

Description of the course/module

Organization (institution): KSTU
Course Title: Research and application of software systems in mining
Target Group: PhD Students (Mining)
Type (Required/Optional): Required Part
ECTS credits allocated (if applicable); estimated workload: 5 ECTS (150 academic hours)
Form of education (full-time / distance learning, etc.); number of classroom hours: 45 hours (full-time hours)
Teaching language: Kyrgyz/Russian/English
Prerequisites and related requirements (if applicable): spatial data science, geographic information systems, introduction to geospatial programming, aerial photography and remote sensing, rock movement, English reading skills.
Course Objectives: Formation and acquisition of scientific and technical knowledge of the creation and application of effective software systems in mining.
Learning outcomes: The student will be able to: LO 1: carry out scientific and technical activities to apply and/or create effective software systems with the properties of openness for export/import of information, manufacturability, safety, efficiency and adapted for each enterprise separately, taking into account the existing specifics of mining-geological, mining-technical and geomechanical conditions; LO 2: create a bank of geological and surveying data, scientifically and technically substantiate and create geological and surveying digital models for solving mining and technical problems, develop models of open-pit and underground mine workings and evaluate their reliability, safety, and efficiency; LO 3: it is scientifically and technically sound to develop and/or apply software systems capable of providing database management, pre-processing of initial information, modeling of rock masses and mine workings, design and scheduling of mining operations; LO 4: scientifically and technically substantiate, develop and/or work with regulatory, technical, reference books, and technological documents of a mining enterprise.
Course content: 1. Review and analysis of new software systems at mining enterprises in domestic and foreign countries, patent research of scientific and technical achievements in this area, comparison of their applicability in domestic fields, including: General purpose mining software systems; Specialized mountain programs; Production management systems; Systems for recording (accounting) production results; Visualization of the results obtained using GIS technologies. 2. Practical application of general-purpose software systems for geology, mining planning, surveying and various production needs; 3. Practical application of specialized software systems for areas of technology: optimization of quarries and mines, scheduling, drilling and blasting, ventilation, geomechanics, ecology and others; 4. Practical application of production management software systems in real time: control of mining transport, excavators, drilling rigs, etc.;; 5. Practical application of software systems for recording (accounting) production results in real time and generating various reports.
Recommended or required reading and other learning resources/tools: 1. Lecture materials 2. Course materials will be available through ELMS .

<p>3. Power lecture slides Point are available for download in PDF format from the course website.</p> <p>4. Electronic resources on lecture topics are available on the course website.</p> <p>5. Class notes, recent journal articles, and links related to course topics will be referenced and/or circulated during lectures.</p> <p>6. Texts and reference books on the discipline</p>
<p>Planned training activities and teaching methods:</p> <p>1. Regular and interactive lectures;</p> <p>2. Laboratory and computational problems;</p> <p>3. Individual practical training with materials from mineral deposits;</p> <p>4. 8. Class discussions .</p>
<p>Methods and evaluation criteria:</p> <p>1. Midterm Exam (25%)</p> <p>2. Laboratories and Computing (25%)</p> <p>3. Discussion/participation in classrooms (10%)</p> <p>4. Final exam 40%</p> <p>5. Grades: A, B, C, D, E, Fx, F</p>
<p>Additional information: course teacher - Ph.D., associate professor Umarov T.S., Kazatov U.T.</p>

Authors: Popkov Yu.N., Prokopov A.Yu., Prokopova M.V. Information technologies in mining, textbook, 2007.

Authors: Mambetov Sh.A., Abdiev A.R., Mambetov A.Sh. Mining work in the Tien Shan. monograph, 2013.

Authors: Umarov T.S., Uzbekov T.S., Altybaev S.Y. Experience in implementing the domestic software product Dolon Systems in the mining industry and in the education system Kyrgyz Republic, scientific article, 2023.

Authors: Mambetov Sh.A., Abdiev A.R., Mambetov A.Sh. Mining work in the Tien Shan. monograph, 2013.

Authors: N.V. Fedorova, A.A. Abdiev, A.B. Orokov, U.T. Kazatov, A.R. Abdiev. Experience in using a digital block model of a copper-gold deposit to optimize open-pit boundaries, scientific article, 2023.

Authors: Urmat Kazatov, Bakyt Raimbekov, Rasul Bekbosunov, Bekbolot Ashirbaev, Arstanbek Abdiev, and Azizbek Orokov. Some results of the study of rock properties of the Sulukta deposit, scientific article, 2023.