Appendix A

COURSE DEFINITION AND EQUIVALENCY DETERMINATION PROCESS.

Three types of courses are involved in the PACE MS programs. Definitions of the course types are as below:

1. **Bridge Courses**: Courses that are mandatory for entering students with limited or no background in the degree field. B**ridge course** credits do not count toward the degree.
2. **Core (or Foundational) Courses**: Courses that are mandatory for all students pursuing and count towards the degree.
3. **Elective Courses**: Courses that can count towards the degree.

All selected PACE MS degrees for the 4+1 program require the completion of 30 credits toward the degree. Consequently, a 4-course (12 credits) equivalency between ATLAS courses and PACE MS program courses is sufficient and necessary for a 4+1 Dual degree where students can complete their residency at PACE within two semesters. The following course mapping shall guide the selection of 4-course (12 credits) equivalencies between the two Atlas majors and six PACE graduate degrees. The first table (Appendix B) maps courses for the core curriculums and the second table (Appendix C) maps the eligibility of Atlas' elective courses to the six PACE degrees. If a 12-credit equivalency cannot be met with the core course mappings, electives shall be considered for the deficit.

Appendix B

CORE CURRICULUM MAPPINGS

The following tables six tables aim to outline the approved mappings between the core (foundational) and bridge courses of the PACE graduate programs and the core curriculum of the ATLAS undergraduate degrees.

(1) Course mappings for MS in Information Systems (IS)

PACE Course				ATLAS Course	
Type	**Course**		**Type**	**Course**	
Core	IS 612	Introduction to Coding	SE & CE Core	1410121002	Programming II
Core	IS 613	Database Management Systems	SE & CE Core	1410311005	Database Systems
Core	IS 632	Business Data Communications	SE & CE Core	1410321004	Computer Networks
Core	IS 623	Information System Design and Development	SE-Core	1413211007	Software Design and Architecture
			CE-Elective	1410002010	

(2) Course mappings for MS in Cybersecurity

PACE Course			ATLAS Course		
Type	**Course**		**Type**	**Course**	
Bridge	CS 601C	Computational Statistics	CE Core	1410211005	Probability and Statistics
Bridge	IS 612	Introduction to Coding	SE & CE Core	1410121002	Programming II
Bridge	IS 632 or IS 656	Business Data Communications / Networks: Routing & Switching	SE & CE Core	1410321004	Computer Networks
Core	CYB 613	Operating Systems Theory and Administration	CE Core	1410311003	Operating systems
Core	CYB 611	Introduction to Cybersecurity	SE-Elective	1413002014	Introduction to Cyber Security
			CE-Elective	1410002001	
Core	CYB 623	Network Security and Defense	SE-Elective	1413002022	Network Security

(3) Course mappings for MS in Computer Science

PACE Course			ATLAS Course		
Type	**Course**		**Type**	**Course**	
Bridge	CS 505	Introduction to Computer Science with Java	SE & CE Core	1410121002	Programming II
Core	CS 604	Computer Systems and Concepts	SE & CE Core	1410311001	Computer Organization and Architecture
Core	CS 608	Algorithms and Computing Theory	SE Core	1400221026	Design and Analysis of Algorithms
			CE Core	1410221002	
Core	CS 610	Introduction to Parallel Computing	SE-Elective	1413002030	Distributed System
				1413002012	Parallel Computing
Core	CS 623	Database Management Systems	SE & CE Core	1410311005	Database Systems
Core	CS 612	Concepts and Structures in Internet Computing	SE-Elective	1413002025	Advanced Web Programming
			CE-Elective	1413002023	Cloud Computing and Big Data Analytics

(4) Course mappings for MS in Data Science

PACE Course			ATLAS Course		
Type	**Course**		**Type**	**Course**	
Bridge	CS 661	Python Programming	SE Core	1410121004	Programming II
			CE Core	1410121002	
Bridge	CS 623	Database Management Systems	SE & CE Core	1410311005	Database Systems
Core	CS 676	Algorithms for Data Science	SE Core	1400221026	Design and Analysis of Algorithms
			CE Core	1410221002	
Core	CS 619	Data Mining	SE-Elective	1413002010	Data Mining
			CE-Elective	1410002013	
Core	CS 677	Machine Learning	SE-Elective	1413002042	Machine Learning
			CE-Elective	1410002007	Introduction to Machine Learning

(5) Course mappings for MS in Human Centered Design

PACE Course			ATLAS Course		
Type	**Course**		**Type**	**Course**	
Elective	IS 612	Introduction to Coding	SE Core	1410121004	Programming II
			CE Core	1410121002	
Elective	IS 623	Information System Design and Development	SE-Core	1413211007	Software Design and Architecture
			CE-Elective	1410002010	
Elective	CS 641	Mobile Web Content and Development	SE-Elective	1413002025	Advanced Web Programming
Elective	IS 680	Data Science I: Introduction to Data Science (formerly IS 665)	SE-Elective	1413002010	Data Mining
			CE-Elective	1410002013	

(6) Course Mappings MS in Software Engineering

PACE Course			ATLAS Course		
Type	**Course**		**Type**	**Course**	
Bridge	SE 602	Fundamental Computer Science I with Java	SE Core	1410121004	Programming II
			CE Core	1410121002	
Core	SE 616	Introduction to Software Engineering	(waived for SE majors)		
Core	SE 673	Software Design Methodologies	SE-Core	1413211007	Software Design and Architecture
			CE-Elective	1410002010	
Core	SE 675	Requirements Engineering	SE-Core	1413411001	Software Requirements Engineering
Core	SE 677	Software Reliability & Quality Assurance	SE-Core	1413321006	Software Testing and Quality Assurance

Appendix C

ELECTIVE COURSE MAPPINGS

The following table shows the elective courses for Atlas curriculum and their eligibility to count towards one of the six Pace Graduate Degrees.

Course Code	Course Name	Major	IS	CYB	CS	DS	HCD	SE
1410002032	Wireless Network Technologies and Applications	CE	x	x	x			
1413002025	Advanced Web Programming	SE	x	x	x		x	x
1410002004	Artificial Intelligence	CE	x	x	x	x		
1410002030	Artificial Neural networks	CE	x	x	x	x		
1413002013	Artificial Neural Networks	SE	x	x	x	x		
1410002022	Autonomous Systems	CE			x			
1413002027	Autonomous Systems	SE			x			
1410002024	Cloud Computing and Big Data Analytics	CE	x	x	x	x		
1413002023	Cloud Computing and Big Data Analytics	SE	x	x	x	x		
1410002002	Compiler Design	CE			x			
1413002002	Compiler Design	SE			x			
1413002017	Computer Graphics	SE			x			
1413002036	Computer Organization	SE			x			
1410002031	Computer Security	CE	x	x	x			
1413002003	Computer Vision	SE	x	x	x	x		
1410002013	Data Mining	CE	x	x	x	x	x	
1413002010	Data Mining	SE	x	x	x	x	x	
1410002003	Deep Learning	CE	x	x	x	x		
1413002007	Deep Learning	SE	x	x	x	x		
1410002034	Digital Whole Circuit Design	CE						
1413002030	Distributed System	SE			x			
1413002032	Embedded Systems	SE			x			
1410002036	Engineering Laboratory Techniques	CE						
1413002016	Formal Verification	SE						
1413002037	Fundamentals of Electric and Electronic Circuits	SE						
1413002011	Game Programing	SE	x	x	x			x
1410002027	Game Programming	CE	x	x	x			x
1413002001	Genetic Algorithms	SE	x	x	x	x		
1410002020	Geographic Information Systems	CE	x	x				
1413002026	Geographic Information Systems	SE	x	x				
1410002033	High Performance Computing	CE			x			
1410002025	Image processing	CE	x	x	x	x		
1413002005	Image Processing	SE	x	x	x	x		
1410002035	Introduction to Coding Theory	CE			x			

1410002038	Introduction to Computational Engineering	CE						x
1410002001	Introduction to Cyber Security	CE	x	x	x			x
1413002014	Introduction to Cyber Security	SE	x	x	x			x
1410002007	Introduction to Machine Learning	CE	x	x	x	x		
1410002005	Introduction to Robotics	CE	x	x	x	x		
1413002004	Introduction to Robotics	SE	x	x	x	x		
1413002034	Logic Design and Circuits	SE						
1413002042	Machine Learning	SE	x	x	x	x		
1410002018	Machine Vision	CE	x	x	x	x		
1413002029	Mobile and Wireless Networking	SE	x	x	x			x
1410002012	Mobile Application Development	CE	x	x	x		x	
1410002009	Natural Language Processing	CE	x	x	x	x		
1413002021	Natural Language Processing	SE	x	x	x	x		
1413002022	Network Security	SE	x	x	x			x
1410002017	Object Oriented Design	CE	x	x	x			x
1413002012	Parallel Computing	SE	x	x	x	x		
1410002037	Power Electronics Applications in Engineering	CE						
1410002026	Real-Time Programming	CE			x			
1410002010	Software Design and Architecture	CE	x	x			x	x
1413002008	Software Quality Assurance	SE	x	x				x

Column Definitions: IS - MS in Information Systems; CYB - MS in Cybersecurity; DS -MS in Data Science; HCD -MS in Human Centered Design; SE- MS in Software Engineering