

Cybersecurity - Intelligent Systems Engineering

PACE UNIVERSITY - CAMPUS BIO-MEDICO UNIVERSITY

Program description

The Program title will allow Students to obtain the Master of Science Degree in “ Cybersecurity” (“US Degree”) from PACE and the Master of Science Degree in “Intelligent Systems Engineering” (“Italian Degree”) from CAMPUS. The Program aims to fully integrate Italian, US, and foreign students and professors and will be open to students of all nationalities. All courses and activities will be in English at both PACE and CAMPUS.

- a. The duration of the Program for each Student will be two (2) years (four full-time semesters).
- b. Administrative offices of the Program will be at PACE and CAMPUS. The staffing and location of such offices will be determined by each institution in its sole discretion.
- c. Students are required to obtain the equivalent of 120 ECTS at CAMPUS to earn the Italian Degree and 30 credits at PACE to earn the US Degree.
- d. Students will be allowed transfer of up to twelve (12) credits from CAMPUS to PACE, which will count towards the fulfillment of the US Degree requirements. Students will be allowed transfer of up to eighteen (18) credits from PACE to CAMPUS, which will count towards the fulfillment of the Italian Degree requirements.
- e. The departmental coordinators of each institution shall have the role of academic advisor to all incoming students to the Program during their academic activities at both institutions.

Enrollment criteria

Students from Italy will apply using PACE online application. The standard application fee will be waived for students applying to the Program. Students entering the program should be enrolled in a Master of Science Degree in “Intelligent Systems Engineering” at CAMPUS. All students can apply to the program, but they must have completed all the exams at CAMPUS before moving to PACE. Students must provide a certified TOEFL score as part of the application process. In the case of a low TOEFL score, the TOEFL test must be repeated with a score of at least 90 (IBT) at the end of the first year before Students can attend classes at PACE.

Students from USA will apply using CAMPUS online application. CAMPUS will admit students who are enrolled as full-time graduate students at PACE who elect to participate in the Program.

Responsibilities of students

- a. Each Student will abide by the laws and customs of the host country and by the policies and regulations of the host institution.
- b. The host institution will have the right to terminate the participation of any Student in the Program (and in any other program, service or benefit of the host institution) if at any time, and in the sole judgment of the host institution, such Student fails to maintain satisfactory academic performance or violates the policies of the host institution. The host institution will inform the other institution of any such action, subject to applicable law.
- c. Each Student must either purchase medical insurance required by the host institution or demonstrate to the satisfaction of the host institution that the medical insurance carried by or on behalf of such Student is sufficient for all purposes of the host institution.
- d. Each Student is required to have proof of immunizations satisfactory to the host institution in order to participate in the Program.
- e. The cost of any medical insurance or immunizations required pursuant to this Agreement as well as any medical expenses or immunizations not covered by such insurance will be the personal responsibility of the Student.
- f. Each Student is fully responsible for making personal travel arrangements related to the Program.
- g. Each Student is fully responsible for all personal expenses related to the Program, including but not limited to textbooks, supplies, room and board, and travel costs.
- h. Each Student is fully responsible for all charges related to room and board. The Student may withdraw

from the Program at any time, but will be subject to the refund policy of PACE.

PROGRAM STRUCTURE

General Program Rules

Level	Master of Science
Duration	2 years
Partner Universities	Pace University and Campus Bio-Medico University
Degrees obtained	If compliant with both Campus Bio-Medico and Pace academic requirements: <ul style="list-style-type: none">• Campus students will obtain the MS in Cybersecurity (issued by Pace) and the MS in Intelligent Systems Engineering (issued by Campus)• Pace students will obtain the MS in Cybersecurity (issued by Pace) and the MS in Intelligent Systems Engineering (issued by Campus) * Pace degree should always be completed first
Number of students	There is not a minimum of maximum number of students that will move from and to Campus and Pace. However, both University will properly advertise this program on their official webpages.
Grade/Course Recognition	The tables below describe the students' mobility scenario and the activities to be completed are listed. The academic activities recognized by the partner university will be transferred according to a conversion tables commonly agreed between Campus and Pace.
Tuition Fees	Students will be charged the tuition fees applicable at the institution where they study and are registered as in attendance. Students will themselves be responsible for any expenses incurred as a result of their participation in the Programme, e.g. travel and accommodation.
Academic Calendar	Campus <ul style="list-style-type: none">• Semester 1 (Fall Semester): from early September to mid-February• Semester 2 (Spring Semester): from mid-February to early July• Summer Break: from early July to early September Pace <ul style="list-style-type: none">• Semester 1 (Fall Semester): from early September to end of December• Semester 2 (Spring Semester): from January to half of May• Summer semester: from half of May to half of July (Summer I) and from half of July to end of August (Summer II)

Mobility Structure

Campus students Year 1: Campus (Intelligent System Engineering MS)
Year 2: Pace (Cybersecurity MS)

Pace students Year 1: Pace (Cybersecurity MS)
Year 2: Campus (Intelligent System Engineering MS)

Campus students must apply to Pace program before the start of the Spring Semester of the first year (March 1st). They must complete the TOEFL (Pace University TOEFL code 2635, with a minimum grade requirement of TOEFL iBT® score of 78 or TOEFL® Essentials™ score of 8.5). The J1 Visa application, required to study in USA, must be completed by the end of the Spring Semester of the first year (June 1st). The application to Pace dorms should be completed before the start of the Spring Semester of the first year (March 1st), and all the students coming from Italy will be accommodated together in the room if available. Students may contact the Pace international students office for further details.

Pace students must apply to Campus program before the start of the Spring Semester of the first year (March 1st). The Italian Visa application, required to study in Italy, must be completed by the end of the Spring Semester of the first year (June 1st). The application to Campus dorms should be completed before the start of the Spring Semester of the first year (March 1st), and all the students coming from USA will be accommodated together in the room if available. Students may contact the Campus international students office for further details.

Final Thesis

- Students must respect the thesis procedures and deadlines from Campus.
- Students will complete their theses during their mobility period with one Campus supervisor.
- Students will defend their theses only at Campus at one of the available graduation sessions: July, October/November or April.

ACADEMIC SCOPE

Campus students moving to Pace

Year 1 at Campus for Italians

Course taken at Campus	Semester	ECTS	Recognition for Pace Degree	Credits
Modelling and network control and event study	1	9	IT 600 Overview of Computer Networks and Internet Technology	3
Programming	1	9	CS 611 Principles of Programming Languages	3
Models and methods for optimization and statistics	1	9	CS 601C Computational Statistics	

Innovation and Digital Transformation	2	9	IT 690U Innovation of the 21 st Century	3
Distributed system architecture	2	9	IT 500 Introduction to the Internet, Web Authoring, and Multimedia	3
Machine Learning	2	9	CS 677 Machine Learning	3
Human dimension in the digital transformation	2	3		
English language (TOEFL)	1	3		
		60	4 COURSES TRANSFERRED TO PACE AMONG THE 5 PROPOSED	12

Year 2 at Pace for Italians

Course taken at Pace		Semester	Credits	Recognition for Campus Degree	ECTS
CYB 611	Introduction to Cybersecurity	1	3	Smart systems	9
CYB 621	Information Security Management	1	3	Deep Learning for Big Data	9
CYB 613	Operating Systems Theory and Administration	1	3	Project management	9
CYB 623	Network Security and Defense	2	3	Smart sensing and measurements	9
CYB 625	Ethical Hacking and Penetration Testing	2	3	Thesis (first part)	9
CYB 691	Cybersecurity Capstone Project	2	3	Thesis (second part)	9
				Thesis integration (back in Italy)	6
				18	60

Students must first finalize the Degree at Pace and only in a second stage at Campus Bio-Medico.

Pace students moving to Campus

Year 1 at Pace for Americans

Course taken at Pace		Semester	Credits	Recognition for Campus Degree	ECTS
CYB 611	Introduction to Cybersecurity	1	3	Programming	9
CYB 621	Information Security Management	1	3	Models and methods for optimization and statistics	9
CYB 613	Operating Systems Theory and Administration	1	3	Innovation and Digital Transformation	9
CYB 623	Network Security and Defense	2	3	Modelling and network control and event study	9
CYB 625	Ethical Hacking and Penetration Testing	2	3	Human dimension in the digital transformation + English language	3+3
CYB 691	Cybersecurity Capstone Project	2	3	Distributed system architecture	9
CS200B	Topics in Computer Science: machine learning or CS3B5 Artificial Intelligence I	2	3	Machine Learning	9
				18	60

Year 2 at Campus for Americans

Course taken at Campus	Semester	ECTS	Recognition for Pace Degree	Credits
Computer vision	1	9	CS 671 Computer Vision	3

Cybersecurity	1	9	IT 670 Mobile Forensics Investigation	3
Project Management	1	9	IS 660P Topic: Advanced Concepts in Project and Program Management	3
Deep Learning for Big Data	1	9	CS 672 Introduction to Deep Learning	3
Thesis	2	24		
		60	4 COURSES TRANSFERRED	12

Students must first finalize the Degree at Pace and only after at Campus Bio-Medico.

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ADDITIONAL ACADEMIC ACTIVITIES

Pace summer courses and internship

Campus students can attend summer courses and internship programs at Pace University always with 15% discount in tuition and housing fees (30% if more than 10 students will come from Italy in each semester).

Campus semester abroad and thesis

Pace students can attend single courses as well as to conduct a thesis/project at Campus Bio-Medico University during a semester in Italy.

GRADES EQUIVALENCE

Transfer courses will follow the following grades equivalence.

Courses transferred from Italy to USA		Courses transferred from USA to Italy	
30 cum laude - 30/30	A	A	30 cum laude
28 - 29/30	A-	A-	29
26 - 27/30.	B+	B+	27
24 - 25/30	B	B	25
22 - 23/30	B-	B-	23
20 - 21/30	C+	C+	21
18 - 19/30	C	C	19

SYLLABUS FOR THE TRANSFER STUDENTS

Pace University courses

CYB 611 Introduction to Cybersecurity (3 credits) - Fall

This course is to introduce the fundamental concepts in cybersecurity. The course will first introduce the vulnerabilities of computer systems and networks and then lead students to understand the fundamental principles in security using cases and examples. Various risk management strategies for organizations will then be introduced. In addition, the course will introduce methods to identify the potential threats from inside and outside of an organization and to deploy security technologies to mitigate the threats. Privacy, ethical and legal issues related to cybersecurity will be discussed. Students will gain hand-on experience by investigating security problems through laboratory exercises.

CYB 613 Operating Systems Theory and Administration (3 credits) - Fall

Operating systems (OS) provide the platform on which running software acquires and uses computing resources. OS are responsible for working with the underlying hardware to provide the baseline security capabilities of a system. Understanding the underlying theory of operating system design is critical to cybersecurity as operating systems control the operation of a computer and the allocation of associated resources. This course is to provide students with an understanding of the roles of an operating system, its basic functions, and the services it provides. Through lab exercises, this class will also identify the key issues and functions in administrating a Linux operating system.

CYB 625 Ethical Hacking and Penetration Testing (3 credits) - Fall

This course will introduce students to cybersecurity operations which includes understanding of the cyberspace in the enterprise. Ethical hacking and penetration testing are at the center of cybersecurity operations. What are the common vulnerabilities and threats to web applications whether front the front-end (browser side) or the back-end (Server-side). All aspects of penetration testing and how to use it in order examine the security of online operation. The importance of data security and the different attacks on databases. Also, the course will illustrate the use of Identity and access management to enforce security and governance. This is a hands-on class, as it will use secure VPN to teach the students about the different topics

in a lab environment. In addition, students will the arsenal of offensive security tools comes with Kali Linux to apply and examine the topics taught in class.

CYB 621 Information Security Management (3 credits) - Spring

This course introduces students to methods and practices to develop policies and plans for managing personnel, systems and processes related to information security in an organization. This course will first introduce methods to identify information assets, prioritize threats to information assets, and define an information security strategy and architecture. The course will then introduce methods and practices to develop system specific plans against various threats. Most importantly, students will learn about legal and public relations implications of security and privacy issues. Last but not the least, the course will present a disaster recovery plan for recovery of information assets after cybersecurity incidents.

CYB 623 Network Security and Defense (3 credits) - Spring

This course will introduce the students to an overall view of network security and the latest defense techniques and strategies known in the enterprise. Starting with understanding network elements and architecture to how to identify and understand the different vector of attacks on a network. This includes sampling forensics and understanding the new concept of threat intelligence. Students will understand risk assessment and risk management for different components of the network and the impact of the different kinds of threats and attacks. In addition, the course will elaborate on the essentials of how to design, architect a secure enterprise network and how to define security policies, and how-to police it using intrusion detection/ prevention systems. The course is mainly a hands-on all along from examining network security, learning how to attack a network, and learn how to defend it. Policy design and enforcement lab as well as IDS/IPS set up and configuration.

CYB 691 Cybersecurity Capstone Project (3 credits) - Spring

This capstone course focuses on research projects in cybersecurity. The goal of the capstone course is to provide an opportunity for students to incorporate cybersecurity knowledge and skills learned from previous courses and apply them to a real-world project. The project can come from a student's internship experience, as an extension of a previous research project, or a project with an external client, such as a faculty or an industry expert. Students are expected to work in a team setting to plan, analyze and design a solution to the problem being explored in the project.

Campus University courses

Cybersecurity - Fall

The course aims to provide the learner with the basic concepts of cyber security in order to permit to the student to introduce those elements in the design stage, management, maintenance and dissolution of a cyber-physical system. The course illustrates both the basics for preparing, organizing and monitoring a cyber attack and the main methodological, technological and operational tools to prevent such threats. The course focuses in particular on the problems of the monitoring systems and the control of OT systems, analyzing the effects on a cyber-attack to a physical system and to control systems. Furthermore, the course provides a brief overview about the techniques of social engineering and the legal aspects related to the cyber-security.

Computer vision - Fall

The course aims to teach students the fundamental principles and applications of Computer Vision (CV), i.e. the technologies that lie at the heart of modern Artificial Intelligence (AI) applications that can perceive, understand and reconstruct the complex visual world and that deal with developing the set of processes that aim to create a model of the real world starting from two-dimensional images. CV is one of the fastest

growing and most challenging AI disciplines in industry and academia today. This course has been designed to open the doors of this discipline to students who are interested in learning about its fundamental principles and important applications.

Deep Learning for Big Data - Fall

The course will explore the main Deep Learning approaches based on deep neural networks for the analysis of multidimensional data. Deep learning algorithms are general nonlinear models that are capable of learning features directly from data, making them an excellent choice for robotic, natural language processing, healthcare, and computer vision applications. Concepts and technologies relating to Big Data analysis will be explored. The purpose of the final project will be to learn how to independently address a real or laboratory problem by applying a neural network model to create an application or to experimentally evaluate the ability of Deep Learning approaches in various contexts. The course will consist of two parts, one consisting of theoretical lectures and a second part carried out in a concerted laboratory on the application of the models analyzed using the Python language.

Project Management - Fall

The course aims to provide:

- The fundamental notions, both theoretical and practical, on software development project management processes
- Knowledge of project management areas of expertise, as well as practical knowledge of related techniques and tools
- The value chain, process quality standards, process analysis and representation, projects in organizations
- Awareness of innovation processes and the development of soft skills to face the digital transition in a cooperative and collaborative perspective.
- The principles of Design Thinking.

Thesis - Spring

The student, under the supervision of a Professor of Campus Bio-Medico University, will develop a scientific project based on a research or practical experience.