FACULTY OF COMPUTING AND ENGINEERING SCIENCES

BS ARTIFICIAL INTELLIGENCE

BSAI program is offered by the Department of Robotics and Artificial Intelligence. The BSAI is a 4 year program and consists of 41 courses with a total of 130 credit hours. The Internship opportunities are provided to complete degree requirement. BSAI is a full time day program that covers the emerging dimensions of Machine Learning, Deep Learning, Explainable AI, Evolutionary Computing, Computer Vision, Software Engineering, Natural Language Processing etc. The program comprises of 39 credit hours of Core Computing course, 18 credit hours of Computer Science Core courses, 19 credit hours of General Education courses, 18 credit hours of Artificial Intelligence Core courses, and 36 credit hours of Elective courses. The Maximum duration of the program is six years

Mission Statements

To provide a quality education in Artificial Intelligence in order to produce scientifically, technologically, and professionally competent graduates who are adept to perform a significant role in the continuing transformation of local and global society.

Program Educational Objectives

Following are the Program Educational Objective (PEO)

PEO 1: To equip students with the necessary skills and knowledge to solve complex problems in real-world settings.

PEO 2: To produce graduates practicing in the area of Artificial Intelligence in a socially and ethically responsible way.

PEO 3: To prepare students for lifelong learning skills in Artificial Intelligence and allied disciplines.

Program Learning Outcomes

To attain the educational objectives of programs, it is intended to produce the following measurable outcomes at the time of graduation. Graduates of the program will have:

a. Ability to apply knowledge of mathematics, science, computing fundamentals and any of its specializations to solve complex problems.

b. Ability to identify, formulate, research literature, and analyze complex problems reaching substantiated conclusions using basic principles of mathematics, natural sciences and computer science.

c. Ability to design solutions for complex problems and design software systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

d. Ability to investigate methodically complex problems including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.

e. Ability to create, select and apply appropriate techniques, resources, and modern IT tools, including prediction and modeling, to complex activities, with an understanding of the limitations.

f. Ability to understand the impact of professional solutions in societal and environmental contexts and apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues.

g. Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of society and professional practice.

h. Ability to work effectively, as an individual or in a team, on multifaceted and/or multidisciplinary settings.

i. Ability to communicate effectively, orally as well as in writing, on complex activities with the community and with the society at large, such as being able to write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

j. Ability to demonstrate management skills and apply systems development principles to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.

k. Ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

BS (ARTIFICIAL INTELLIGENCE) COURSE PLAN (ROADMAP)

Sem.	Codes	Course Title	Cr.Hrs.		Pre-Req.
First Year					
		First Semester			
1	CSC 1108	Introduction to Computer Science	2, 0	2	-
	CSCL 1108	Lab : Introduction to Computer Science	0, 1	1	-
	CSC 1103	Fundamentals of Programming	3, 0	3	-
	CSCL 1103	Lab : Fundamentals of Programming	0, 1	1	-
	CSC 1209	Islamic Studies/ Humanities	2, 0	2	-
	CSC 1109	Pakistan Studies	2, 0	2	-
	CSC 1101	Calculus and Analytical Geometry	3, 0	3	-
	CSC 1102	English Composition and Comprehension	3, 0	3	-
		Sub-total		**17**	
		Second Semester			
2	CSC 1208	Object Oriented Programming Techniques	3, 0	3	CSC 1103
	CSCL 1208	Lab: Object Oriented Programming Techniques	0, 1	1	-
	CSC 2103	Digital Logic Design	3, 0	3	-
	CSCL 2103	Lab: Digital Logic Design	0, 1	1	-
	CSC 2206	Linear Algebra	3, 0	3	CSC 1101
	CSC 1206	Probability and Statistics	3, 0	3	-
	CSC 2101	Communication and Presentation Skills	3, 0	3	CSC 1102
		Sub-total		**17**	
Second Year					
		Third Semester			
3	CSC 2102	Data Structures and Algorithms	3, 0	3	CSC 1103
	CSCL 2102	Lab: Data Structures and Algorithms	0, 1	1	-
	CSC 2201	Computer Organization and Assembly Language	3, 0	3	CSC 2103
	CSCL 2201	Lab: Computer Organization and Assembly Language	0, 1	1	-
	CSC 1201	Discrete Mathematical Structures	3, 0	3	-
	CSC 4101	Artificial Intelligence	3, 0	3	CSC 1208
	CSCL 4101	Lab: Artificial Intelligence	0, 1	1	-
	CSC 2122	Differential Equations	3, 0	3	CSC 1101
	Sub-total			**18**	
		Fourth Semester			
4	CSC 3205	Computer Networks and Data Communications	3, 0	3	-
	CSCL 3205	Lab: Computer Networks and Data Communications	0, 1	1	-
	CSC 2203	Database Systems	3, 0	3	-
	CSCL 2203	Lab: Database Systems	0, 1	1	-
	CSC 3202	Design and Analysis of Algorithms	3, 0	3	CSC 2102
	AIC 2401	Programming for Artificial Intelligence	2,0	2	CSC 4101
	AICL 2401	Lab: Programming for Artificial Intelligence	0, 1	1	-
	AIC xxxx	AI Elective - 1	3, 0	3	-
		Sub-total		**17**	

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Third Year					
Fifth Semester					
5	CSC 2205	Operating Systems	3, 0	3	CSC 2102
	CSCL 2205	Lab: Operating Systems	0, 1	1	-
	AIC 3501	Artificial Neural Networks	2, 0	2	AIC 2401
	AICL 3501	Lab: Artificial Neural Networks	0, 1	1	-
	AIC 3503	Machine Learning	2, 0	2	AIC 2401
	AICL 3503	Lab: Machine Learning	0, 1	1	-
	AIC 3502	Knowledge Representation and Reasoning	3, 0	3	AIC 2401
	AIC xxxx	University Elective – 1	3, 0	3	-
	Sub-total			**16**	
Sixth Semester					
6	CSC 1205	Technical and Business Writing	3,0	3	CSC 2101
	AIC 3602	Computer Vision	2, 0	2	CSC 3501
	AICL 3602	Lab: Computer Vision	0, 1	1	-
	AIC 3603	Natural Language Processing	3, 0	3	CSC 3501
	CSC 3109	Software Engineering	3, 0	3	-
	AIC xxxx	AI Elective - 2	3,0	3	-
	AIC xxxx	University Elective - 2	3, 0	3	-
	Sub-total			**18**	
Fourth Year					
Seventh Semester					
7	CSC 4106	Parallel and Distributed Computing	3, 0	3	CSC 1208, CSC 2205
	CSC 4102	Professional Practices	3, 0	3	-
	AIC xxxx	University Elective-3	3, 0	3	-
	AIC xxxx	AI Elective - 3	3, 0	3	-
	AIC 4707	Final Year Project-I	0, 3	3	-
	Sub-total			**15**	
SEighth Semester					
8	AIC 4807	Final Year Project-II	0, 3	3	AIC 4707
	AIC 4xxx	University Elective – 4	3, 0	3	-
	CSC 4201	Information Security	3, 0	3	-
	AIC xxxx	AI Elective - 4	3, 0	3	-
	Sub-total			**12**	
Total				**130**	

AI ELECTIVES

AIC 4701 Advanced Statistics
AIC 4706 Theory of Automata and Formal Languages
AIC 4802 Data Mining
AIC 4702 Deep Learning
AIC 4805 Speech Processing
AIC 4804 Reinforcement Learning
AIC 4803 Fuzzy Systems
AIC 4703 Evolutionary Computing
AIC 4705 Swarm Intelligence
AIC 4801 Agent Based Modeling
AIC 4704 Knowledge Based Systems

UNIVERSITY ELECTIVES

Each campus may offer university electives as per convenience and availability of resources. The Electives being offered at Islamabad Campus as are as follows:

AIC 4504 Organizational Behavior
AIC 4605 Research Report
AIC 4603 Management Principles
AIC 4601 Business and Technology Ethics
AIC 4503 Introduction to Accounting
AIC 4602 Foreign Languages
AIC 4502 History of Scientific Ideas
AIC 4501 Design and Creativity
AIC 4505 Sociology
AIC 4604 Psychology

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MATHEMATICS & SCIENCE FOUNDATION COURSES

Coverage of relevant pre-requisite will be ensured while allowing any of the following courses from this category:

1. Calculus and Analytical Geometry
2. Linear Algebra
3. Probability and Statistics
4. Differential Equations

DISTRIBUTION OF CREDIT HOURS

I. Core Courses (List Attached):	
i. Computing Core Courses	39
ii. Computer Science Core Courses	18
iii. General Education Courses	19
iv. Artificial Intelligence Core Courses	18
II. Elective Courses (List Attached)	
i. Mathematics & Science Foundation Courses	12
ii. Artificial Intelligence Elective Courses	12
iii. Institutional Elective Courses	12
Total	**130**

Internship

The internship is scheduled for summer at the end of third year. After completion of the six-week internship, all students are required to submit a comprehensive report giving details of their experience and learning.