Name of subject	HIGHWAY INVENTORY AND ROAD PASSPORTS (4 ECTS)
Subject/module code	**AYP2504**
Science taught semester (s).	5th semester
Module leader	D. G‘ulomov, PhD, Acting Associate Professor, Department of Road Engineering
Education language	Uzbek
Connection to the curriculum	Elective
Training hours (this including independent education)	**Total hours – 120 hours** **Contact hours – 48 hours** Lecture training hours – 24 hours Practical training hours – 24 hours **Independent education – 72 hours**
Course work	No
ECTS	4
The purpose and tasks of subject / learning outcomes	**The purpose of teaching the subject is** to compile and maintain a digital road passport and its linked inventory by collecting, checking and documenting spatial, geometric, technical and condition data for a road and its assets. **The objectives of teaching the subject** are to assign identifiers to roads and assets. Relate chainage to coordinates and map geometry. Check survey records, source documents, photographs and video. Build GIS geometry and attribute tables and record the evidence for pavement, structure and road equipment attributes. Check completeness, accuracy, dates and versions. Use the passport to justify inspections and maintenance needs. **Learning outcomes:** 1. Explain how a technical road passport, an asset inventory and the state road cadastre serve different purposes, how their information is related and which procedures govern official records. 2. Assign unique road, section and asset identifiers and compile a location table specifying chainage limits, direction and coordinate reference system. 3. Record GNSS or other survey observations and documentary evidence with their source, date, method and accuracy. Identify discrepancies requiring verification. 4. Create road alignment and asset layers in GIS, link their attribute tables and check that geometry and identifiers correspond. 5. Inventory road cross-sections, pavements, drainage, bridges, culverts and road equipment using measurements or documented technical descriptions. 6. Enter defects and condition indicators with method, unit, observation date and location. Distinguish photographic evidence from instrument readings. 7. Audit the inventory for completeness, field types, units, duplicate or missing values and spatial consistency. Record errors for correction. 8. Link each new observation to its earlier record and log the reason for the change, date, author and version. 9. Use the passport to generate thematic maps, query condition records and list inspection or maintenance needs. Explain the limits of decisions based on the available evidence. 10. Deliver a student road passport with a map, digital inventory, asset records, metadata and technical report, and defend the individual contribution

Course content (topics)	**I. Main Theoretical Part (Lecture Sessions).** Topics: 1. Purpose and legal basis of road passports. 2. Passport structure and asset identification. 3. Geodetic and GNSS observations. 4. GIS and the digital passport database. 5. Documenting pavements and defects. 6. Pavement condition indicators. 7. Mobile and remote data collection. 8. Geometry, earthworks and highway structures. 9. Inventory of road equipment and traffic infrastructure. 10. Monitoring and updating. 11. Data quality and management decisions. 12. Delivering the digital passport. **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. Define the passport structure. Produce a data dictionary giving the section, field name, meaning, type, unit, source and validation rule. 2. Inventory a road section by chainage. Create a linear referencing table with road and segment identifiers, start and end points, and direction. 3. Verify GNSS or supplied survey points. Reconcile observations with control points and tabulate the reference system, units, accuracy and observation times. 4. Create GIS layers for roads and assets. Deliver a project linking geometry, identifiers, attributes and metadata, plus a log of duplicate and topology errors. 5. Enter defects from field notes, photographs and video. Prepare a table with type, location, date, appearance, evidence for the recorded quantity and a source reference. 6. Describe supplied IRI and other condition data. Record units, segment, method, date and quality flags, and list missing information. 7. Check crack, rut and pothole quantities against scaled images or measurements. Map each verified quantity and its uncertainty. 8. Inventory signs, markings, barriers and road equipment. Link each unique code to its type, orientation, chainage, coordinates, condition and photograph. 9. Prepare asset records for bridges, culverts and drainage. Give the location, source of geometric and technical details, observation date and condition record.

	10. Audit and update the database. Check identifiers, field types, missing values, units and dates. Link the old and new records in a change log. 11. Generate a thematic map and a list of sections requiring inspection. Rank the sections in a table showing selection criteria, evidence and data quality. 12. Assemble and defend the digital student road passport. Submit a GIS project that opens successfully, the inventory, asset records, evidence files, metadata and a consistent technical report. **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. Prepare a passport data dictionary and source plan for one road section. Justify the identifiers, units, dates and validation rules. 2. Reconcile GNSS observations, chainage and photographs. Inventory the road and its assets and investigate duplicate records and positional discrepancies. 3. Build a GIS inventory of road sections, defects and structures. Use identifiers to link documents, coordinates, condition records and photographic evidence. 4. Analyse condition indicators and data quality. Create a thematic map documenting missing values, methods, dates and uncertainty. 5. Use the research review to compare methods of digitising traffic control infrastructure. Assess detection results against field checks and identify sources of inventory error. 6. Complete the digital student road passport. Submit the change log, metadata, verification records, map and technical report, and defend the individual result.
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

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<tr><td></td><td>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 the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject, and has an idea about the subject</td></tr>
<tr><td>3</td><td>60-69,9</td><td>Satisfactory</td><td>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.</td></tr>
<tr><td>2</td><td>0-59,9</td><td>Unsatisfactory</td><td>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.</td></tr>
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<tr><td>Course assessment criteria and procedure</td><td>
<table>
<tr><th>Assessment type</th><th>Total points allocated</th><th>Control (task) form</th><th>Distribution of points</th><th>Qualifying score</th></tr>
<tr><td>Current assessment</td><td>30 points</td><td>System tasks</td><td>20 points (divided by number of tasks)</td><td>18 points</td></tr>
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<tr><td></td><td></td><td>Student activity (in seminars, practical, laboratory classes)</td><td>10 points</td><td></td></tr>
<tr><td rowspan="2">Midterm assessment</td><td rowspan="2">20 points</td><td>Supervision: writing work</td><td>10 points</td><td rowspan="2">12 points</td></tr>
<tr><td>System tasks</td><td>10 points (divided by number of tasks)</td></tr>
<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. Cabinet of Ministers of the Republic of Uzbekistan. Resolution No. 152 of 30 June 2005, Annex 1. Regulations on maintaining the State Cadastre of Highways. The syllabus cites paragraphs 20–24 of the consolidated text dated 23 June 2026. lex.uz
2. G‘aniyev, I. G‘., Bobojonov, R. T. Avtomobil yo‘llarini pasportlashtirish [Highway Inventory and Road Passports]. Textbook. Ilm nuri print, Jizzakh, 2026. 205 pp.
3. Hamilton, I., Richey, D., Himes, S., Chestnutt, C. Model Inventory of Roadway Elements 2.1. Federal Highway Administration, August 2024. FHWA-SA-24-052. rosap.ntl.bts.gov
4. QGIS Project. QGIS Training Manual, version 3.44. Vector data, attributes, topology, forms and coordinate transformations. docs.qgis.org
5. Chang, G. K., Gilliland, A. L., TaghaviGhalesari, A., Rada, G. R., Serigos, P. A., Simpson, A. L., Kouchaki, S. Successful Practices for Quality Management of Pavement Surface Condition Data Collection and Analysis: Final Report. FHWA, February 2023. FHWA-RC-23-0002. www.fhwa.dot.gov
6. Li, M., Li, X., Wu, D., Zou, L., Huang, X. Digitizing and inventorying traffic control infrastructures: A review of practices. Transportation Research Interdisciplinary Perspectives, 21, 2023, 100879. DOI 10.1016/j.trip.2023.100879. www.sciencedirect.com
7. Texas A&M University. CVEN423 — Geomatics for Civil Engineering. Undergraduate Catalog, 2026–2027 Edition. catalog.tamu.edu
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