# ПРОГРАММА

межфакультетского курса

***на английском языке***

Искусственный интеллект в области медицины и здравоохранения

**Artificial Intelligence in Healthcare and Medicine**

Автор программы:

Кандидат социологических наук

Ирина Викторовна Яковлева

**1. Цель реализации программы межфакультетского курса**

Слушатели приобретают знания, умения и навыки в области применения искусственного интеллекта в области здоровья и медицины с их спецификой и учетом необходимых особенностей области; умеют на базовом уровне анализировать применение и применимость технологий ИИ в области здоровья и здравоохранения; могут оценить преимущества применения технологии и проанализировать ее возможные негативные эффекты; обладают знаниями о категории доверия и факторами, на нее влияющими в области здоровья и здравоохранения; приобретают знания по поводу современных концепций здоровья в современной цифровой среде.

**2. Содержание программы**

**План**

программы межфакультетского курса

«Artificial Intelligence in Healthcare and Medicine: The Foundations»

(«Искусственный интеллект в области медицины и здравоохранения: основные концепции в реализации»)

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| №  п/п | Наименование  разделов | Всего,  час. | В том числе |
| лекции |
| 1 | Introduction to the Course.  Artificial Intelligence in healthcare: basic concepts and brief history | 2 | 2 |
| 2 | Principles from medicine applied to AI | 2 | 2 |
| 3 | Approaches for applying AI in Medicine. New frontiers of AI in medicine | 2 | 2 |
| 4 | Artificial Intelligence and concept of life medicalization | 2 | 2 |
| 5 | Social consideration for AI in Medicine.  AI in evidence-based medicine | 2 | 2 |
| 6 | Benefits and unintended consequences of AI in health care settings | 2 | 2 |
| 7 | Settings for AI application: from traditional point of care to population health management | 2 | 2 |
| 8 | Settings for AI application: from traditional point of care to population health management | 2 | 2 |
| 9 | Modern approaches to AI selection, evaluation and implementation in clinical care | 2 | 2 |
| 10 | Doctor-Patient Trust: the evolution in the XXI century. AI in medicine and patient’s perspective | 2 | 2 |
| 11 | Medical robots and humans: the peculiarities of interaction. Ethical challenges of integrating AI into healthcare | 2 | 2 |
| 12 | Final Colloquium | 2 | 2 |
|  |  | 24 |  |
|  |  |  |  |
| Итоговая аттестация | | зачет | |

Учебно-тематический план

программы повышения квалификации

« Artificial Intelligence in Healthcare and Medicine:

The Foundations»

(«Искусственный интеллект в области медицины и здравоохранения: основные концепции в реализации»)

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| № п/п | Наименование разделов и тем | Всего,  час. | В том числе |
| лекции |
| 1 | 2 | 3 | 4 |
| **1** | **Artificial intelligence in healthcare and medicine: the major concepts and approaches** |  |  |
| 1.1 | Introduction to the Course.  Artificial Intelligence in healthcare: basic concepts and brief history | 2 | 2 |
| 1.2. | Principles from medicine applied to AI | 2 | 2 |
| 1.3 | Approaches for applying AI in Medicine. New frontiers of AI in medicine | 2 | 2 |
| 1.4 | Artificial Intelligence and concept of life medicalization | 2 | 2 |
| **2** | **AI in health care and medicine: the issue of communication** |  |  |
| 2.1 | Social consideration for AI in Medicine.  AI in evidence-based medicine | 2 | 2 |
| 2.2 | Benefits and unintended consequences of AI in health care settings | 2 | 2 |
| 2.3 | Settings for AI application: from traditional point of care to population health management | 2 | 2 |
| 2.4 | Settings for AI application: from traditional point of care to population health management | 2 | 2 |
| 2.5 | Modern approaches to AI selection, evaluation and implementation in clinical care | 2 | 2 |
| **3** | **AI and challenges of integration** |  |  |
| 3.1 | Doctor-Patient Trust: the evolution in the XXI century. AI in medicine and patient’s perspective | 2 | 2 |
| 3.2 | Medical robots and humans: the peculiarities of interaction. Ethical challenges of integrating AI into healthcare | 2 | 2 |
| 3.3 | Final Colloquium | 2 | 2 |

**3. Материально-технические условия реализации программы**

Аудитории для проведения лекций и семинаров должны быть оснащены презентационной техникой (проектором, экраном, компьютером/ноутбуком). Для самостоятельной работы студентам необходим компьютер с выходом в Интернет. Курс может быть проведен полностью в дистанционном формате.

**4. Учебно-методическое обеспечение программы**

Основная литература:

1. *Artificial Intelligence in Health Care: The Hope, the Hype, the Promise, the Peril*, Editors Michael Matheny, SonooThadaneyIsrani, Mahnoor Ahmed, National Academy of Medicine, Washington, DC, NAM.EDU, 2019
2. Schivao, Renata. *Health Communication: from Theory to Practice*, Jossey-Bass, 2014

Дополнительнаялитература:

1. Cathy O’Neil *Weapons of Math Destruction*, Crown, New York, 2016
2. *Health and behavior: the interplay of biological, behavioral, and societal influences* / Committee on Health and Behavior, Research, Practice, and Policy, Board on Neuroscience and Behavioral Health, Institute of Medicine, National Academy Press, 2001
3. *Hello, World: Artificial Intelligence and its Use in the Public Sector*, Editors Jamie Berryhill, KévinKokHeang, Rob Clogher, Keegan McBride, OECD, 2019
4. *Health communication: Theory and practice* Dianne Berry Open University Press, 2007
5. *The Oxford Handbook of Health Communication, Behavior Change, and Treatment Adherence*, Edited by Leslie R. Martin M. Robin DiMatteo Oxford University Press, 2014
6. Roger Penrose,*The Emperor’s New Mind*, Oxford Landmark Scince, 2016
7. *The sociology of health promotion*, Edited by Robin Bunton, Sarah Nettleton, Roger Burrows, Routledge, 2005

Интернет-ресурсы:

1. Association for the Advancement of Artificial Intelligence (AAAI): <http://aaai.org>
2. Нейронные сети и их применение в научных исследованиях: <http://msu.ai>
3. Научно-образовательные школы МГУ: http://nosh.msu.ru

5. Требования к результатам обучения

Формы текущего контроля – контрольные работы, эссе, опросы

Форма аттестации – зачет.

Процедура итоговой аттестации – устная форма зачета

Перечень вопросов:

1. Outline the major AI methods and the most widespread applications.
2. What are the major domains of AI?
3. What is a self-rated health? Why is it important?
4. What is ML and what types of if are relevant to the field of healthcare and medicine?
5. What medical principles are applied back to AI?
6. What are major AI approaches in clinical medicine?
7. What is a learning health system?
8. Provide a brief overview of a clinical decision support system.
9. What are the principles of AI framework development?
10. What are the limitations of ML methods in medicine?
11. What are the social challenges that we face by implementing AI in health care settings?
12. What are the approaches to the ethics of AI with considerations to privacy and safety?
13. What is a physician-patient relationship? Describe their modifications in terms of AI implementation.
14. What are the approaches to the systems of medical decisions?
15. What are the approaches to the diagnostic reasoning?
16. What are the ML approaches to diagnosis?
17. What are the trends in quality and safety research within the healthcare field?
18. What are the approaches to patient safety and preventing errors?
19. What is an adverse event and what are the ways to tackle by means of ML?
20. What is the concept of a shared decision-making?
21. What are the major domains of AI?
22. AI and reliance on data: what are the major difficulties?
23. What are the major aims of healthcare?
24. What are the criteria that drive technology innovation?
25. Explain medicalization of life as an approach.
26. Why do we need AI in healthcare?
27. What are the major approaches to understanding AI?
28. What so the terms ‘learning’ and ’intelligence’ mean in relation to AI?
29. What expectations of the past influence the present of AI?
30. What are the major ways the AI is changing healthcare and health?
31. What is an electronic health records? How do they affected the patient-provider relationship?
32. Provide a brief overview of the study of inequalities and AI.
33. What is the politics of algorithms, data and code?
34. What are the inequalities that are highly likely to be made more durable by AI?
35. AI as a social phenomenon: provide a brief overview of the wider social, cultural, economic and political conditions.
36. What is the application of AI in non-health care industries? Provide a brief overview.
37. Could you outline the key stakeholders of AI research and development?
38. What are the AI solutions for patients and families?
39. How could improper AI hurt patients?
40. How could improper AI hurt health systems?
41. What are typical cybersecurity vulnerabilities due to AI implementation in healthcare?
42. What is the influence of AI on human skills?
43. What are the factors to take into account for AI application evaluation?
44. What are the ways to empower patients and caregivers by AI applications?
45. What is the typical framework for AI selection for health care?
46. What is information management in healthcare settings?
47. What are the AI enhanced approaches to improve population health?
48. What are Public Health areas to implement AI solutions?
49. What are typical cybersecurity vulnerabilities due to AI implementation in healthcare?
50. What is the influence of AI on human skills?
51. What are the factors to take into account for AI application evaluation?
52. What is a traditional point of care and nontraditional health care settings?
53. What are the ways to use AI for population health management?
54. What are the ways to empower patients and caregivers by AI applications?
55. What is the typical framework for AI selection for health care?
56. Describe the developmental life cycle of AI application.
57. What are major approaches to understanding health behavior?
58. What are the approaches to analyze the trust of the Internet?
59. What are the traditional digital divide factors? Why are they included in the method?
60. What are the major characteristics and requirements of the doctor-patient communication in the XXI?