CUNEF
UNIVERSIDAD

ARTIFICIAL INTELLIGENCE SUMMER SCHOOL

COURSE SCHEDULE:

Start: 30 June 2025
End: 18 July 2025
Mornings from 9:00 to 14:00 from Monday to Friday
9 CREDITS

STUDENT PROFILE:

University students, teachers, researchers and professionals from any sector with an interest in the course topic. No prior knowledge is required.

OBJECTIVES:

Obtain a global vision of Artificial Intelligence as a widely used technology and discover the challenges and opportunities of its applications. Understand the new way of obtaining, managing and analysing data to generate knowledge and incorporate it into the development of novel intelligent systems. Reflect, analyse and open the mind to the change in society that we are experiencing to understand its impact on today's society and find new professions, challenges and opportunities. Learn to program simple algorithms in Python, to illustrate the foundation of the implementation of intelligent systems using machine learning techniques. Learn the fundamentals of Generative Artificial Intelligence and the different tools available and their applications in different areas of business. Learn applications of intelligent systems such as Natural Language Processing and other cutting-edge technologies.

METHODOLOGY:

The summer course on artificial intelligence will employ a comprehensive methodology, combining lectures, debates, and hands-on programming sessions. Students will gain theoretical knowledge through expert-led lectures, engage in critical discussions during debates, and apply their learning in practical programming classes. This approach ensures a well-rounded understanding of AI concepts and their real-world applications.

COURSE PROGRAM:

Week 1: Fundamentals
Day 1:
> S1- 9.00-10.30: Presentation: Origin and evolution of Artificial Intelligence.
> S2-11.00-12.30: Fundamentals of AI: machine learning, natural language processing and computer vision.
> S3: 12.45-14.15: Use cases.

Day 2:
> S1- 9.00-10.30: Presentation: Ethical implications.
> S2-11.00-12.30: Fundamental algorithms I: design strategies
> S3: 12.45-14.15: Laboratory: Programming paradigms for AI

Day 3:
> S1- 9.00-10.30: Presentation: Cybersecurity
> S2-11.00-12.30: Fundamental algorithms II: Search
> S3: 12.45-14.15: Laboratory: Implementation in Python

Day 4:
> S1- 9.00-10.30: AI applications
> S2-11.00-12.30: Fundamental algorithms II: Sorting
> S3: 12.45-14.15: Laboratory: Implementation in Python

Day 5:
> S1- 9.00-10.30: Module assessment test
> S2-11.00-12.30: Design of an intelligent system
> S3: 12.45-14.15: Laboratory: Implementation in Python

Week 2: Data Science and AI

Day 1:
      S1- 9.00-10.30: Data and big data technologies.
      S2-11.00-12.30: Data collection: sensors, networks and social networks.
      S3: 12.45-14.15: Laboratory: Data collection in the cloud.

Day 2:
      S1- 9.00-10.30: Open data and open government
      S2-11.00-12.30: Data preprocessing with packages
      S3: 12.45-14.15: Laboratory: Data preprocessing in practice

Day 3:
      S1- 9.00-10.30: Data Science in Business
      S2-11.00-12.30: Data analytics I: Statistics fundamentals
      S3: 12.45-14.15: Laboratory: Data analytics with RStudio

Day 4:
      S1- 9.00-10.30: Data Science in health and society
      S2-11.00-12.30: Data analytics II: Clustering
      S3: 12.45-14.15: Laboratory: RStudio Cluster libraries

Day 5:
      S1- 9.00-10.30: Module assessment test
      S2-11.00-12.30: How to integrate data in intelligent systems
      S3: 12.45-14.15: Laboratory: Visualization

Week 3: Generative AI

Day 1:
      S1- 9.00-10.30: Introduction to generative AI
      S2-11.00-12.30: Transforming business with generative AI.
      S3: 12.45-14.15: Use cases

Day 2:
      S1- 9.00-10.30: Technological risks of GenIA
      S2-11.00-12.30: Natural language processing
      S3: 12.45-14.15: Laboratory: Text generation tools

Day 3:
      S1- 9.00-10.30: Improving productivity with GenIA
      S2-11.00-12.30: Computer vision
      S3: 12.45-14.15: Laboratory: Image and video generation tools

Day 4:
      S1- 9.00-10.30: Internet of things and robotics
      S2-11.00-12.30: Parallel programming and Cloud computing
      S3: 12.45-14.15: Laboratory: building AI projects

Day 5:
      S1- 9.00-10.30: Module assessment test
      S2-11.00-13.30: Delivering insights through data-based storytelling
      S3: 13.30-14.15: Closing

REFERENCES:

- Solanki, S. R., & Khublani, D. K. (2024). *Generative Artificial Intelligence: Exploring the Power and Potential of Generative AI*. Apress.
- Artasanchez, A., & Joshi, P. (2020). *Artificial Intelligence with Python* (2nd ed.). Packt Publishing
- Russell, S. & Norvig, P. (2020). *Artificial Intelligence: A Modern Approach*, Pearson.
- Bostrom, N. (2014). *Superintelligence: Paths, Dangers, Strategies*. Oxford University Press.