Bachelor of Science in Artificial Intelligence Program

For Fall 2020 and onwards

Department of Creative Technology

Faculty of Computing and Artificial Intelligence

Air University, Islamabad

For Fall 2020 and onwards

Contents

For Fall 2020 and onwards

PROGRAMME GENERAL INFORMATION

Academic year	2020/21
Awarding body	Air University
Teaching institute and location	Air University, Islamabad Campus
Language of study	English
Final award	BS
Program title	Artificial Intelligence
Duration of study	4 years (maximum time upto 6 years)
Total number of semesters	8
Number of weeks per semester	16 - 18 (16 for teaching and 2 for examinations)
Total number of credit hours	136
Total number of courses	45
Credit hours per semester	15-18
Proposed starting date	Fall 2020 Semester

Distribution of Courses

Following is the distribution of course

S#	Category	Credit Hours	HEC Rec.
1	Computing Core	39	39
2	Domain Core (AI)	18	18
3	Domain Electives (AI)	12	12
4	Domain Supporting (AI)	21(+3)	18
5	Mathematical & Science Foundation	15(+3)	12
6	University Elective Courses	13(+1)	12
7	General Education Courses	18(-1)	19
	Total Credit Hours	136	130

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Computing Core Courses

Course Title	Credit hours
Programming Fundamentals	(3-1-4)
Discrete Structures	(3-0-3)
Object Oriented Programming	(3-1-4)
Data Structures & Algorithms	(3-1-4)
Operating Systems	(3-1-4)
Database Systems	(3-1-4)
Software Engineering	(3-0-3)
Information Security	(3-0-3)
Computer Networks	(3-1-4)
Senior Year Design Project	(0-6-6)
Total	**39 (26-13)**

Artificial Intelligence Core Courses

	Course Title	Credit hours
1	Programming for Artificial Intelligence	(2-1-3)
2	Machine Learning	(2-1-3)
3	Knowledge Representation & Reasoning	(3-0-3)
4	Artificial Neural Networks	(2-1-3)
5	Natural Language Processing	(3-0-3)
6	Computer Vision	(2-1-3)
	Total	**18(14-4)**

Artificial Intelligence Supporting Courses

Course Title	Credit hours
Digital Logic and Design	(3-1-4)
Artificial Intelligence	(3-1-4)
Design and Analysis of Algorithms	(3-0-3)
Probability Methods in AI	(3-0-3)
Parallel and Distributed Computing	(2-1-3)
Computer Organization & Assembly Language	(3-1-4)
Total	**21(17-4)**

Mathematics and Science Foundation Courses

Course Title	Credit hours
Calculus & Analytical Geometry	3-0-3
Linear Algebra	3-0-3
Differential Equation	3-0-3

Probability & Statistics	3-0-3
Multi Variable Calculus	3-0-3
Total	**15(15-0)**

General Education Electives

Course Title	Credit hours
English Composition & Comprehension	3-0-3
Technical & Business Writing	3-0-3
Communication & Presentation Skills	3-0-3
Intro to Info. & Comm. Technologies	2-1-3
Islamic Studies	2-0-2
Pakistan Studies	2-0-2
The Ethics of Artificial Intelligence	2-0-2
Total	**18(17-1)**

University Elective Courses

(Not limited to the list below, the university may add more courses)

Course Title	Credit hours
Principles of Accounting	3-0-3
Operation Research	3-0-3
Human Resource Management	3-0-3
Principles of Management	3-0-3
Total Quality Management	3-0-3
Organizational Behavior	3-0-3
Philosophy and Iqbaliyat	3-0-3
Social Psychology and Human Behavior	3-0-3
Introduction to English Linguistics I	3-0-3
Foreign Language	3-0-3
Entrepreneurship & Technology Commercialization	3-0-3
Social Services	1-0-1
Total (Any four courses + Social Services**)**	**13**

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Semester Plan

Semester – I			
Code	**Course Title**	**Credit Hours**	**Pre-requisite**
CS180	Introduction to Information and Communication Technologies	2-0-2	
CS180L	Introduction to Information and Communication Technologies Lab	0-1-1	
CS111	Programming Fundamentals	3-0-3	
CS111L	Programming Fundamentals Lab	0-1-1	
HU119	English Comprehension & Composition	3-0-3	
MA110	Calculus & Analytical Geometry	3-0-3	
MA216	Discrete Structures	3-0-3	
HU115	Pakistan Studies	2-0-2	
Total		**16-2-18**	

Semester – II			
Code	**Course Title**	**Credit Hours**	**Pre-requisite**
HU120	Communication & Presentation Skills	3-0-3	HU119
MA201	Linear Algebra	3-0-3	
CS112	Object Oriented Programming	3-0-3	CS111/CS111L
CS112L	Object Oriented Programming Lab	0-1-1	CS111/CS111L
AI130	Programming for Artificial Intelligence	2-0-2	
AI130L	Programming for Artificial Intelligence Lab	0-1-1	
EE223	Digital Logic and Design	3-0-3	
EE223L	Digital Logic and Design Lab	0-1-1	
Total		**14-3-17**	

Semester – III			
Code	**Course Title**	**Credit Hours**	**Pre-requisite**
CS214	Data Structures & Algorithms	3-0-3	CS112/CS112L
CS214L	Data Structures & Algorithms Lab	0-1-1	CS112/CS112L
MA301	Probability and Statistics	3-0-3	
MA106	Differential Equations	3-0-3	
CS340	Artificial Intelligence	3-0-3	MA216
CS340L	Artificial Intelligence Lab	0-1-1	MA216
CS223	Computer Organisation and Assembly Language	3-0-3	EE223/EE223L
CS223L	Computer Organisation and Assembly Language Lab	0-1-1	EE223/EE223L
Total		**15-3-18**	

Semester – IV			
Code	**Course Title**	**Credit Hours**	**Pre-requisite**
AI200	Probability Methods in Artificial Intelligence	3-0-3	MA301
CS332	Design and Analysis of Algorithms	3-0-3	CS214/CS214L
CS230	Database Systems	3-0-3	CS214/CS214L
CS230L	Database Systems Lab	0-1-1	CS214/CS214L

AI201	Knowledge Representation & Reasoning	3-0-3	AI130/AI130L
SE100	Software Engineering	3-0-3	
Total		**15-1-16**	
Semester – V			
Code	**Course Title**	**Credit Hours**	**Pre-requisite**
AIXXX	AI-Elective-I	3-0-3	
MA105	Multivariable Calculus	3-0-3	
AI332	Machine Learning	2-0-2	AI130/AI130L
AI332L	Machine Learning Lab	0-1-1	AI130/AI130L
HU116	Islamic Studies	2-0-2	
CS225	Operating Systems	3-0-3	CS214/CS214L
CS225L	Operating Systems Lab	0-1-1	CS214/CS214L
BAXXX	University Elective -I	3-0-3	
Total		**16-2-18**	
Summer			
AI496	Internship	**Non credit**	
Semester – VI			
Code	**Course Title**	**Credit Hours**	**Pre-requisite**
CS360	Computer Networks	3-0-3	
CS360L	Computer Networks Lab	0-1-1	
AIXXX	AI-Electives-II	3-0-3	
HU401	Technical & Business Writing	3-0-3	
AI220	Natural Language Processing	3-0-3	AI332/AI332L
BAXXX	University Elective-II	3-0-3	
AI497	FYP-I	0-1-1	
Total		**15-2-17**	
Semester – VII			
Code	**Course Title**	**Credit Hours**	**Pre-requisite**
AI498	FYP-II	0-2-2	AI497
CS426	Parallel and Distributed Computing	2-0-2	CS225/CS225L
CS426L	Parallel and Distributed Computing Lab	0-1-1	CS225/CS225L
AIXXX	AI-Electives-III	3-0-3	
AI433	Artificial Neural Networks*	2-0-2	AI130/AI130L
AI433L	Artificial Neural Networks Lab*	0-1-1	AI130/AI130L
AI403	Computer Vision	2-0-2	AI332/AI332L
AI403L	Computer Vision Lab	0-1-1	AI332/AI332L
AI340	The Ethics of Artificial Intelligence	2-0-2	
Total		**11-5-16**	
Semester – VIII			
Code	**Course Title**	**Credit Hours**	**Pre-requisite**
HU414	Social Service	1-0-1	
CS415	Information Security	3-0-3	
AIXXX	AI-Electives-IV	3-0-3	
AI499	FYP – III	0-3-3	AI498
BAXXX	University Elective -III	3-0-3	
BAXXX	University Elective – IV	3-0-3	
Total		**13-3-16**	

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Total Credit Hours: 136

Artificial Intelligence Elective Courses

(More Courses may be added to this list)

Code	Course Title	Credit hours
CS437	Data Warehousing & Data mining	3-0-3
AI408	Virtual and Augmented Reality	2-0-2
AI408L	Virtual and Augmented Reality Lab	0-1-1
AI414	Swarm Intelligence	3-0-3
AI302	Digital Image Processing	2-0-2
AI302L	Digital Image Processing Lab	0-1-1
AI310	Microcontroller and Embedded Systems	2-0-2
AI310L	Microcontroller and Embedded Systems Lab	0-1-1
AI311	Automation and Robotics	2-0-2
AI311L	Automation and Robotics Lab	0-1-1
AI321	Semantic Technologies	3-0-3
AI404	Speech Processing	3-0-3
AI405	Cognitive AI	3-0-3
AI406	Bio-inspired Computing	3-0-3
AI407	Evolutionary Computing	3-0-3
AI412	Fuzzy Systems	3-0-3
AI413	Agent Based Modeling	3-0-3
AI422	Computational Linguistics	3-0-3
AI423	Information Retrieval	3-0-3
AI424	Linked Data Engineering	3-0-3
AI434	Deep Learning	2-0-2
AI434L	Deep Learning Lab	0-1-1
AI435	Reinforcement Learning	3-0-3
AI441	AI for Games	3-0-3
AI442	Computational Biology	3-0-3
CS341	Theory of Automata	3-0-3
CS437	Data Warehousing & Data mining	3-0-3
MA421	Numerical Analysis	3-0-3
MT446	Digital Signal Processing	3-0-3