Name of subject	AERODROME ENGINEERING (ECTS 6)
Subject/module code	**AEM1106**
Science taught semester (s).	1st semester
Responsible teacher	Ganiyev Inomjon Gulomovich – head of the department "Road engineering", PhD, professor
Education language	Uzbek
Connection to the curriculum	Compulsory
Training hours (this including independent education)	**Total hours – 180 hours** **Contact hours – 54 hours** Lecture training hours – 24 hours Practical training hours – 30 hours **Independent education – 126 hours**
Course work	No
ECTS	6
The purpose and tasks of subject / learning outcomes	**The purpose of teaching the subject is** To develop advanced engineering competence for the systematic planning, geometric design, construction, operation and development of aerodrome and airport infrastructure, integrating ICAO standards, FAA guidance and applicable national requirements. **The objectives of teaching the subject** are to study aerodrome classification, reference codes, and functional layouts; develop forecasts of demand and aircraft fleet composition; select suitable sites, analyze wind conditions, and prepare aerodrome master plans; calculate the geometric parameters of runways, taxiways, aprons, and aircraft stands; assess the load-bearing capacity of aerodrome pavements and select appropriate pavement structures; design surface and subsurface drainage systems; define obstacle limitation surfaces and plan the provision of markings, lighting, and visual navigation aids; analyze capacity and queuing; account for climate resilience, noise, emissions, foreign object debris (FOD), and emergency-related risks; and justify design alternatives based on life-cycle costs and sustainability criteria. **Learning outcomes:** 1. Explain the purpose, scope and relationship of ICAO Annex 14, PANS-Aerodromes, the Aerodrome Design Manual and FAA Series 150 guidance. 2. Select a design aircraft and aerodrome reference code from aircraft characteristics, demand forecasts and service-level requirements. 3. Perform a multi-criteria assessment of an aerodrome site using wind, terrain, geology, environment, land use and transport-access factors. 4. Calculate runway orientation, length, width, longitudinal profile, safety areas and declared distances. 5. Design taxiways, rapid-exit taxiways, aprons and aircraft stands based on safety, capacity and manoeuvrability criteria. 6. Analyse load, soil, climate and material data and select structural solutions for flexible and rigid aerodrome pavements. 7. Design aerodrome drainage, erosion protection and climate-adaptation measures. 8. Lay out obstacle-limitation surfaces, markings, signs, lighting, PAPI and surface-movement guidance elements. 9. Assess aerodrome capacity, queues, FOD, wildlife, noise, emissions and operational risks and develop management measures.

	10. Use GIS/CAD/BIM and calculation tools to prepare an integrated aerodrome master plan, technical-economic justification and professional presentation.
Course content (topics)	**I. Main Theoretical Part (Lecture Sessions).** Topics: 1. Systems introduction to aerodrome engineering 2. Air-transport demand and design aircraft 3. Aerodrome site selection and master planning 4. Runway system and orientation 5. Geometric design of runways 6. Taxiways, rapid exits, aprons and stands 7. Aerodrome pavement engineering I 8. Aerodrome pavement engineering II 9. Aerodrome drainage and climate resilience 10. Visual aids and electrical systems 11. Aerodrome capacity and operational efficiency 12. Safe, sustainable and manageable aerodrome **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. Select design aircraft, reference code and preliminary demand forecast 2. Select runway orientation using wind rose and coverage coefficient 3. GIS-based multi-criteria site-selection map 4. Calculate runway dimensions, profile and declared distances 5. Assess obstacle-limitation surfaces and surrounding objects 6. Design taxiways, rapid exits and separation distances 7. Lay out apron and aircraft stands; check manoeuvring and jet-blast safety 8. Develop a flexible pavement design option 9. Develop a rigid pavement slab/joint design option 10. Assess pavement condition using PCI/PASER or equivalent and propose rehabilitation 11. Develop surface and subsurface drainage scheme 12. Develop functional layout for markings, signs, lighting and PAPI 13. Estimate aerodrome capacity and queues using a simplified model/simulation 14. Multi-criteria assessment of noise, emissions, climate risk and resilience 15. Defend an integrated aerodrome master plan **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. Comparative matrix of ICAO Annex 14, PANS-Aerodromes and FAA Airport Design 2. Demand forecast, design aircraft and reference code 3. GIS-based multi-criteria aerodrome site selection 4. Runway orientation, length and declared distances 5. Taxiway, apron and stand master plan 6. Flexible/rigid pavement design option 7. Drainage, marking and lighting engineering package 8. Noise, emissions and climate-resilience assessment 9. Integrated aerodrome master plan and technical-economic justification
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

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.

Criteria for assessing student knowledge

5 grade	100 points		Assessment criteria
5	90-10	Excellent	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.
	4	70-89,9	Good	When the student is considered to be able to observe independently, apply 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)	

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<tr><td>Final assessment</td><td>50 points</td><td>Written assignment (5 questions)</td><td>50 points (10 points per question)</td><td>30 points</td></tr>
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* 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.
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<tr><td>Recommended Literature</td><td>
1. Ganiyev, I. G. Aerodromlar muhandisligi / I. G. Ganiyev. — Jizzakh: So‘g‘diyona NMU, 2026. 221 b.
2. ICAO. Annex 14 to the Convention on International Civil Aviation. Aerodromes. Volume I: Aerodrome Design and Operations. — 9th ed. — Montréal: ICAO, 2022. — 352 p. — Amendment 18, dated 04.08.2025.
3. ICAO. Aerodrome Design Manual. Part 1: Runways: Doc 9157. — 4th ed. — Montréal: ICAO, 2020. — 98 p. — Amendment 1, dated 24.06.2025.
4. ICAO. Aerodrome Design Manual. Part 2: Taxiways, Aprons and Holding Bays: Doc 9157. — 5th ed. — Montréal: ICAO, 2020. — 186 p. — Amendment 2, dated 30.06.2025.
5. ICAO. Aerodrome Design Manual. Part 3: Pavements: Doc 9157. — 3rd ed. — Montréal: ICAO, 2022. — 146 p.
6. FAA. Airport Design: Advisory Circular AC 150/5300-13B. — FAA, 2022. — Consolidated to include Change 1, dated 16.08.2024, and errata updates as of 03.04.2025. — 413 p
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