MINISTRY OF HIGH EDUCATION, SCIENCE AND INNOVATIONS OF THE KYRGYZ REPUBLIC

OSH STATE UNIVERSITY
INTERNATIONAL MEDICAL FACULTY
DEPARTMENT OF NATURAL SCIENCES AND MATHEMATICS

Training Program (Syllabus)

Specialty (Program):	**General Medicine**	**Course Code:**	**AIHC 301**
Language of Instruction:	English	Course Title:	Artificial Intelligence and Healthcare (AIHC)
Academic Year:	2025-2026	Number of Credits:	3
Instructors:	Dr. Mohd Faizan Sidiqui, MD Dr. Aliia Bazieva, PhD Dr. Ainura Mitalipova, PhD	Semester:	1/2
		Schedule:	**https://myedu.oshsu.kg/#/teacherSchedules** (Mon–Sat)
E-Mail	**abazieva@oshsu.kg** **Faizan@oshsu.kg**	Consultations:	**IMF, rooms 104, 409, 402**
Location:	**According to the schedule, rooms 409, 402**	Mode of Study:	Full-time
Course Type:	B	Course Type	Elective course

Head of the Educational program “General Medicine” M. Bugubaeva,

Associate Professor

Osh 2025

1. Purpose of the Course

The discipline 'Artificial Intelligence and Healthcare' (AIHC) is an elective course (Course Type: B) within the professional cycle of the General Medicine curriculum. This course provides 3rd-year medical students with a foundational and critical understanding of Artificial Intelligence (AI) and Machine Learning (ML) technologies, specifically focusing on their application, evaluation, ethical implications, and regulatory challenges within clinical and hospital settings. The course moves beyond theoretical concepts to prepare future physicians for the practical realities of working alongside AI, emphasizing topics like algorithmic bias, regulatory compliance (SaMD), human-AI teamwork, and the measurement of real-world clinical utility.

2. Course Goals

To form students' ability to critically evaluate and responsibly integrate AI systems into evidence-based medical practice, ensuring patient safety, health equity, and adherence to medical ethics.

3. Course Objectives

a) Develop knowledge of the principles of technical AI evaluation, including metrics like Sensitivity, Specificity, PPV, NPV, and the concept of Model Drift (Concept and Data Drift).
b) Develop skills in identifying and mitigating sources of algorithmic bias (e.g., historical and sampling bias) across the AI lifecycle to ensure health equity and fairness.
c) Develop competency in analyzing the non-technical challenges of AI deployment, including human factors (e.g., Automation Bias) and integration hurdles (FHIR and the 'Zero-Click' philosophy).
d) Foster an understanding of the complex regulatory environment for medical AI, including the concepts of Software as a Medical Device (SaMD), the FDA's Predetermined Change Control Plan (PCCP), and physician liability in the context of Algorithmic Malpractice.
e) Cultivate an ethical framework for practice, emphasizing patient autonomy, the Duty of Disclosure, the Right to an Explanation (XAI), and the principle of Meaningful Human Control (MHC) in AI-assisted clinical decision-making

4. Lecture Plan

Week	#	Lecture Topics	Lecture hours	Lecture participation	Tests or tasks in google classroom	notes	total
Module 1							
1	1	Evaluations of AI in Health Care: Technical Metrics (Sensitivity, PPV, NPV) and Model Drift.	2	1	2	1	4
2	2	AI deployment in Healthcare: Clinical Integration, HER	2	1	2	1	4

Week	#	Lecture Topics	Lecture hours	Lecture participation	Tests or tasks in google classroom	notes	total
		Interoperability (FHIR), and the Zero-Click Philosophy.					
3	3	Downstream evaluations of AI in Health Care: Bias and Fairness: Identifying Algorithmic Bias and Mitigation Strategies.	2	1	2	1	4
4	4	The Regulatory Environment for AI in Health Care: Software as a Medical Device (SaMD), PCCP, and Risk Classification.	2	1	2	1	4
5	5	Best Ethical Practices for AI in Health Care: Patient Autonomy, XAI, Automation Bias, and Algorithmic Malpractice.	2	1	2	1	4
Total hrs / average points			10	1	2	1	4

5. Plan for practical classes

№	week	Practical class topics	Class hrs	Class participation	Tests or tasks in google classroom	notes	total
1st module							
1	1	The AI Diagnostic Audit: Calculating and interpreting clinical performance metrics (PPV, NPV) from a	2	1	2	1	4

№	week	Practical class topics	Class hrs	Class participation	Tests or tasks in google classroom	notes	total
		raw AI report to determine if it is fit for screening. (Evaluation)					
2	2	'Last Mile' Workflow Simulation: Designing a seamless integration of an AI alert system into a hospital EHR, applying the Zero-Click principle to reduce physician burden. (Deployment)	2	1	2	1	4
3	3	Bias Mitigation 'Repair Shop': Analyzing a case where an AI model showed racial or gender bias and proposing data or algorithmic 'fixes' to achieve Predictive Parity. (Bias & Fairness)	2	1	2	1	4
4	4	SaMD Regulatory Pitch: Role-playing a startup team to classify a new adaptive AI tool (SaMD Tiers) and outlining its necessary Predetermined Change Control Plan (PCCP) for the FDA. (Regulation)	2	1	2	1	4
5	5	AI Patient Communication Role Play: Role-playing a doctor's consultation where you must use principles of XAI to obtain Informed Consent for an AI-generated diagnosis. (Ethics)	2	1	2	1	4

№	week	Practical class topics	Class hrs	Class participation	Tests or tasks in google classroom	notes	total
6	6	Meaningful Human Control (MHC) Design: Reviewing an autonomous AI surgical system and designing the human override and monitoring protocols required to ensure MHC. (Ethics & Deployment)	2	1	2	1	4
7	7	The Automation Bias Incident Report: Analyzing a clinical case where a physician made a commission or omission error due to Automation Bias, and drafting an accountability report. (Ethics & Liability)	2	1	2	1	4

5.Chart of Collection Points

Discipline	**Credit**	**In-lass hours**	**ISW**	**Module 1(25** points**)**				**Module 2 (25** points**)**				**Exam (50** points**)**	
		40%	60%	In-class hours		ISW/IWST	SC(r)	In-class hours		ISW/IWST	SC(r)	(E)	
				Lec.	Pr.			Lec.	Pr.				
AI in Healthcare	3	48	72	10	16	30/6		10	12	30/6			
Cumulative Points Chart				4	4	8	9	4	4	8	9		
Module and Exam Results				(M=tcp.+r+s) до 25 / 25				(M=tcp.+r+s) до 25 / 25				50	
				Rдоп. = M1 + M2 (30-50)									
Final Grade				I = Rдоп. + E								100	

6. Course Policy

a) Attendance is mandatory.

b) Academic integrity: no plagiarism, no cheating.
c) Deadlines: late work is penalized, missing work = no exam admission.
d) Classroom behavior: respectful, no bullying, no texting in class.
e) Conflict resolution: first with teacher, then program head if unresolved.

7. Students Self-Work Topics

1. AIHC. Ethical, Legal, and Societal Implications (ELSI) of AI in Healthcare (20 topics)
2. The challenge of obtaining Granular Consent for future use of patient data in AI model training.
3. The application of the Learned Intermediary Doctrine in determining liability for an AI-caused medical error.
4. Case study analysis of a medical AI system found to have a racial or gender bias.
5. The ethical duty of physicians to disclose the use of an AI system to a patient (Duty of Disclosure).
6. Evaluating the concept of a patient's 'Right to an Explanation' and the limitations of XAI.
7. The role of Meaningful Human Control (MHC) in highly autonomous surgical robotics.
8. The impact of Automation Bias on diagnostic accuracy among junior residents.
9. Analyzing the ethical conflict between Predictive Parity and Equal Opportunity in a cancer screening algorithm.
10. The regulatory pathway for a continuously learning algorithm under the FDA's Predetermined Change Control Plan (PCCP).
11. The implications of classifying AI as a Software as a Medical Device (SaMD) under the EU AI Act.
12. The financial and ethical challenges of ensuring equitable access to advanced AI diagnostic tools (Digital Divide).
13. The concept of Algorithmic Malpractice and its potential to redefine physician responsibility.
14. Assessing the cybersecurity risks and patient data privacy challenges in AI cloud deployment.
15. The role of AI in reducing administrative burden vs. its potential for de-skilling physicians.
16. The impact of AI on the doctor-patient relationship and trust.
17. The necessity of AI Literacy for medical students to achieve proper Trust Calibration.
18. Analyzing the ethical concerns of using large language models (LLMs) for clinical documentation and note generation.
19. The challenge of post-market monitoring and detecting Model Drift in deployed AI systems.
20. The economic viability and reimbursement models for new AI diagnostic tools in a public health system.
21. The ethical implications of using social determinants of health (SDOH) data in predictive AI models.

8. Grading System

a) The grading is modular: 50 points for Module, and 50 points for the final exam.
b) Minimum 30 points are required for exam admission.

1 module	**max 50 points**		
SSW/ SSWT	8/8	Lectures, current knowledge control	4*2=8
Practical classes, current knowledge control	4*2=8	Intermediate knowledge assessment (M1)	18

1 module	**max 50 points**		
Exam	50 points		

- The minimum score for admission to the exam is 30.
- The semester grade for the current assessment is calculated automatically, based on the average of the current assessments for the semester.

9. Grading System Table

Points	Letter Grade	GPA Equivalent	Traditional System Evaluation
93–100	A	4.00	Excellent
90–92	A–	3.75	Excellent
87–89	B+	3.50	Excellent
84–86	B	3.25	Good
81–83	B–	3.00	Good
78–80	C+	2.75	Good
74–77	C	2.50	Good
71–73	C–	2.25	Satisfactory
68–70	D+	2.00	Satisfactory
64–67	D	1.75	Satisfactory
61–63	D–	1.50	Satisfactory
31–60	FX	0.00	Unsatisfactory
0–30	F	0.00	Unsatisfactory
61–100	P	—	Pass
0–60	NP	Not counted in GPA	Fail
—	I	—	Did not fulfill all requirements for the discipline due to a valid reason

Points	Letter Grade	GPA Equivalent	Traditional System Evaluation
—	X	—	Student may be withdrawn from the course for academic or administrative reasons
—	W	—	Withdrawal: student's refusal to continue the course, officially confirmed

10. Educational Resources

	E-Resources (I)		
1.	**FDA Software as a Medical Device (SaMD) Guidance**	Official FDA documentation on AI/ML regulation	https://www.fda.gov/medical-devices/software-medical-device-san
2.	**WHO Guidance on the Ethics of AI in Health**	World Health Organization's principles and recommendations	https://www.who.int/publications/i/item/9789240029200
3.	**EU AI Act - High-Risk AI in Health**	Overview of the EU's regulatory approach to high-risk AI systems in healthcare	https://digital-strategy.ec.europa.eu/en/policies/artificial-intelligenc
4.	**PubMed**	Electronic search system for biomedical research on AI-related clinical studies	https://pubmed.ncbi.nlm.nih.gov/
5.	**Web of Science**	Electronic search platform combining	https://clarivate.com/cis/solutions/web-of-science/

	E-Resources (I)		
		multiple bibliographic and abstract databases for academic literature	
6.	**Stanford HAI**	Stanford University's Human-Centered AI research and reports	https://hai.stanford.edu/
7.	**Coursera / edX**	Educational web platforms for supplemental AI/ML courses and content	https://www.coursera.org
	General Resources (O)		
1.	**Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again** (Eric Topol, 2019)	Foundational text on the impact of AI in clinical practice and workflow.	https://agatadata.com/wp-content/uploads/2024/11/Deep-Medicine
2.	**The AI in Medicine Handbook**	JULIA by Erasmus	https://www.julia-project.eu/sites/default/files/2025-08/JuLIA%2BHandbook%2BAI%2Band%2BHealth_FINAL_AU
3.	**Principles for the Responsible Use of Artificial Intelligence in Medical Education (AAMC)**	Guidelines for faculty and learners on AI in the curriculum and practice.	https://www.aamc.org/about-us/mission-areas/medical-education/p

	E-Resources (I)		
4.	**Ethical and Regulatory Challenges in AI-Driven Healthcare**	Collection of academic papers on bias, fairness, and accountability.	https://www.cell.com/heliyon/fulltext/S2405-8440%2824%290232 4?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fret

11. GOOGLE CLASSROOM LINKS (JOIN to GC with your passport name)

AIHC 301

1st stream:
2nd stream: