NAVOI STATE UNIVERSITY

IG11208 CLIMATOLOGY AND HYDROLOGY — COURSE SYLLABUS

Department of Geography | 60530200 Geography Programme

COURSE PASSPORT & ACADEMIC METADATA

Course Title:	Course Code:
Climatology and Hydrology	IG11208
Course Type:	**Field of Study:**
Compulsory Course	500000 Natural Sciences, Mathematics & Statistics / 530000 Physics & Natural Sciences
Programme:	**Academic Year:**
60530200 Geography	2025–2026
Semester:	**Form of Education:**
1–2 (Semesters 1 and 2)	Full-time / Uzbek & Russian
ECTS Credits:	**Total Workload:**
10 ECTS Credits	300 Hours (150 Contact Hours [Lectures & Practicals], 150 Independent Study Hours)
Weekly Contact Hours:	**Assessment:**
4 Hours	Current, Interim, and Final Examinations
Curriculum Code:	**Aligned UN SDGs:**
60530200-1.1	SDG 6 (Clean Water and Sanitation); SDG 13 (Climate Action); SDG 15 (Life on Land); SDG 2 (Zero Hunger)



1. Course Description & Scope

The course 'Climatology and Hydrology' (IG11208) provides comprehensive theoretical and practical training on atmospheric structure, solar radiation distribution, thermal regimes, climate history, climate-forming factors, and climate forecasting, alongside hydrosphere components, hydrological cycle regularities, river regimes, groundwater interactions, and water resource management [cite: 115, 116, 117].

2. Course Aims & Professional Competencies

Course Aim: To equip students with comprehensive knowledge of atmospheric and hydrosphere components, climatic variables, hydrological processes, and environmental interactions, enabling practical application in geographical and ecological research [cite: 115, 116].

Professional Competencies:

• Theoretical Knowledge: Understanding atmospheric stratification, radiation and heat balances, circulation patterns, climate classification, and hydrological regime formation [cite: 115, 116, 117].
• Analytical & Processing Skills: Collecting, processing, and analyzing meteorological and hydrological data, computing water balance indicators, and assessing quantitative water resources [cite: 116, 122].
• Applied & Environmental Competence: Evaluating meteorological influences on hydrological processes, climate change impacts, and sustainable water resource management in Central Asia [cite: 116, 122].

3. Prerequisites

• General Physics and Mathematics [cite: 115]
• Physical Geography of Continents and Oceans [cite: 115]

4. Course Learning Outcomes (CLO)

Code	Learning Outcome Description
CLO 1	Explain atmospheric composition, radiation regimes, circulation factors, and climatic classifications [cite: 116, 117, 118].
CLO 2	Analyze hydrological cycle mechanisms, river feeding sources, runoff dynamics, and groundwater interactions [cite: 116, 119].
CLO 3	Process meteorological and hydrological field data and compute hydrological and climatic indices [cite: 122].

CLO 4	Assess climate change consequences and apply sustainable water resource management strategies for Uzbekistan and Central Asia [cite: 118, 120, 122].

5. Teaching Technologies & Methods

• Interactive lectures and multimedia climate modeling;
• Practical data processing, map analysis, and weather station observation techniques;
• Problem-based learning (PBL), interactive case studies, and group discussions [cite: 122];
• Team projects and scientific presentations.

6. Requirements for Earning Course Credits

Students must fully master theoretical and methodological concepts of climatology and hydrology, successfully complete practical assignments and independent study projects, and pass current, interim, and final written evaluations [cite: 122].

7. Assessment Criteria

Evaluation is conducted on a 100-point rating system across current, interim, and final tests, reflecting comprehensive mastery of atmospheric and hydrological laws, analytical proficiency, and independent scientific reasoning.

8. Recommended Literature & Information Sources

Core Literature:

1. Petrov, Yu. V., Egamberdiyev, H. T., Xolmatjanov, B. M., & Alautdinov, M. (2022). Physics of the Atmosphere [Textbook]. Tashkent [cite: 122].
2. Yunusov, G., & Ziyayev, R. R. (2018). General Hydrology and Climatology [Study Guide]. Barkamol Fayz Media, Tashkent [cite: 122].
3. Xikmatov, F., Aytbayev, D. P., Adenbayev, B. Ye., & Pirnazarov, R. T. (2017). Introduction to Hydrology [Textbook]. Universitet, Tashkent [cite: 122].

Additional Literature:

4. Khromov, S. P., & Petrosyants, M. A. (2006). Meteorology and Climatology. MSU Publishing [cite: 122].
5. Shultz, V. L. (1965). Rivers of Central Asia. Gidrometeoizdat [cite: 122].
6. Sang, N. (2020). Modelling Nature-based Solutions. Cambridge University Press [cite: 123].

Digital Sources:

7. Government Portal of Uzbekistan: www.gov.uz [cite: 123]
8. ZiyoNET Portal: www.ziyonet.uz [cite: 123]

9. UN Sustainable Development Goals (SDG) Alignment

• SDG 6 — Clean Water and Sanitation: Focuses on hydrological monitoring, river runoff assessment, and sustainable water resource management in Central Asia.
• SDG 13 — Climate Action: Addresses climate change monitoring, greenhouse gas tracking, atmospheric dynamics, and adaptation strategies.
• SDG 15 — Life on Land: Evaluates cryosphere dynamics, glacier preservation, and land-water ecological interactions.
• SDG 2 — Zero Hunger: Supports agricultural water supply optimization and drought resilience planning.