environmental impact assessment basic principles of environmental impact assessment: primacy, complexity, democracy. Level of difficulty: 1 General outline of the environmental impact assessment process. Elements of the environmental impact assessment process. Community involvement and consideration of alternatives. Level of difficulty: 2 The initial stages of the environmental impact assessment process. Methods and procedures for selecting projects for impact assessment definition of impact assessment tasks. Methods for determining significant effects. Level of difficulty: 2 Forecasting and assessment of the significance of environmental impact characteristics of the state of the environment: description of natural conditions and environmental components Level of difficulty: 2 Consultations and public participation in the environmental impact assessment process. The concept of public participation. The concept of "public" refers to public groups. Level of difficulty: 3 Consideration of alternative options for the project (activity) in the process of environmental impact assessment Level of difficulty: 3 Documentation of environmental impact assessment and quality control. Level of difficulty: 3 Environmental impact assessment and decision-makin. Level of difficulty: 3 Post-project stages of environmental impact assessment. Level of difficulty: 4 Strategic environmental impact assessment. Purpose and subject of strategic environmental impact assessment. Level of difficulty: 4 Environmental impacts resulting from agricultural activities and ways to reduce them. Level of difficulty: 4 Environmental impact as a result of water management activities and ways to reduce them Level of difficulty: 5 Ecosystem services. Stimulation of ecosystem services (EXR): principles, types of schemes, international experience. Level of difficulty: 5 Environmental audit. Principles, procedure, methodology of environmental audit (EA), international experience. Level of difficulty: 5
Exams and assessment formats	Two written midterm assessments (30 minutes each), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass

Reading list	1. Saloxiddinov A.T. va b. Atrof muhitga bo'ladigan ta'sirni baholash. – Toshkent: Chinor ENK, 2013. 2. Ветошкин А.Г. Инженерная защита атмосферы от вредных выбросов. Учебно-практическая пособия. Инфра-инженерия Москва-Вологда 2016 й. 3. Кудрящева О.В., Ледащева Т.Н. «Методика и практика оценки воздействия на окружающую среду » М-2014. 4. Оценка воздействия на окружающую среду: учебное пособие для студентов высших учебных заведений, обучающихся по направлению "Экология и природопользование" / [В. К. Донченко и др.] ; под ред. В. М. Питулько. Москва: Академия, 2013. 394 с. 5. Anji Reddy Mareddy. Environmental impact assesment Theory and Practice Book-2018 https://www.sciencedirect.com/book/9780128111390/environmental-impact-assessment#book-description 6. John Glasson, Riki Therivel and Andrew Chadwick Introduction to Environmental Impact Assessment Third Edition Taylor & Francis e-Library ISBN 0-415-33837-9. USA, 2005 289 r. Ecological Hazards. Wessex Institute of Technology UK, 2015. 277 r.
Module designation	EP4106 - Environmental protection
Semester(s) in which the module is taught	7
Person responsible for the module	Prof., Dr. Maria Radkevich PhD Kamila Shipilova
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 180 Contact hours: lecture - 30, practical lessons – 50, self-learning – 100, hours
Credit points	6
Required and recommended prerequisites for joining the module	Ecology and environmental protection, Environmental biotechnology, Sewage and wastewater treatment, Waste management, Environmental monitoring
Module objectives/intended learning outcomes	To know and understand: - international and local legislation in the field of environmental protection. - principles of sustainable development and basics of rational management of natural resources. - status of air, water and soil pollution problems, as well as ways to reduce pollution. To be able to: - use principles of evaluation of sustainable development indicators. - use rules of organisation of recycling water supply systems, principles of selection of dust and gas purification methods and facilities. - use principles of organisation of flora and fauna protection. To form competences in: - assessment of natural resource endowment; calculation of water footprint. - selection of various dust and gas separation devices and calculation of their parameters. - evaluation of flora and fauna protection measures.

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Theoretical foundations of environmental protection. Goals and objectives of science. Resources of the biosphere and human influence on them. Theoretical bases of environmental protection. Organisational and legal bases of environmental protection. Measures to prevent the global ecological crisis. Level of difficulty: 2. Principles of rational nature management and sustainable development. Fundamentals and principles of rational nature management. Resource cycle. Principles of sustainable development. Concept and goals of sustainable development (SDGs). SDGs related to nature conservation. Interrelation of the concepts of "sustainable development" and "rational nature management". Level of difficulty: 2. Basics of water resources protection. Water footprint and methods of its detection. The concept and essence of water footprint. Options for reducing water footprints while preserving water resources. Problem of water pollution by oil products. Picking up oil from the waterline. Water treatment from oil products in industrial conditions. Level of difficulty: 3. Reduction of water consumption in production Directions of water use in production. Closed and circulating water supply systems in production. Principles of building a closed water supply system. Methods of wastewater treatment. Directions of wastewater reuse. Level of difficulty: 3. Sources of atmospheric air pollution. Classification of sources of atmospheric air pollution. Methods of controlling emissions of harmful gases and dust. Properties of production powders. Classification and efficiency of dust-collecting equipment. Level of difficulty: 4. Equipment for purification of powdery gas mixtures by dry methods. Classification of equipment for chemical cleaning of powdery gaseous mixtures. Chambers in which gravity dust sits. Inertial dust collectors. Structure, principle of action. Rotating dust collectors. Dust collectors working under the action of centrifugal forces. Types of cyclones. Beehive dust collectors. Dust collectors with filter. Fabric filters. Fibre filters. Level of difficulty: 4. Dust retention in electric field. Dust cleaning on electrostatic precipitators. Types of electrostatic precipitators, principles of operation. Material of electrodes. Determination of basic parameters. Level of difficulty: 4. Equipment for cleaning dust and gas mixtures by chlorine methods. Equipment for boiler gases washing. Scrubber with nozzle. Scrubbers for plaster and foam. Impact driven inertial gas cleaning equipment. Doyle scrubber. Gas cleaning equipment driven by centrifugal forces. Cyclones. High velocity gas cleaning equipment. Venturi scrubber, Calvert scrubber. Mechanical scrubbers. Level of difficulty: 4. Methods of sorption purification of gases. Types of sorption purification. Gas adsorption processes. Production of adsorbents. Types of adsorbers. Absorption of gases. Conditions of absorption. Requirements for absorbents. Barbotage absorbers. Spray absorbers. Level of difficulty: 4. Basics of soil protection. State of soil resources in the Republic of Uzbekistan. Causes of soil degradation. Erosion. Pesticide pollution. Waste pollution and its elimination. Pollution by oil products. Principles of soil protection from pollution. The concept of recultivation. Level of difficulty: 3. Fundamentals of fauna and flora protection. State of fauna and flora protection in the country. Principles of conservation and reproduction of rare species. Preservation of animal migration routes. Protected natural territories in Uzbekistan. Functioning of the centre "Jeyran". Danger of introduction of alien plant species. Principles of preservation and reproduction of forests. Level of difficulty: 3. The following topics are recommended for practical classes: 1. Assessment of the region's natural resource endowment. Level of difficulty: 2. 2.Assessment of the level of environmental pollution in the process of biofuel production compared to fossil fuels. Level of difficulty: 2. 3.Determination of water footprint value. Level of difficulty: 2. 4.Estimation of water supply system closure in the production process. Level of difficulty: 2. 5.Calculation of oil trap parameters. Level of difficulty: 2. 6.Calculation of flotation equipment parameters. Level of difficulty: 3.

Exams and assessment formats	One written midterm assessment (30 minutes), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass
Reading list	1. Радкевич М.В. Охрана природы. Учебник. Ташкент: НИУ ТИИИМСХ, 2023. – 308 с. 2. Ветошкин А.Г. Инженерная защита атмосферы от вредных выбросов. Учебно-практическое пособие. — 2-е изд. доп. и перераб. — М.: Инфра-Инженерия, 2016. — 316 с 3. Ветошкин А.Г. Основы процессов инженерной экологии. Теория, примеры, задачи. СПб.: Лань, 2014. -512 с. 4. Дорожко С., Малькевич Н., Морзак Г. Технические основы охраны окружающей среды. Учебное пособие, 4 тома. — Минск: БНТУ, 2012. — 1197 с 5. Дульзон А.А. Парадокс устойчивого развития. М.: Триумф, 2018. — с. 264
Module designation	MYR4106 Land reclamation, recultivation and protection
Semester(s) in which the module is taught	7
Person responsible for the module	Mamataliev Adkham Boymirzaevich, Associate professor
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson.
Workload (incl. contact hours, self-study hours)	Total workload: 180 hours. Contact hours: 80 hours: - lecture – 30 hours. - exercise – 50 hours. Private study including examination preparation, specified in hours[9]: 100 hours.
Credit points	6
Required and recommended prerequisites for joining the module	Engineering Geodesy, Chemistry, Soil Science, Geology and hydrogeology, Hydrology, meteorology and basic climatology Hydraulics

Module objectives/intended learning outcomes	To know and understand: - rational and efficient use of land. - irrigation of of agricultural crops. - modern irrigation methods and irrigation techniques, - water sources and their management. - causes of waterlogging and salinization of soils. - improvement of land reclamation. - lands to be recultivated and stages of recultivation; - soil pollution factors; - restoration of degraded lands; - recultivation and protection of land resources. To be able to: - adopting the irrigation regime of agricultural crops. - application of irrigation methods and techniques according to conditions. - evaluation of land that is unhealthy in terms of land reclamation. - identification of degraded lands. - determination of directions for land recultivation. - determination of soil pollution protection measures. - irrigation erosion and development of complex measures against it. To form competences in: - development of an irrigation regime appropriate to the conditions. - the correct choice of water-saving irrigation technologies and methods. - determination of measures for the rehabilitation of saline lands. - development of new lands. - restoration of degraded lands. - use of lands prone to erosion. development of measures against soil pollution. - determination of soil protection measures.
Content	Basic information about irrigation and irrigation systems, Irrigation regime of agricultural crops, Irrigation methods and irrigation techniques of agricultural crops, Efficiency value of canals and system, Water wastage in canals, Drainage reclamation, Reclamation measures against land salinity, Drainage in irrigated lands, Land degradation, Land recultivation, Erosion and riddance of them, Protection of soil from pollution, Land reclamation of understanding and flooded lowland area, Protection of irrigated land from floodings, irrigation by wastewater, Chemical land reclamation.
Exams and assessment formats	e.g. two oral Midterm assessments (20 minutes each) and one final oral exam (40 minutes), short computer-based quizzes, take-home written assignments
Study and examination requirements	Requirements for successfully passing the module. e.g. the final grade in the module is composed of 60% performance on exams, 10% quizzes, 10% take-home assignments, 10% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	Mamataliev A.B. Land reclamation, recultivation, and protection. “Ilm-ziyo-zakovat” publishing house. Tashkent 2019. 224 p.
Module designation	HFX4205 Safety of life activities
Semester(s) in which the module is taught	7

Person responsible for the module	Khojiev Aliakbar Abdumannopovich – Doctor of Philosophy (PhD) in technical sciences, associate professor. Mirkhosilova Zulfiya Kuchkarovna – Doctor of Philosophy (PhD) in technical sciences, associate professor.
Language	In Uzbek, Russian languages
Relation to curriculum	Elective
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total load – 120 hours. Auditorium hours – 60 hours. Lecture – 30 hours. Practical training – 30 hours. Self-study – 90 hours.
Credit points	5
Required and recommended prerequisites for joining the module	Chemistry, physics, mechanics, geography
Module objectives/intended learning outcomes	Students will have an idea about principles, methods and means of ensuring safety, sanitary and labor hygiene requirements in water industry production, types of emergency situations, their causes, principles, methods and methods of saving and saving people and material assets in emergency situations, as well as the causes of fire, their prevention and extinguishing organizational and technical means. Students will learn regulations adopted in the field of life and activity safety, causes of occurrence of dangerous and harmful production factors and methods of their prevention, sanitary-hygienic standards, the main ones observed in the use, maintenance and repair of electrical devices, equipment, machines and mechanisms technical safety requirements; they will be able to carry out quick emergency rescue operations in the event of an emergency and know and use emergency procedures.
Content	The aim is teaching students the causes, characteristics, consequences, and rules of their elimination, creating safe working conditions, protecting the population from natural, man-made, ecological and other emergency situations, teaching them theoretical and practical protection and the rules of providing first aid to the injured.
Exams and assessment formats	There is one midterm control (30 minutes) and a final written exam (80 minutes), a short, computerized test and written homework.
Study and examination requirements	The total maximum score will be the sum of the points allocated to the final exam (60%), Midterm (20%), homework (20%) and classroom activity (20%).

Reading list	1. T. Haydarov, A. Khojiyev, N. Saidhojayeva. Life safety. – "Fidokor yosh avlod", Textbook, 2022.– 322 p. 2. E.I. Ibragimov, S. Gazinazarova, O.R. Yuldashev. Labor protection special course. Textbook. -T.: TIIM, 2014.-536 p. 3. H. Goyipov. Life safety. –T.: "Yangi asr avlodi", 2007. – 264 p. 4. Belov A.V. Life safety. M.:2007.-616 p.
Module designation	HSB4205 Basin water resources management
Semester(s) in which the module is taught	8
Person responsible for the module	Docent Ravshan Boyirov Senior lecturer Sobit Mamatov
Language	Uzbek, Russian
Relation to curriculum	Selection
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture - 30, practical lessons –30, self-learning – 90, hours
Credit points	5
Required and recommended prerequisites for joining the module	To master the course, Bachelor Students must have basic knowledge in geology and hydrogeology, hydraulics, irrigation, and reclamation, Multi purposes water resources use.

Module objectives/intended learning outcomes	The purpose of teaching science is to teach students the theoretical foundations, basic concepts and categories of their knowledge of Water Resources at the basin level, the conflicts that the use of water resources can be inherent in the period and ways to solve them, as well as methods of their implementation in practice. scientific fundamentals of managing and Planning Water Resources at the basin level, organizing, saving, and reserving their effective use different view of water in nature, their distribution and location. causes and sources of pollution of Water Resources. the need to use water wisely and sparingly. purpose and necessity of basin management of Water Resources. imbalance in the distribution of Water Resources with respect to time and space water resources available in the World, Central Asia and Uzbekistan. the main scientific and technical problems and tasks of water supply of economic sectors and ecosystems at the basin level. conditions for the operation of water facilities. changes in the chemical composition and quality of water in its natural state and because of anthropogenic action. regulatory documents, regulations, legal documents and other information related to the state and Interstate Water Fund. basic national and international laws on the management and use of Water Resources. mathematical modeling of the processes of Water Resource Management and its use. compilation of extreme models of certain processes of water uses and execution of high-quality books within the framework of the created model. high-level programming languages, data warehouse, software and programming technology, computer graphics. comprehensive measures to eliminate the negative impact of water cell activities on natural muchit; fundamentals and methods of Basin warfare and planning of Water Resources. application of the principles of current legal acts when drawing up plans for the national and International Water Fund. environmental justification of the water management complex project. predicting the impact of water management activities on the environment. justification of the goals of accounting and management of Water Resources and complex measures of their rational use and protection. to carry out research in the field of basin management and planning of Water Resources

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Introduction to the science of Watershed Management and planning of Water Resources. Level of difficulty: 2 Organization and development of Basin organizations. The essence and advantages of basin management of Water Resources. Level of difficulty: 4 Legal, organizational, socio-economic, environmental foundations and opportunities for basin management of Water Resources. Level of difficulty: 3 Watershed management planning process. Level of difficulty: 2 Development and approval of water resource basin management plan (Basin Plan). Level of difficulty: 5 Monitoring and evaluation of implementation of Basin plans. Level of difficulty: 1 Necessary costs in the development and implementation of Basin plans. Level of difficulty: 2 Conflicts that take place in the process of using water resources and ways to solve them. Level of difficulty: 3
Exams and assessment formats	Two written midterm assessments (30 minutes each), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	Saloxiddinov A.T. Suv resurslarini havzaviy boshqarish va rejalashtirish. – Toshkent: TIQXMMI, 2018. – 126 b. Grafton R.Q., Hussey K. Water resources planning and management. Cambridge University Express. 2011-366p. https://doi.org/10.1017/CBO9780511974304 Jean Burton. Integrated water resources management on a basin level. UNESCO, 2003. - 244 p. Integrated water resource management and river basin planning. Cambridge University Press DOI: https://doi.org/10.1017/CBO9780511998065.002 Методическое пособие по созданию Бассейновых советов. – Алмааты, ПРООН, 2013. - 48 стр.
Module designation	ARI4205 Environmental resources economics,
Semester(s) in which the module is taught	7
Person responsible for the module	associate Ph. D Yunusov Iskandar
Language	Uzbek
Relation to curriculum	selection
Teaching methods	Lecture, practical training

Workload (incl. contact hours, self-study hours)	Total workload: - 150 hours Auditorium Hours: Lecture - 30 hours; Practical training- 30 hours Independent education - 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	For example: Ecology end environmental protection, Environmental biotechnology, Resource economics
Module objectives/intended learning outcomes	The main purpose of the study of science is to study the economic assessment of the rational use of the environment and resources. Student: - Economic reforms in the Republic of Uzbekistan; regulatory guidelines for the use of water and land resources, documents under the law and law; socio-economic characteristics of resource use; the role of resources in the development of Republican water economy; the relationship between production and state in agriculture and water industry knowledge of modern methods of resource management - creation of an ecological resource; environment and resources rational development and development of margin analysis options; environment and economic resources related to the economy; creation of favorable conditions for economic development. - students studying issues of analysis and conclusion; economist of Muammolarin solution is as necessary as buzlgan education for his time and development of malakalariga iga kerak.
Content	Issues to be studied are the role of resources in the development of the Republican water economy; environmental and economic characteristics of resource use; the use of marginal analysis in comparing options for rational use of the environment and resources; economic assessment of the environment and resources; the formation of practical skills about the economic assessment of factors affecting the efficiency of water use.
Exams and assessment formats	Educational results are evaluated in a 100-point rating system. One midterm (60 points) and final oral exam (40 points)
Study and examination requirements	Requirements for successfully passing the module. To pass the subject successfully, the student must score 60% or more of the allotted points.
Reading list	1. Djalolov S.Ch., Mirzaeva M.S., Mirzaev S.S. Atrof muhit va resurslar iqtisodiyoti. – O'quv qo' llanma. – Toshkent, 2011. – 222 b. 2. Tietenberg, T., Lewis, L. (2012) Environmental & Natural Resource Economics 9th Edition.
Module designation	YIQ4205 Green economy,
Semester(s) in which the module is taught	7

Person responsible for the module	associate professor Ph. D Sultanov Bakhodir Fayzullaevich
Language	Uzbek, Russian
Relation to curriculum	selection
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total workload: - 150 hours Auditorium Hours: Lecture - 30 hours. Practical training- 30 hours Independent education - 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	For example: Theory of economy, Irrigation and reclamation, Soil science, Environment protection, Geoinformation systems and technologies.
Module objectives/intended learning outcomes	Purpose of the subject is to teach indicators of "Green economics" assessment, comparative study of models of transition to "Green economics" formed in world practice, formation of knowledge and skills on development of "Green economics" in Uzbekistan. - To have an idea about the rules of formation of green economics in the economy of the Republic of Uzbekistan, the importance of the economy and the current situation. - Comparative analysis of the nature of "Green economics" and "green growth" and the approaches recommended by them, to know the production criteria for the transition to green energy, and to be able to analyse and evaluate the indicators of international organizations for evaluating its scale using them. - To know about leading countries of the world have "Protection of the organization, the creation of a concentration on the implementation of the national program, the implementation of the acquisition of the skills of comparative control of best practices.
Content	Issues to study- "Green economics" development, ecological control and production mechanisms of its implementation, sustainable directions of transfer to "Green economics" and comparative orientation of foreign experience.
Exams and assessment formats	Educational results are evaluated in a 100-point rating system. One midterm (60 points) and final oral exam (40 points)
Study and examination requirements	Requirements for successfully passing the module. To pass the subject successfully, the student must score 60% or more of the allotted points.
Reading list	. 1. A.V. Vahabov, Sh.Kh. Khajibiyev, etc. Yashillar Darslik. / T.: "University", 2020. - 262 p. 2. Adrian C. Newton. Introduction to the Green economics: 1st edition. Routledge, 2014. - 382 p. 3. Greening the Global Economy (Boston Review Originals) Hardcover - 2015 November 13. - 176 r. 4. Sevil Acar, from Erinch Yale. Guide to Green economics: 1st edition 2019. - 250 r. 5. Vashchalova T.B. Ecological changes. Ustoychivoe razvitie: uchebnoe posobie. - M.: Yurayt, 2020. - 186 p.
Module designation	Emergencies and civil protection HFX4205
Semester(s) in which the module is taught	7

Person responsible for the module	Khojiev Aliakbar Abdumannopovich - Doctor of Philosophy (PhD) in technical sciences, associate professor. Associate professor Saidkhonova Nazokat Joldasovna
Language	In Uzbek, Russian languages
Relation to curriculum	Elective
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total load: 150 hours Auditorium hours: 60 hours Lecture - 30 hours. Practical training - 30 hours Hours of independent study are 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	Biology, chemistry, medicine
Module objectives/intended learning outcomes	To know and understand: - general principles of civil protection in emergency situations. - classification of emergency situations. -system of regulatory legal acts on emergency situations. - methods of protection against natural and man-made emergencies. To be able to: - carry out rescue work in economic sectors and settlements; - make civil defense plans; - organize training in civil defense structures; - calculate the necessary forces and means for carrying out rescue operations.. To form competences in: - using personal protective equipment; -prompting decision-making in the organization of search and rescue operations; - providing emergency assistance to victims; - using radiation and chemical control devices; - calculating evacuation time and developing its plan.
Content	The purpose, objectives and basic concepts of the subject of emergency situations and civil defense. Classification and description of emergency situations. Earthquake and avalanches. Causes and prevention measures of floods and mudslides. Epidemiological, epizootic and epiphytotic emergencies, causes of occurrence and measures to eliminate the consequences. Level of difficulty: 5 Traffic accidents. Accidents at chemically hazardous facilities. Accidents at facilities with a fire and explosion hazard. Accidents in power and utility systems. Hydraulic accidents. Environmental emergencies, causes and features of their occurrence.Level of difficulty: 3 Planning of civil defense measures in emergency situations. Weapons of mass destruction, their impact factors and losses. Concepts of sustainability. The concept of sustainable functioning of economic facilities in emergency situations. Methods and procedures of rescue operations in the centers of emergency rescue operations. Moral and psychological preparation for actions in emergency situations. Level of difficulty: 5
Exams and assessment formats	To fully master the theoretical and methodological concepts related to science, be able to correctly reflect the results of the analysis, independently observe about the processes being studied and carry out tasks and tasks assigned in intermediate forms of control, submit a written work on final control.

Study and examination requirements	Students of successful transition from science The maximum points to be summed will consist of the final exam (40%), the interval control (60%), the sum of the points to be separated. In order to successfully pass the subject, the student must score 60% of the allocated points and collect a high score in it.
Literature list	1. Nigmatov I., Tojiyev M. Emergencies and Civil defense. Academic textbook – Tashkent.: Economy-Finance, 2011, 260p. 2.Yunusov M.Yu., Ikromov E.J. Civil Defense-constant necessity. – Tashkent.: 2002. 3. 3. Khojiyev A., Tillayev Sh. Kurbanov A. Emergencies and civil protection. – Tashkent.: Study mannual, 2021.– 166 p.
Module designation	SIB4205 Integrated water resources managament
Semester(s) in which the module is taught	8
Person responsible for the module	Docent Ravshan Boyirov Senior lecturer Sobit Mamatov
Language	Uzbek, Russian
Relation to curriculum	Selection
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture - 30, practical lessons –30, self-learning – 90, hours
Credit points	5
Required and recommended prerequisites for joining the module	To master the course, Bachelor Students must have basic knowledge in geology and hydrogeology, hydraulics, irrigation, and reclamation, Multi purposes water resources use.
Module objectives/intended learning outcomes	The purpose of teaching the subject is to teach undergraduates the issues of water resource management, multi – purpose integrated management of Water Resources at the basin level in conditions where certain water resources are limited and water requirements are increasing, as well as the correct assessment of available opportunities. • water resource accounting systems in the world and Central Asia, water facilities - distribution of rivers, lakes, reservoirs and glaciers, surface and groundwater reserves and resources, operational water resources, hydrometric network designed to take into account River Water Resources, the use of local flows and the basics of water facility protection. • forecasts for the return of succulent and low periods in water sources, short and long-term predictions of river flow, monthly data on the amount of precipitation in the winter period and an assessment of the wateriness of its rivers for the growing season, images of the study of winter precipitation, snow reserves, methodological data. annual renewable aquaculture resource assessment • calculation of water balance in natural and artificial water bodies, assessment of hydrologicquality of collected river waters by hydrochemical indicators, assessment of potential exploitation resources of groundwater by Trunk River basins, prediction of changes in river flow due to human economic activity, drawing up a plan for water use at the lower level of management.

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Important issues of Integrated Water Resource Management. Level of difficulty: 2 Implementation of Integrated Water Resource Management. Level of difficulty: 3 Development of a strategic vision in the integral management of Water Resources. Level of difficulty: 4 Water resource management planning: Level of difficulty: 1 Development of an integrated water resource management work plan: Level of difficulty: 4 Stakeholder participation in the development of an integrated water resource management work plan: Level of difficulty: 4 Water resource status analysis in the water resource management planning process. Water resources management strategies and options: Level of difficulty: 5 Preparation and approval of an Integrated Water Resources Management Plan: Level of difficulty: 5 Public participation in the integral management of Water Resources. Management of Water Resources in agriculture: Level of difficulty: 3 Water resource monitoring and their assessment: Level of difficulty: 4 Managed aquifer recharge. Benefits and challenges: Level of difficulty: 5
Exams and assessment formats	Two written midterm assessments (30 minutes each), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	1. R. Quentin Grafton, Karen Hussey Water Resources Planning and Management Cambridge University Press Cambridge, UK, 2011. 249 r. 2. Toolbox IWRM. GWP, second version, email: www.gwpcacena.net 3. Салохиддинов А.Т., Икромов Р.К., Темирова М.Н. Управление водными ресурсами. Учебное пособие. Тошкент, 2015 - 246 стр. 4. Saloxiddinov A.T., Raximov N.R. Suv resurslarini integrallashgan boshqarish asoslari. 2018 y. 136 b. 5. Духовный В.А. Управление водными ресурсами Центральной Азии – на пути водно-энергетическому согласию Т. НИЦ МКВК 2010 – 41 стр. 6. Мирзаев Н.Н. Руководство по внедрению интегрированного управления водными ресурсами. Том 1. Институциальные аспекты Ташкент-2012 г. 152 с
Module designation	EAU4205–Environmental audit
Semester(s) in which the module is taught	8
Person responsible for the module	Phd, Razzakov Ruslan
Language	Uzbek, Russian
Relation to curriculum	Elective
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture - 30, practical lessons – 30, self-learning – 90, hours
Credit points	5

Required and recommended prerequisites for joining the module	To master the course, Magister Students must have basic knowledge in" Ecology and Environmental Protection", "Environmental impact assesment", "Environmental monitoring", "Environmental biotexnology", "Environmental rights".
Module objectives/intended learning outcomes	To know and understand: - Know the principles, goals and objectives of environmental audit. - Know the problems of practical implementation of environmental audit and ways to solve it. - Know the regulatory documents regulating the organization of industrial and technological environmental work, the principles of environmental infrastructure. To be able to: - Be able to apply environmental research methods in solving typical professional tasks. - Be able to analyze the compliance and inconsistencies in the activities of economic entities with the requirements of legislation, environmental standards, and norms. - Be able to apply the principles of ecological infrastructure in the reconstruction of territories and restoration of polluted landscapes. To form competences in: - Have an environmental audit procedure in order to ensure sustainable development. - Possess the skills of planning and conducting an environmental audit (including drawing up programs and plans, collecting, evaluating, analyzing and documenting audit evidence, presenting audit results in accordance with the international standard ISO 19011) - Have the skills to develop an action plan for monitoring compliance with environmental requirements based on environmental regulations

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Introduction. The general concept of environmental audit. Criteria for mandatory audit of organizations and enterprises. The place and role of environmental audit in the overall system of auditing activities. The procedure, forms, and methods of environmental audit. Level of difficulty: 1 Risk assessment methodology and environmental regulation. The concept of risk, its main types. Comparison of risk values in various sectors of the economy. The main indicators of risk assessment, their identification. Main methodological approaches and stages of environmental risk assessment Level of difficulty: 1 Legal and regulatory and methodological support of environmental audit. International and national standards for environmental audit Level of difficulty: 2 The procedure for conducting an environmental audit. Rights and obligations of the participants of the eco-audit. The procedure (stages) of the eco-audit. The main sources of information for conducting an environmental audit Level of difficulty: 2 Environmental certification system. Forms of confirmation of conformity of certification objects. Voluntary environmental certification. Mandatory environmental certification. Level of difficulty: 3 Information support of environmental audit. Sources of information formation for environmental audit, the order of environmental accounting of the enterprise Level of difficulty: 3 The following topics are recommended for practical classes: The importance of environmental audit for the analysis of environmental protection activities of agricultural enterprises. Level of difficulty: 4 Responsibility of persons and audit organizations conducting environmental audits Level of difficulty: 4 Types of eco-audit (classification by users of the results, by the degree of detail of the analyzed indicators, by direction) Level of difficulty: 4 Methods of collecting information during an environmental audit. The structure of the ecoaudit conclusion. Level of difficulty: 4 Objects of environmental certification Level of difficulty: 5 Organization of environmental accounting of enterprises, its main features and principles. Level of difficulty: 5 The main recommendations on the procedure for providing environmental information in domestic and foreign practice. Level of difficulty: 5
Exams and assessment formats	Two written midterm assessments (30 minutes each), take-home written assignments and one final oral exam (40 minutes).
Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass.
Reading list	1. Environmental audit. Theory and practice [Electronic resource]: Textbook for university students / I. M. Potravny [et al.]; ed. by I. M. Potravny. - Environmental audit. Theory and practice; 2022-03-26. - Moscow: UNITY-DANA, 2017. - 583 p. - License until 26.03.2022. - ISBN 978-5-238-02424-0. URL: http://www.iprbookshop.ru/81591.html 2. Environmental management and environmental audit: textbook / E.A. Vasilyeva, L.M.Isyanov - Irkutsk 2016 – 75 p. 3. Environmental audit: textbook / L.M. Bazavlutskaya, Alekseeva L.P., Korneev D.N. - Chelyabinsk: Publishing House of A. Miller Library CJSC. - 2022 – 137 p . 4. 5.
Module designation	REI4205 Resource economics
Semester(s) in which the module is taught	7

Person responsible for the module	associate Ph.D Yunusov Iskandar
Language	Uzbek,Russian
Relation to curriculum	selection
Teaching methods	Lecture, practical training
Workload (incl. contact hours, self-study hours)	Total workload: - 150 hours Auditorium Hours: Lecture - 30 hours. Practical training- 30 hours Independent education - 90 hours
Credit points	5 5
Required and recommended prerequisites for joining the module	For example: Theory of economy, ecology end environmental protection, Soil science.
Module objectives/intended learning outcomes	The main purpose of studying the science of" resource economics " is to provide students with theoretical knowledge that allows them to rationally use the natural resources and natural conditions that exist in our country in the conditions of modernization of the economy, and to prepare qualified specialists who can apply theoretical knowledge in practice. The effective use of available resources in the conditions of scarce resources, the study of the features of their impact on sustainable management, preservation and conservation, the provision of knowledge in the field of international cooperation in the restoration, protection and prospects of ecological and economic management methods and management systems, nature.
Content	As a result of mastering science, the student: • To have an idea of the importance of resource use in the economy of the Republic of Uzbekistan, its current state, the laws of the formation of business planning; (knowledge) • Be able to know and use the content of regulatory legal acts that regulate the activities of the resource economy, indicators for the analysis of production in the planning of the enterprise and the norms of assessment; (skill) • Must have the skills to solve situational issues in resource economics, put and solve issues of eliminating the problems of financial recovery of the enterprise. (qualification
Exams and assessment formats	Educational results are evaluated in a 100-point rating system. One midterm (60 points) and final oral exam (40 points)
Study and examination requirements	Requirements for successfully passing the module. To pass the subject successfully, the student must score 60% or more of the allotted points.
Reading list	1. T. D.D. Dusmuratov, A.S. Sultanov, U.R. Sangirova, S.R. Umarov Suu khajaligi ekonomiki. // Darslik. T.: 2017. 225 B. 2. Lukyanikov N.N., Potravin I.M. Economics and organization of prorodopolzovaniya. - M.: Troika, 2000. 3. Sultanov B.F. Rural land reclamation measure in samaradorligi. Monograph. - T.: "Thinking", 2019. - B.240. 4. Tietenberg, T., Lewis, L. (2012) Environmental & Natural Resource Economics 9th Edition.
Module designation	EM-4205 Ecological modelling
Semester(s) in which the module is taught	6 semesters

Person responsible for the module	Professor Pulatov A.S.
Language	Uzbek, Russian
Relation to curriculum	Elective This module is not shared with other study programs
Teaching methods	Lecture and seminar
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 150 hours. Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 30 hours lectures and 30 hours seminars. Private study including examination preparation, specified in hours10: 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	Ecology and environmental protection, Environmental biotechnology Geology and hydrogeology
Module objectives/intended learning outcomes	Key question: what learning outcomes should students attain in the module? - to have an idea about ecological modelling elements, modelling processes, model types, evaluation parameters, ecological modelling theory. - to know and be able to use ecological systems and their changes as a result of various influences, to model these changes based on physical and mathematical formulas, to implement models through computer programs, and to draw conclusions based on the results. - must have the skills to conduct lectures and propaganda work within the boundaries of his professional activity;
Content	As a result of studying the science of "Ecological Modelling", undergraduates will be able to learn about ecological systems, their changes as a result of various influences, to model these changes based on physical and mathematical formulas, to implement models through computer programs and to draw conclusions based on the results. it is required to know how to conduct.
Exams and assessment formats	Two Midterm assessments (80 minutes each) and one final exam (80 minutes), take-home written assignments
Study and examination requirements	Requirements for successfully passing the module. the final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	(Developments in Environmental Modelling 23) Sven Erik Jørgensen and Brian D. Fath (Eds.) - Fundamentals of Ecological Modelling-Academic Press, Elsevier (2011).
Module designation	IFX4205 Labor protection
Semester(s) in which the module is taught	8
Person responsible for the module	Khaydarov Tuygun Anvarovich, Candidate of technical sciences, associate professor
Language	In Uzbek, Russian languages
Relation to curriculum	Elective
Teaching methods	Lecture, practical training

Workload (incl. contact hours, self-study hours)	Total load: 150 hours Auditorium hours: 60 hours Lecture - 30 hours. Practical training - 30 hours Hours of independent study are 90 hours
Credit points	5
Required and recommended prerequisites for joining the module	Biology, chemistry, mechanics
Module objectives/intended learning outcomes	Student will have an idea and knowledge of the dangers arising in production activities and their study, creation of safe working conditions in production processes, study of measures that reduce occupational diseases and prevent accidents in the technosphere, carrying out rescue and recovery work of citizens in the hearths of lesions, carrying out measures on fire safety, industrial sanitation and occupational hygiene, as well as knowledge that can help victims in the provision of primary health care Acquires such skills as the latest and basic data on the requirements of legislation and other regulatory legal acts adopted in the field of ensuring safe working conditions, methods of preventing the occurrence of hazardous and harmful production factors, organization of hygienic standards of microclimate at work.
Content	Teaching students the causes of occurrence, properties, consequences, and measures to eliminate hazards arising in the labor process, methods of creating safe working conditions, the basic requirements of legislation in the field of ensuring working conditions, risks arising in production activities, measures to reduce occupational diseases in the technosphere and directed precautionary measures to prevent accidents.
Exams and assessment formats	There is one midterm (30 minutes) a final written exam (80 minutes), a short, computerized test and written homework.
Study and examination requirements	The total maximum points awarded will be the sum of the points allocated to the final exam (60%), Midterm (20%), homework (20%) and classroom activity (20%).
Literature list	1. Mark A., Friend P., Fundamentals of Occupational safety and health. Bernan Press.Germany, 2007 2. B.I.Akhmedov. Safety in production processes. “Ilod-press”, 2021. 472 p. 3. E.I.Ibragimov, A.A. Khojiev, N.S.Saidkhojaeva. Labor protection. Study mannual.-Tashkent.: TIIAME, 2019.-166 p. 4. O.R.Yuldashev, R.R.Nurmamatova. Labor protection. Academic textbook. Tashkent.: 2021. 669 p. 5. T.A.Khaydarov. Safety of production and technological processes. Study mannual. Tashkent.: 2021. 156 p.
Module designation	SRB4205 Water resources management
Semester(s) in which the module is taught	8
Person responsible for the module	Docent Ravshan Boyirov Senior lecturer Sobit Mamatov
Language	Uzbek, Russian
Relation to curriculum	Selection
Teaching methods	Lecture, practical lesson, self-learning

Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture - 30, practical lessons – 30, self-learning – 90, hours
Credit points	5
Required and recommended prerequisites for joining the module	To master the course, Bachelor Students must have basic knowledge in chemistry, Hydraulics, Hydrology, meteorology and basic climatology, Geology and hydrogeology, Drinking water supply
Module objectives/intended learning outcomes	Water Resources Management means increasing its operational capabilities in order to carry out a fuller use of source water. Therefore, the ability of a society to manage its water resources is an indicator that it has scientific and technological progress. Water resources are made up of water found in the air, above ground and underground. • scientific methodological foundations of water management, rational and excellent use of Water Resources in developed irrigation farming conditions, on the structure and composition of the Earth, geological processes and phenomena, analysis of the laws of adaptation and movement of groundwater resources, the law of unity of natural waters, circulation and interdependence of waters in nature, Water Resource Management.; • water Resource Management Planning, s uv resource management planning features, water resource management and planning stages, Water Resource Management, the main tasks of research and production in the field of integrated and basin management, active participation in water resources and their fields.; • should have the qualification of studying the specificity of the balance and regime of groundwater, analyzing geological and mukhandis–geological phenomena and processes occurring in irrigated areas and construction sites, studying factors affecting the formation of river flows, analyzing the foundations of water and land rights.
Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	Content, subject and method, basic concepts of the science of Water Resource Management. Level of difficulty: 1 Water resources of the world, their distribution by continent. Quantitative description of water. Level of difficulty: 3 Water farm balance. The principle, style and forms of drawing up the water farm balance. Estimates of the balance of Water Resources. Level of difficulty: 4 Participants of the water farm complex Level of difficulty: 3 Improving the quality of Water Resources. Environmental and sanitary water transfer issues. Level of difficulty: 5 Suv resurslarini boshqarish zarurati, asoslari va usullari. Suv resurslarini boshqarishda fan va texnika yutuqlaridan foydalanish. Level of difficulty: 2 Water Resources Management Planning. Water resources management planning features. Water Resources Management and planning steps. Level of difficulty: 3 Effects of climate change on Water Resources and water utility. Level of difficulty: 4 Water farm and water protection measures: justification of their composition, size, place and time of implementation. Level of difficulty: 5 The concept of transboundary, interstate and mahaly water bodies. International conventions. Rationalizing and perfecting the use of Water Resources. Level of difficulty: 3 Development of Water Resource Management. Modern approaches to water resource management: integrated and basin management. Level of difficulty: 1
Exams and assessment formats	Two written midterm assessments (30 minutes each), take-home written assignments and one final oral exam (40 minutes).

Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 60% performance on exams, 20% take-home assignments, 20% in-class participation. Students must have a final grade of 60% or higher to pass
Reading list	1. Salohiddinov A.T., Boyirov R.Q., Milov K., Taha R., Zigler D. Suv resurslarini havzaviy boshqarish va rejalashtirish. Toshkent 2020 y. 2. Salohiddinov A.T. Suv resurslarini havzaviy rejalashtirish va boshqarish. Toshkent 2020 y. 3. Salohiddinov A.T., Raximov N.R. Suv resurslarini integral boshqarish asoslari. 2018 y. 136 b. 4. R.Quentin Grafton, Karen Hussey "Water resources planning and management", London 2011, Cambridge University Press p.423
Module designation	ERB 4205 - Environmental risks assessment
Semester(s) in which the module is taught	8
Person responsible for the module	Prof., Dr. Maria Radkevich
Language	Uzbek, Russian
Relation to curriculum	Elective
Teaching methods	Lecture, practical lesson, self-learning
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture - 30, practical lessons – 30, self-learning – 90, hours
Credit points	5
Required and recommended prerequisites for joining the module	To master the course, students must have basic knowledge in" General ecology and Environmental Protection", "Environmental impact assessment", "Environmental monitoring".
Module objectives/intended learning outcomes	To know and understand: main elements of environmental risk analysis. - basic normative levels of environmental risk. - the concept of acceptable risk. - normative documents regulating risk assessment of various types of activities. - the essence, composition and purpose of health risk assessment. To be able to: - carry out multicomponent assessment of environmental risk in cities and industrial zones. - calculate and assess the risk to public health according to international methods. - allocate the most dangerous zones for living and life activity of adult and child population. To form competences in: - assessing the environmental risk arising in the functioning of cities and industrial zones. - carrying out ecological rationing of technogenic impacts and loads on the environment,.

Content: The discipline includes the following topics. The level of difficulty: (1 – low, 5 high):	The concept of environmental risks and their spatial and temporal manifestations. Ecological risk and its manifestations in different regions of the planet. Criteria of ecological risks, ecological disaster. Characteristics of crisis territories (separate continents, cities, local areas). Level of difficulty: 2. Methods of quantitative assessment of ecological risks. Methods of calculation of ecological risks associated with chemical pollution of the environment. Scheme calculation scheme: hazard identification, exposure-effect models, quantitative characterisation of risks, hazard to public health and biota. Level of difficulty: 2. Environmental risks in cities and industrial areas. Environmental problems and situations in urban conditions. Hazardous phenomena. Analysis of anthropogenic load on the territory of the city. Urban typology. Natural complex in the conditions of the city. Geo-ecological problems of cities. Categories of lands of cities and industrial zones by purpose purpose. Level of difficulty: 2. Health risk assessment of urban population. Health risk assessment in the system of environmental risk assessment in foreign practice. The essence, composition and purpose of health risk assessment. The essence, composition and purpose of health risk assessment. Health risk assessment by reduction of life expectancy. The main geo-ecological factors of health risk for urban residents. Level of difficulty: 3. Main stages of health risk assessment. Tasks and composition of works at the stage of hazard identification. Criteria for prioritisation of chemical substances for health risk assessment. Estimation of exposure of pollutants on a person. Integrated air exposure equation. Dose-response relationships. Threshold and threshold-free concepts in health risk assessment. Level of difficulty: 3. Measures to prevent environmental risks associated with anthropogenic pollution. Measures to prevent negative consequences and reduce environmental risks. Choice of ways to solve problems on minimisation of ecological risks and improvement of ecological state of the environment related to technogenic pollution. Level of difficulty: 2. International legal aspects of regulation environmental risks and principles of minimisation socially and environmentally determined risks. International legal aspects of environmental risk regulation. Principles of environmental optimisation (landscape architecture, solving transport problems in cities, improving the quality of the environment, improving the quality of the environment). transport problems in cities, improving the quality of food systems of the peoples of the world). Level of difficulty: 2. The following topics are recommended for practical classes: 1. Environmental problems and situations in the city. Dangerous phenomena. Level of difficulty: 3. 2. Categories of lands of cities and industrial zones by purpose. Level of difficulty: 3. 3. Analysis of hazardous processes and phenomena in the region using the risk concept. Level of difficulty: 3. 4. Assessment of ecological risk in the design and functioning of technogenic systems using the risk matrix. Level of difficulty: 3. 5. Health risk assessment of exposure to threshold substances. Level of difficulty: 3. 6. Health risk assessment of exposure to hormone-free substances Level of difficulty: 3.
Exams and assessment formats	One written midterm assessment (30 minutes), take-home written assignments and one final oral exam (40 minutes).

Study and examination requirements	Requirements for successfully passing the module: The final grade in the module is composed of 40% performance on exams, 20 % independent work, 20 % practical work, 20 % mid-term control tests. Students must have a final grade of 60% or higher to pass
Reading list	3. Hernandez-Soriano M.C. (Ed.) Environmental Risk Assessment of Soil Contamination. Intech, 2014. — 903 p. 4. Popov G., Lyon B.K., Hollcroft B.D. Risk Assessment: A Practical Guide to Assessing Operational Risks. 2nd edition. — Wiley, 2022. — 1114 p. — ISBN 978-1-119-75594-4. 5. Theodore L., Dupont R.R. Environmental Health and Hazard Risk Assessment: Principles and Calculations. CRC Press, 2012. — 619 p. — ISBN: 1439868875, 9781439868874 6. Белов, С. В. Техногенные системы и экологический риск: учебник для академического бакалавриата / С. В. Белов. — М.: Издательство Юрайт, 2018. — 434 с 7. Рягин, Ю. И. Рискология в 2 ч. Часть 1: учебник для вузов / Ю. И. Рягин. — М.: Издательство Юрайт, 2018. — 255 с.
Module designation	BMI4110 – Prediploma internship
Semester(s) in which the module is taught	8
Person responsible for the module	Associate professor, PhD Razzakov Ruslan, PhD Shipilova Kamila
Language	Uzbek, Russian
Relation to curriculum	Compulsory
Teaching methods	practical lesson
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: practical lessons – 150.
Credit points	5
Required and recommended prerequisites for joining the module	Sewerage and wastewater teatment, Environmental monitoring, Waste management, Environmental protection, Environmental impact assesment.
Module objectives/intended learning outcomes	To knows and understands: - knows how to assess environmental impacts and determine the hazard class for enterprises. types of environmental assessment of enterprises, knows the maximum permissible concentrations in atmospheric air, water, and soil. To be able to: - be able to work with regulatory documents, project structures, environmental impact statements, be able to propose environmental measures and protocols, and be able to collect materials for completing final qualifying work. To form competences in: - be able to monitor the compliance of production processes with the requirements of the environmental control system and labor safety.

Content: The discipline includes the following topics.	Before starting work on the assignment received from the department, together with the head of the practice from the organization, he draws up a calendar plan for the internship, approves it from the head of the practice from the university, the student gets acquainted with his duties at the place of internship, is interviewed. introductory safety instruction and on-the-job instruction, conducts the preparation and study of regulatory environmental documentation. Collects materials for the timely completion of the final qualifying work. Systematically provides the collected materials to the manager. Visits the departments of the organization to get acquainted with the technological process of the enterprise. At the end of the internship, he submits to the department a report on the implementation of the internship program, certified in accordance with the established procedure by the head of the department.
Exams and assessment formats	Following the results of the internship, students are required to: • provide an internship diary • prepare and protect reports based on the collected data. The final practice is defended at a meeting in the presence of a commission appointed by the head of the graduating department. The student is given 10 minutes to report on the results of the practice. Then he can be asked questions about the internship program, after which the commission gives the student a score on a 100-point system.
Study and examination requirements	Requirements for successful internship: The final assessment of the program consists of 100% of academic performance during practice. The minimum score for student certification is 60%.
Reading list	1.Вазирлар Маҳкамасининг 2020 йил 7 сентябрдаги 541-сонли Атроф-муҳитга таъсирни баҳолаш механизмини янада такомиллаштириш тўғрисида қарори 2.Экологик нормативлар лойиҳаларини ишлаб чиқиш ва келишиш тартиби тўғрисидаги Низоми. 21.01.2014 й. 3.Vazirlar Mahkamasining 2021-yil 12-apreldagi O‘zbekiston Respublikasi hududida atrof tabiiy muhitni muhofaza qilishning iqtisodiy mexanizmlarini yanada takomillashtirish to‘g‘risidagi 202-son qarori 4.https://eco.gov.uz/ru/legislation/index?legislationCategoryId=1&page=5&per-page=65.