Name of subject	**CONSTRUCTION AND OPERATION OF AERODROME PAVEMENTS (ECTS 4)**
Subject/module code	**AQQE2020**
Science taught semester (s).	3rd semester
Responsible teacher	Ganiyev Inomjon Gulomovich – head of the department "Road engineering", PhD, professor
Education language	Uzbek
Connection to the curriculum	Elective
Training hours (this including independent education)	**Total hours – 120 hours** **Contact hours – 36 hours** Lecture training hours – 12 hours Practical training hours – 24 hours **Independent education – 84 hours**
Course work	No
ECTS	4
The purpose and tasks of subject / learning outcomes	**The purpose of teaching the subject is** To develop competence for engineering design decisions in construction and operation of asphalt and concrete aerodrome pavements, interpretation of diagnostic evidence, and technical-economic justification of maintenance, strengthening and rehabilitation alternatives. **The objectives of teaching the subject** are To teach students to distinguish between the purposes, scope of application, and conditions for implementing national aviation regulations, ICAO documents, and FAA technical guidance materials; To analyze aircraft loads, subgrade conditions, drainage systems, and geosynthetic solutions based on engineering design data and calculations; To substantiate the technological sequence, quality control checkpoints, and quality assessment criteria for the construction of asphalt concrete and cement concrete airfield pavements; To independently assess pavement surface conditions, structural response, and load-bearing capacity, and to investigate the causes of pavement defects using evidence-based methods; To compare pavement repair, strengthening, and reconstruction alternatives in terms of service life, costs, risks, and operational conditions, and to prepare, present, and defend the findings in a digital engineering report. **Learning outcomes:** 1. Distinguish the scopes of national aviation rules, ICAO documents and FAA guidance and substantiate selected engineering decisions using appropriate sources. 2. Convert aircraft fleet information into a design table of mass, landing-gear configuration, wheel loads and traffic repetitions and explain assumptions. 3. Select and compare base/subgrade and geosynthetic options using soil properties, moisture regime and drainage conditions. 4. Define stages, equipment sequence and quality-control points for asphalt pavement construction and verify compliance of quality results. 5. Develop concrete slab and joint layouts, distinguish the roles of dowels/tie bars, and justify curing and quality control. 6. Separately interpret surface condition from PCI, structural response from FWD and GPR indicators, and compare ACR/PCR where applicable. 7. Classify defects by type, severity and extent, link probable causes to evidence and identify additional data needed for confirmation.

	8. Select maintenance, repair or strengthening options appropriate to pavement condition and operation and justify sequence and work safety. 9. Calculate life-cycle costs under a common analysis period and price basis, test sensitivity to discount rate/service life and justify priorities. 10. Build a verifiable digital table linking condition, cost and timing and defend a rehabilitation program with evidence.
Course content (topics)	**I. Main Theoretical Part (Lecture Sessions).** Topics: 1. Introduction and regulatory framework for aerodrome pavements 2. Pavement foundations and construction-site preparation 3. Construction of asphalt aerodrome pavements 4. Construction of cement-concrete aerodrome pavements 5. Operation and diagnostics of aerodrome pavements 6. Maintenance, repair, strengthening and pavement management **II. Instructions and recommendations for organizing laboratory exercises** Laboratory work is not included in the curriculum **III. Practical training instructions and recommendations** The instructor's preparation for a practical session begins with the study of initial documents (such as the curriculum, topic schedule, etc.) and concludes with the development of a detailed lesson plan. The instructor must have a clear understanding of the objectives and tasks of the practical session, as well as the amount of work each student is expected to perform. Methodological guidelines serve as the primary instructional document for instructors in preparing and conducting practical sessions. The purpose of the practical session is to facilitate the comprehension of theoretical material, the acquisition of practical skills, the ability to consciously apply knowledge in academic and professional activities, and the development of critical thinking and confidence in forming personal viewpoints. *Recommended Practical Topics:* 1. Determine aircraft loads and landing-gear configurations 2. Evaluate subgrade using CBR and deformation indicators 3. Compare geosynthetic applications in aerodrome pavements 4. Prepare asphalt-pavement construction method statement and quality plan 5. Develop concrete slab, joint, dowel and tie-bar scheme 6. Analyse geodetic, laboratory and operational quality results 7. Classify defects and determine PCI 8. Interpret FWD results and perform back-calculation 9. Analyse GPR/NDT layers and anomalies 10. Assess aircraft–pavement compatibility using ACR/PCR 11. Compare repair and strengthening alternatives technically and economically 12. Develop a 5–10 year rehabilitation programme, LCCA and priority matrix **IV. Independent learning and independent work** Independent learning competency helps students to develop self-improvement skills and increase the efficiency of their professional activities. Students perform independent tasks on their mobile devices under the guidance of a teacher, either in traditional or electronic form. Recommended topics for independent work: 1. Compare national aviation, ICAO and FAA pavement documents 2. Build aircraft-fleet load/repetition database 3. Develop subgrade, drainage and geosynthetic alternatives

	4. Prepare technological project for asphalt or concrete pavement construction 5. Integrated diagnostics using PCI, FWD and GPR 6. LCCA of repair, strengthening and reconstruction options 7. Pavement-management and 5–10 year rehabilitation program
Exam form	Written
Teaching/learning and examination requirements	Complete mastery of theoretical and methodological concepts and practical knowledge of the discipline, the ability to correctly reflect the results of analysis, independently reason about the processes being studied and carry out tasks in the current, intermediate forms of control and independent work, pass written work on the final control. When drawing up final exam questions, deviations from the content of the discipline program are not allowed. The bank of final exam questions for each discipline is discussed at the meeting and approved by the head of the department. No later than 1 week before the start of the final control, tickets signed by the head of the department, enclosed in an envelope, are sealed by the Dean's office and opened 5 minutes before the start of the exam in the presence of students. Final exam duration is 80 minutes. Answers to final exam questions are recorded in copybooks with the seal of the Dean's office. After completion of the final work, the work is immediately encrypted by a representative of the Dean's office, and the copybooks are handed over to the commission for verification. From the moment of completion of the final exam, a period of 72 hours is allotted for checking and posting the results on the electronic platform. The teacher who taught the students in this discipline is not involved in the process of conducting the exam and checking the students' answers. Student(s) who are dissatisfied with the final exam results may submit a written or oral appeal within 24 hours of the publication of the final exam results. Complaints submitted after 24 hours from the publication of the final exam results will not be accepted.
Scope of assessment criteria and procedure	CURRENT CONTROL Purpose: Determining and assessing the student's level of knowledge, practical skills, and competencies on course topics. Instructions: The student's activity in daily classes is assessed through the student's mastery of course topics, as well as constructively interpreting and analyzing the educational material, developing module specific skills, acquiring practical skills (in terms of quality and the specified number) and competencies, solving problem situations aimed at applying professional practical skills, working in a team, preparing presentations, etc. Current control form: Activity in lessons; Preparing educational materials; Working with sources within the subject; Using educational technologies; Working in a team Preparing presentations; Working with projects. MIDTERM CONTROL Purpose: Assessing the student's knowledge and practical skills and level of mastery of lecture material after completing the relevant section of the course. Form and procedure of intermediate control: Midterm examination is held during the semester during the training sessions after the completion of the relevant module of the curriculum of the subject. Midterm examination is held once in written form within the framework of this subject. Midterm examination questions cover all topics of the subject. INDEPENDENT LEARNING

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<tr><td></td><td>Purpose: Independent learning is aimed at fully covering the content of this course, expanding the theoretical knowledge acquired, and establishing independent learning activities for students.
Form and procedure of independent education: independent work assignments are completed in the form of an educational project, presentation, case study, problem solving, information search, digest, colloquium, essay, article, abstract, etc. Completed assignments for independent study are placed in the electronic system and checked based on the anti-plagiarism program and evaluated by the subject teacher.
In this case, the uniqueness of the completed assignment should not be less than 60%, otherwise the assignment will not be accepted for assessment. The number of independent work assignments, depending on the nature of the subject, should not be less than 3 for one subject (module). Independent work assignments account for 60% of the points allocated for current and intermediate control.
FINAL CONTROL
Purpose: The final examination is held at the end of the semester to determine the level of mastery of the student's theoretical knowledge and practical skills in the relevant subject. The final examination is held at a specified time according to the examination schedule created by the Registrar's Office on the electronic platform.
Requirements: The student must have passed the current control, intermediate control and independent learning assignments by the deadline for the final control type in the relevant subject. A student who has not passed the current control, intermediate control and independent learning assignments, as well as who has received a score in the range of “0-29,9” for these assignments and control types, is not included in the final control type. Also, a student who has missed 25 percent or more of the classroom hours allocated to a subject without a reason is excluded from this subject and is not included in the final control type and is considered not to have mastered the relevant credits in this subject. A student who has not passed or was not included in the final control type and has received a score in the range of “0-29.9” for this type of control is considered to be an academic debtor.
Final control form: The final examination in this subject will be conducted in written form. If the final examination is conducted in written form, the requirements for assessment must also be reflected.</td></tr>
<tr><td>Criteria for assessing student knowledge</td><td>
<table>
<tr><th>5 grade</th><th>100 points</th><th></th><th>Assessment criteria</th></tr>
<tr><td>5</td><td>90-10</td><td>Excellent</td><td>When a student is considered to be able to make independent conclusions and decisions, think creatively, observe independently, apply the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject, and have an idea about the subject.</td></tr>
<tr><td>4</td><td>70-89,9</td><td>Good</td><td>When the student is considered to be able to observe independently, apply</td></tr>
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				the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject, and has an idea about the subject
	3	60-69,9	Satisfactory	When the student is found to be able to apply the knowledge he has gained in practice, understands, knows, can express, and narrate the essence of the subject, and has an idea about the subject.
	2	0-59,9	Unsatisfactory	When it is determined that the student has not mastered the science program, does not understand the essence of the subject, and does not have an idea about the science.

Course assessment criteria and procedure

Assessment type	Total points allocated	Control (task) form	Distribution of points	Qualifying score
Current assessment	30 points	System tasks	20 points (divided by number of tasks)	18 points
		Student activity (in seminars, practical, laboratory classes)	10 points	
Midterm assessment	20 points	Supervision: writing work	10 points	12 points
		System tasks	10 points (divided by number of tasks)	
Final assessment	50 points	Written assignment (5 questions)	50 points (10 points per question)	30 points

* Note: 60% of the points allocated for current and intermediate control are allocated to independent work assignments. Independent work assignments are evaluated as system assignments through the electronic platform.

Recommended Literature

1. Ganiyev I. Aerodrom qoplamalarining qurilishi va ekspluatatsiyasi. Jizzakh: So‘g‘diyona NMU, 2024. 187 b.

	2. ICAO. Annex 14, Volume I — Aerodrome Design and Operations. 9th ed., 2022. 3. ICAO. Aerodrome Design Manual, Part 3: Pavements. 3rd ed., 2022. 4. Civil Aviation Agency. GM-AGA-011: Procedures for reporting aerodrome pavement strength, 2023. 5. ASTM D5340-24: Standard Test Method for Airport Pavement Condition Index Surveys. 6. FAA. AC 150/5320-6G: Airport Pavement Design and Evaluation. 2021.