BS in AI (Public Health)

Program Introduction: Bachelor of Science in Artificial Intelligence (AI) with Integrated Healthcare and Public Policy

The Bachelor of Science in Artificial Intelligence with Integrated Healthcare and Public Policy is designed to equip students with the knowledge and skills necessary to harness AI technologies for transformative advancements in healthcare while navigating the complex landscape of public policy and ethical considerations.

Program Overview

In today's rapidly evolving digital era, artificial intelligence stands at the forefront of innovation, particularly in the realm of healthcare. This program blends rigorous training in AI fundamentals with specialized courses that explore AI's applications in healthcare systems and its implications for public policy. Students will acquire a comprehensive understanding of how AI can enhance medical diagnostics, personalized treatment plans, and healthcare delivery efficiency.

Key Program Features

Technical Foundations: The curriculum begins with a strong foundation in computer science, mathematics, and AI essentials. Students will master programming languages, data structures, machine learning algorithms, and advanced AI techniques tailored for healthcare applications.

Healthcare Integration: Specialized courses delve into healthcare informatics, where students learn to manage and analyze healthcare data responsibly. They explore AI-driven solutions for improving patient care, disease prediction, and public health management.

Public Policy Emphasis: A unique aspect of this program is its integration of public policy courses. Students examine the regulatory frameworks, ethical considerations, and societal impacts of AI adoption in healthcare. They develop skills in policy analysis and formulation to ensure responsible and equitable deployment of AI technologies.

Interdisciplinary Approach: The program fosters interdisciplinary collaboration by incorporating courses that bridge technology and healthcare with ethical, legal, and social dimensions. This prepares graduates to address complex challenges at the intersection of AI, healthcare, and public policy.

Hands-on Experience: Practical training is emphasized through projects, internships, and a final-year capstone project focused on developing AI solutions for real-world healthcare

challenges. Students gain valuable hands-on experience under the guidance of faculty and industry experts.

Career Readiness: Graduates of the program are well-prepared for diverse career paths in healthcare technology companies, research institutions, government agencies, and policy think tanks. They are equipped to drive innovation, shape policy decisions, and contribute positively to global health initiatives.

Conclusion

The BS in Artificial Intelligence with Integrated Healthcare and Public Policy prepares future leaders who are not only proficient in cutting-edge AI technologies but also equipped to navigate the ethical, regulatory, and societal landscapes of healthcare innovation. This program empowers students to leverage AI for improving healthcare outcomes and shaping policies that promote equitable access and ethical deployment of AI-driven solutions.

By blending technical expertise with a deep understanding of healthcare systems and policy frameworks, graduates emerge as critical thinkers and innovators poised to make significant contributions to the healthcare industry and society at large.

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Proposed Curriculum for BS (AI)

Following are the proposed areas which are required to be covered to complete the degree. Covered areas consist of core courses (compulsory), foundation courses, general courses and electives.

Areas Covered in BS (AI)

Course Group	Credit hour	Min no of courses
General Education	19	7
University Electives	12	4
Mathematics & Science Foundation	12	4
Computing Core	39	11
Computer Science Core	18	5
AI Core (Domain Core)	18	6
AI Electives (Domain Electives)	12	4
TOTAL	130	41

General Education Courses

Course title	Credit hours	Contact hours
Introduction to Info. & Comm. Technologies	3 (2-1)	2-3
English Composition & Comprehension	3 (3-0)	3-0
Communication & Presentation Skills	3 (3-0)	3-0
Technical & Business Writing	3 (3-0)	3-0
Islamic Studies/ Ethics	2 (2-0)	2-0
Pakistan Studies	2 (2-0)	2-0
Professional Practices	3 (3-0)	3-0
TOTAL	19 (18-1)	18-3

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University (HAS) Elective courses

(*Details towards the end of document)

Course title	Credit hours	Contact hours
Healthcare Informatics	3 (3-0)	3-0
Health policy and management	3 (3-0)	3-0
Ethics in Healthcare Technology	3 (3-0)	3-0
Public Health and Epidemiology	3 (3-0)	3-0
TOTAL	12(12-0)	12-0

Mathematics and Science Foundation Courses

Course title	Credit hours	Contact hours
Calculus & Analytic Geometry	3 (3-0)	3-0
Linear Algebra	3 (3-0)	3-0
Probability & Statistics	3 (3-0)	3-0
Differential Equations	3 (3-0)	3-0
TOTAL	12 (12-0)	12-0

Computing Core Courses

Course title	Credit hours	Contact hours
Programming Fundamentals	4 (3-1)	3-3
Discrete Structures	3 (3-0)	3-0
Object Oriented Programming	4 (3-1)	3-3
Database Systems	4 (3-1)	3-3
Data Structures & Algorithms	4 (3-1)	3-3
Information Security	3 (3-0)	3-0
Computer Networks	4 (3-1)	3-3
Operating System	4 (3-1)	3-3
Software Engineering	3 (3-0)	3-0
Final Year Project - I	2 (0-2)	0-6
Final Year Project - II	4 (0-4)	0-12
TOTAL	39 (27-12)	27-36

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Computer Science Core Courses

Artificial Intelligence	**4 (3-1)**	**3-3**
Digital Logic Design	**4 (3-1)**	**3-3**
Analysis of Algorithms	**3 (3-0)**	
Computer Organization & Assembly Language	**3 (3-0)**	**3-3**
Parallel & Distributed Computing	**3 (2-1)**	**2-3**
TOTAL	**18 (14-4)**	**14- 12**

Artificial Intelligence Core Courses

Programming for Artificial Intelligence	**3 (2-1)**	**2-3**
Machine Learning	**3 (2-1)**	**2-3**
Artificial Neural Networks	**3 (2-1)**	**2-3**
Knowledge Representation & Reasoning	**3 (3-0)**	**3-0**
Computing Vision	**3 (2-1)**	**2-3**
Natural Language Processing	**3 (3-0)**	**3-0**
TOTAL	**18 (14-4)**	**14-12**

Artificial Intelligence Elective Courses

(Must be any four courses or 12 credit hours, universities may add lab hours to elective courses, where labs are not mentioned)

Advance Statistics	**3 (3-0)**	**3-0**
Theory of Automata & Formal Languages	**3 (3-0)**	**3-0**
Data Mining	**3 (2-1)**	**2-3**
Deep Learning	**3 (3-0)**	**3-0**
Speech Processing	**3 (3-0)**	**3-0**
Reinforcements Learning	**3 (3-0)**	**3-0**
Fuzzy Systems	**3 (3-0)**	**3-0**
Evolutionary Computing	**3 (3-0)**	**3-0**
Swarm Intelligence	**3 (3-0)**	**3-0**
Agent Based Modeling	**3 (3-0)**	**3-0**
Knowledge Based Systems	**3 (3-0)**	**3-0**
TOTAL (Any four courses or 12 credit hours)	**12 (11-1)**	**11-3**

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Proposed Study Plan BS (Artificial Intelligence)

4-Year Program (8 Regular Semester of 18 weeks each) (130 Credit Hours)

Semester - I

COURSE TITLE	Cr hr	Cont hr
Introduction to ICT	3 (2-1)	2-3
Programming Fundamentals	4 (3-1)	3-3
Discrete Structures	3 (3-0)	3-0
Calculus & Analytic Geometry	3 (3-0)	3-0
English Composition & Comprehension	3 (3-0)	3-0
Total	16 (14-2)	14-6

Semester - II

Course Title	Cr hr	Cont hr	pre requisite
Object Oriented Programming	4 (3-1)	3-3	Prog Fundamentals
Database Systems	4 (3-1)	3-3	Cal. & Anal. Geometry
Linear Algebra	3 (3-0)	3-0	
Probability & Statistics	3 (3-0)	3-0	
Communication & Presentation Skills	3 (3-0)	3-0	Eng Comp & Compre
Total	17 (15-2)	15-6	

Semester - III

Course Title	Cr hr	Cont hr	pre requisite
Data Structures & Algorithms	4 (3-1)	3-3	Prog. Fundamentals
Information Security	3 (3-0)	3-0	
Artificial Intelligence	4 (3-1)	3-3	Object Oriented Prog
Digital Logic Design	4 (3-1	3-3	
Differential Equations 3-0	3 (3-0)	3-0	Cal. & Anal. Geometry
Total	18 (15-3)	15-9	

Semester - IV

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Course Title	Cr hr	Cont hr	pre requisite
Computer Networks	4 (3-1)	3-3	
Computer Org. & Assembly Language	4 (3-1)	3-3	Digital Logic Design
Analysis of Algorithms	3 (3-0)	3-0	Data Structures & Algo
Programming for Artificial Intelligence	3 (2-1)	2-3	Artificial Intelligence
AI Elective-1	3 (3-0)	3-0	
Total	17 (14-3)	14-9	

Semester - V

Course Title	Cr hr	Cont hr	pre requisite
Operating System	4 (3-1)	3-3	Data Structures & Algo
Artificial Neural Networks	3 (2-1)	2-3	Programming for AI
Machine Learning 2-3	3 (2-1)	2-3	Programming for AI
Knowledge Representation & Reasoning	3 (3-0)	3-0	Programming for AI
AI Elective-2 (	3 (3-0)	3-0	
University Elective-1 (Health informatics)	3 (3-0)	3-0	
Total	19 (16-3)	16-9	

Semester - VI

Course Title	Cr hr	Cont hr	pre requisite
Parallel & Distributed Computing	3 (2-1)	2-3	OOP, Operating Sys
Computing Vision	3 (2-1)	2-3	Artificial Neural Net
Natural Language Processing	3 (3-0)	3-0	Artificial Neural Net
AI Elective-3	3 (2-1)	2-3	
AI Elective-4	3 (3-0)	3-0	
University Elective-2 (health policy & management)	3 (3-0)	3-0	
Total	18 (15-3)	15-9	

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Semester - VII

Course Title	Cr hr	Cont hr	pre requisite
Final Year Project - I	2 (0-2)	0-6	
Software Engineering	3 (3-0)	3-0	
University Elective 3- (ethics in healthcare technology)	3 (3-0)	3-0	
Technical & Business Writing 3 (3-0) 3-0	3 (3-0)	3-0	Comm. & Present. Skills
Islamic Studies/ Ethics	2 (2-0)	2-0	
Total	13 (11-2)	11-6	

Semester - VIII

Course Title	Cr hr	Cont hr	pre requisite
Final Year Project - II	4 (0-4)	0-12	Final Year Project - I
University Elective- 4 (public health and epideomology)	3 (3-0)	3-0	
Professional Practices	3 (3-0)	3-0	
Pakistan Studies	2 (2-0)	2-0	
Total	12 (8-4)	8-12	