

Titolo del corso (in Inglese)	Advanced Learning Models and Methods
Sottotitolo (in Inglese)	Large Language Models (LLMs) and their Applications
Referente proponente <i>(un membro del Collegio dei Docenti)</i>	Giuseppe Pirrò
Docente/i <i>(Il corso può essere tenuto da uno o più docenti, interni – ivi incluso il referente - oppure esterni, purché di elevata qualificazione.)</i>	Giuseppe Pirrò
Abstract generico del Corso (in Inglese)	Nowadays learning models and methods spans multiple fields in science and engineering, from autonomous driving to human machine interaction, achieving human performance in solving many complex tasks, such as natural language processing and image recognition. This course aims to present the most recent advances in machine and deep learning that brought data-driven models to achieve the state-of-the art performance in many diverse problems. The exact topics of the course may vary from year to year and will depend on both the research interests of the students attending it and on the instructor.
Abstract specifico del Corso (in Inglese)	This course explores latest research and advancements in large language models (LLMs) and their applications. Focusing on state-of-the-art techniques like Retrieval-Augmented Generation (RAG), it examines how these methods enhance natural language processing tasks and achieve human-level performance. The course is designed to reflect cutting-edge developments in machine learning, with topics tailored to the students' research interests and the instructor's expertise. Attendees will gain insights into the transformative impact of LLMs in diverse scientific and engineering domains.
Elenco analitico degli argomenti (in Inglese)	<ul style="list-style-type: none"> • Large Language Models (LLMs) and Retrieval-Augmented Generation (RAG): Explore the latest advancements in LLMs, focusing on techniques like RAG that enhance natural language processing and improve model performance by integrating external knowledge sources. • State-of-the-Art Natural Language Processing (NLP): Understanding cutting-edge NLP methods, including transformer models, attention mechanisms, and recent breakthroughs that enable models to achieve human-like understanding and generation of text. • Applications of LLMs: Examine the practical applications of LLMs, showcasing how these models solve complex, real-world problems.
Ore di didattica frontale prevista <i>(Per uniformità e al fine di agevolare l'organizzazione, risulta preferibile – sebbene non è da intendersi come vincolo – organizzare il corso su 12</i>	12 ore in 4 incontri, da 3 ore ciascuno

<p><i>ore complessive, articolate in 4/6 incontri.)</i></p>	
<p>Prova di verifica <i>(E' obbligatorio prevedere una prova finale. Essa può essere tuttavia articolata con flessibilità: progetti, orale, discussione di lavori scientifici, ...)</i></p>	<p>Progetto di fine corso.</p>
<p>Periodo di erogazione <i>(Riportare preferenza sul mese in cui deve essere erogato il corso)</i></p>	<p>- 15.09.2025 (3 ore) - 16.09.2025 (3 ore) - 17.09.2025 (3 ore) - 18.09.2025 (3 ore)</p>