SALONE DELL'ORIENTAMENTO 2026

CORSO DI LAUREA MAGISTRALE

INGEGNERIA INFORMATICA

COMPUTER ENGINEERING

Politecnico di Torino

SCOPRI TUTTI I CORSI DI STUDIO A.A. 2026/27 www.polito.it

Programme Curriculum presentation

Prof. Tatiana Tommasi

DAUIN
Department of Control
and Computer Engineering

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Artificial Intelligence and Data Analytics

Educational Objectives: train computer engineers with specific skills and know-how on data analytics and artificial intelligence with a strong hands-on approach.

You will learn about the **technological** and **theoretical** aspects of **big data** analysis, **machine learning** algorithms, **deep learning** and artificial intelligence for data analysis.

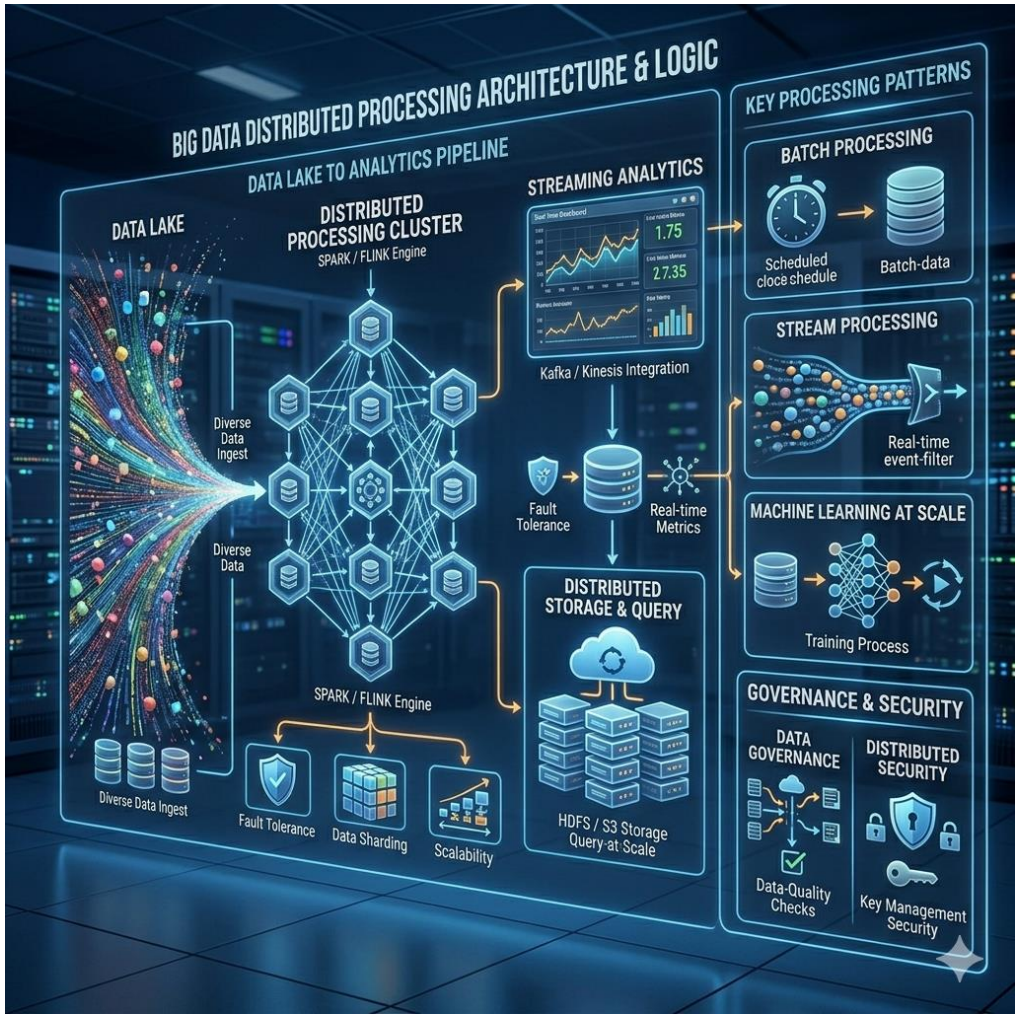
The focus is on theoretical and mathematical aspects of data analysis, technologies for big data processing, distributed systems and modern learning approaches used in **advanced research and modern companies**.

1° year – First Semester

https://www.polito.it/en/education/master-s-degree-programmes/computer-engineering/programme-curriculum

Code	Course	Language	Semester	Credits
01DSHYG	Big data processing and analytics	EN	1	6
02GOLYG	Architetture dei sistemi di elaborazione	IT	1	10
	or			
02LSEYG	Computer architectures	EN	1	10
01SQJYG	Data Science and Database Technology	EN	1	8
	or			
01SQMYG	Data Science e Tecnologie per le Basi di Dati	IT	1	8
01OTWYG	Computer network technologies and services	EN	1	6
	or			
02KPNYG	Tecnologie e servizi di rete	IT	1	6

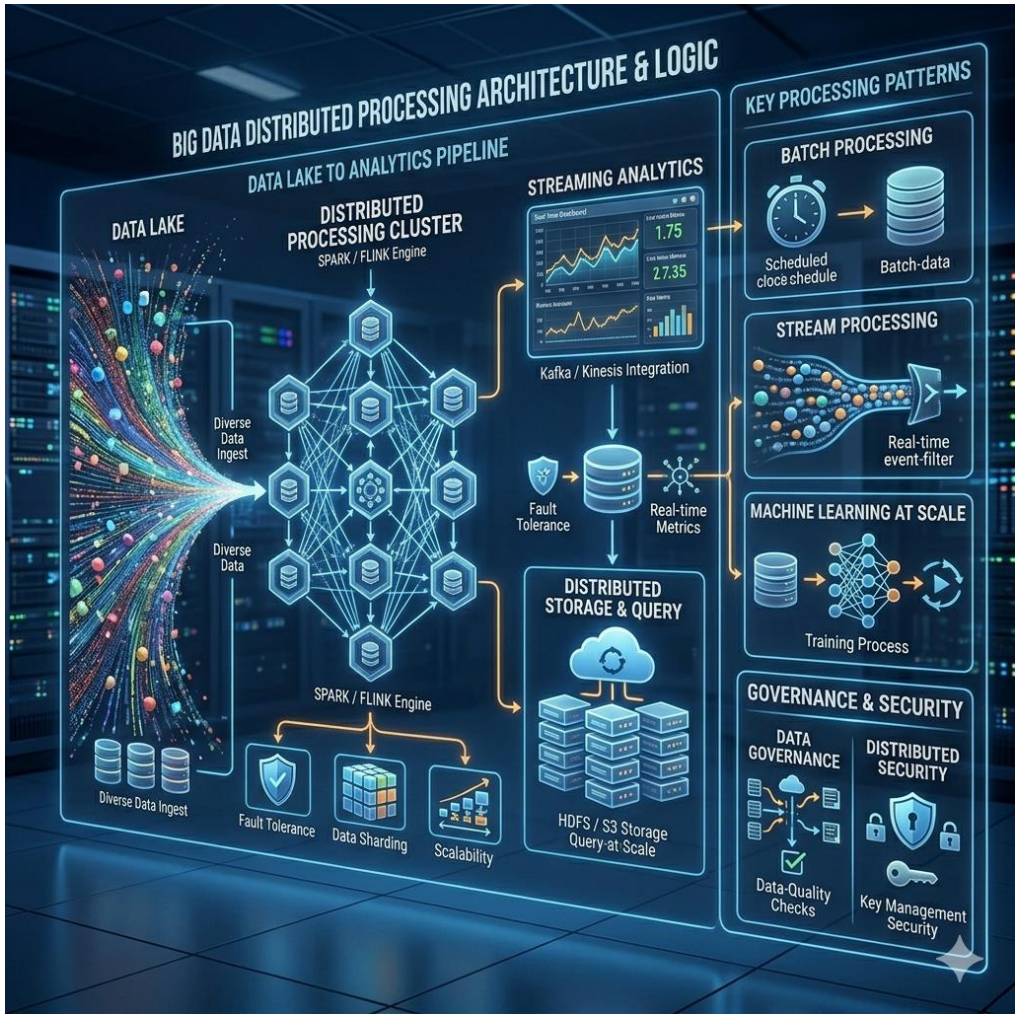
Big data processing and analytics



The course addresses the challenges arising in the Big Data era. Specifically, the course will cover **how to store, retrieve, and analyze big data** to extract useful knowledge and hints.

The course covers not only **data models** and **data analytics** aspects but also **novel programming paradigms** for **distributed processing**.

Big data processing and analytics



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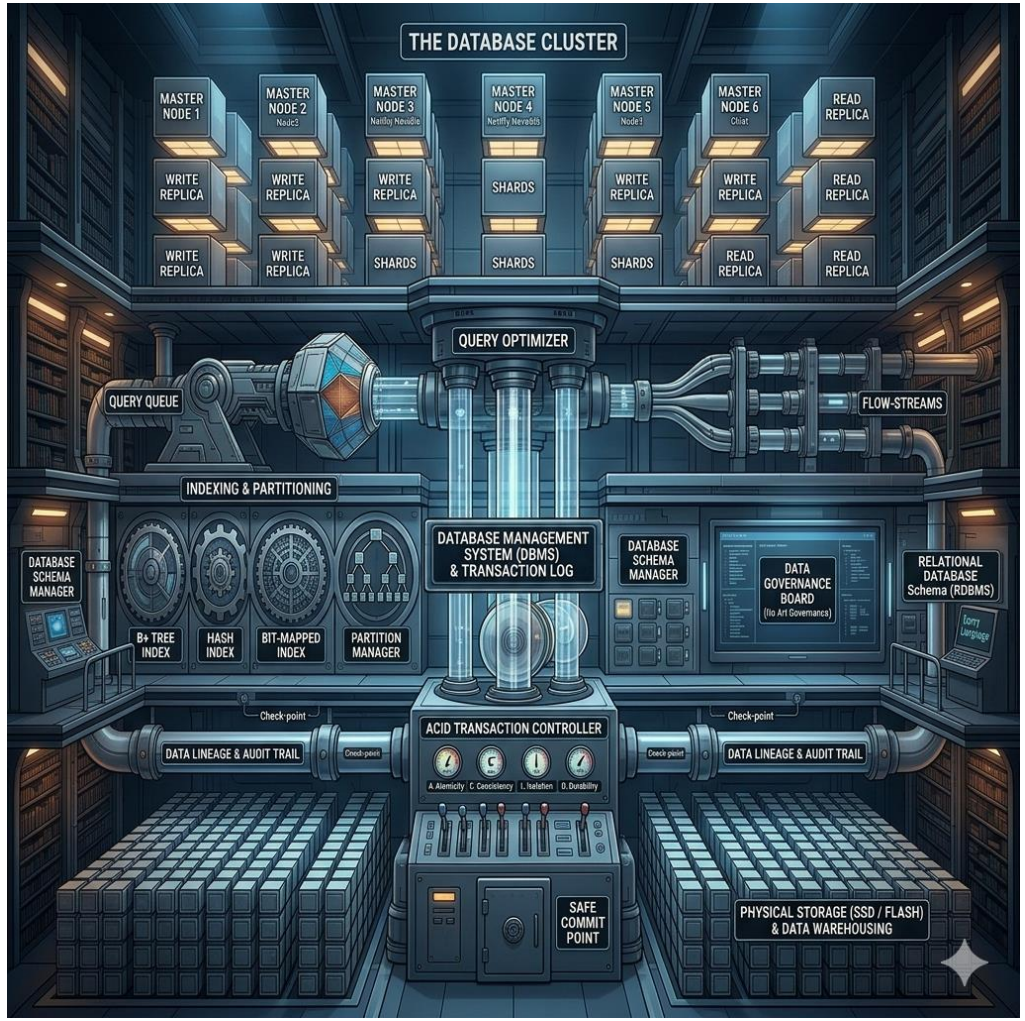
The course covers not only **data models** and **data analytics** aspects but also **novel programming paradigms** for **distributed processing**.

- Modern AI owes part of its existence to big data
- Big tech companies care about scaling AI, not just building prototypes

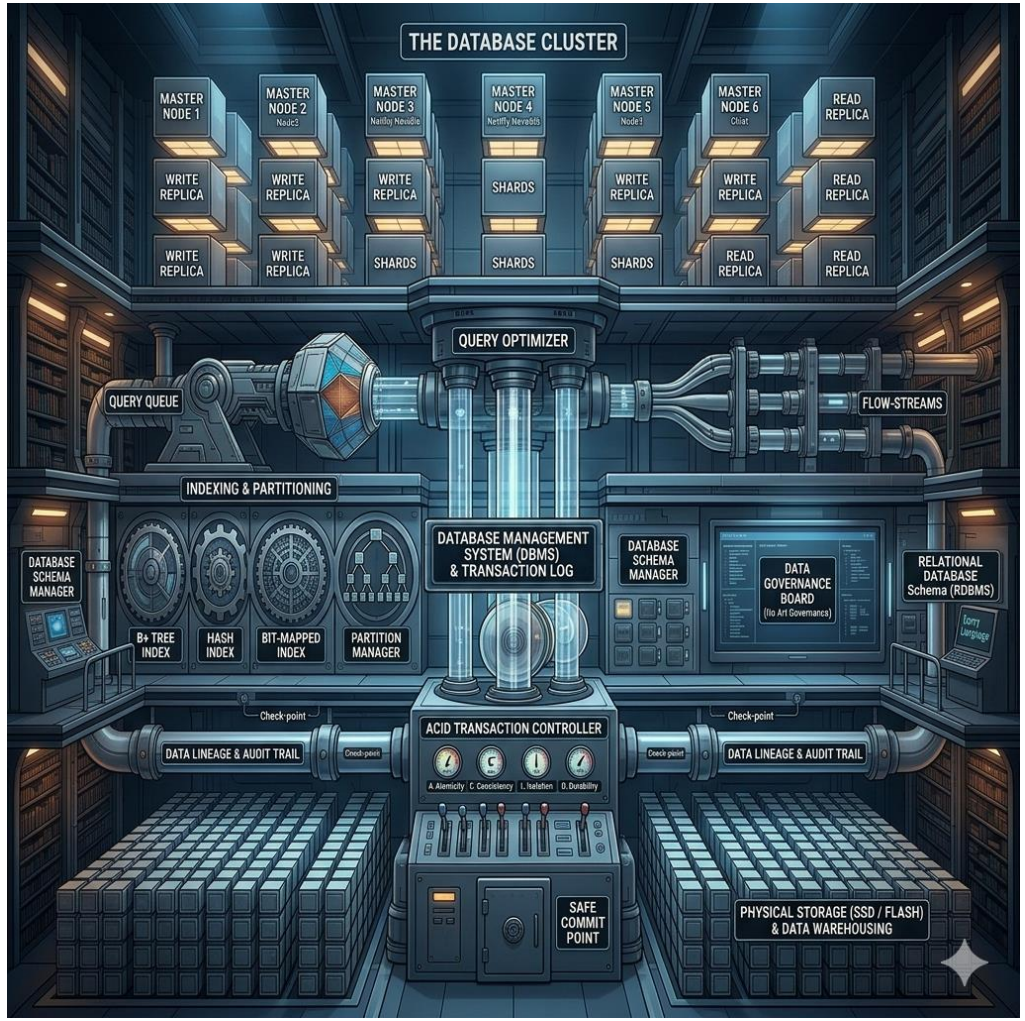
Data Science and Database Technology



Introduces **database management techniques for data warehouses** (database systems specialized in strategic decision support), typically characterized by the need of managing **very large databases**.

Both **traditional OLAP** (On Line Analytical Processing) analysis techniques and **complex data mining techniques** will be addressed.

Data Science and Database Technology



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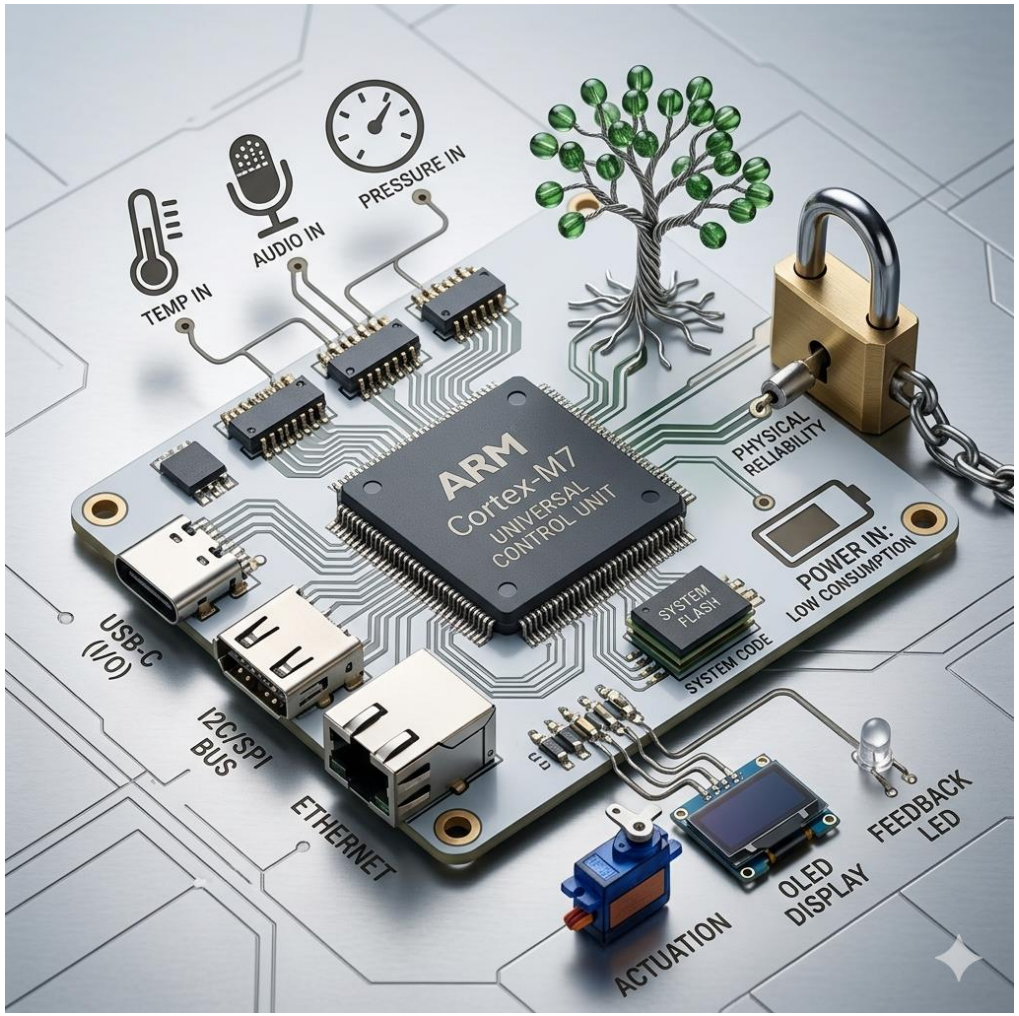
Both **traditional OLAP** (On Line Analytical Processing) analysis techniques and **complex data mining techniques** will be addressed.

- Big tech companies manage real, heterogeneous data collected from thousands (or millions) of users.
- Avoid using solely datasets prepared by others, which may be incomplete or unreliable.

Computer Architectures

Presents the basics of computing systems architectures, with a particular **focus on microprocessor based systems**.

Analyzes the several components from the microprocessor internal architecture, up to system bus for peripheral devices management. It also covers **programming at assembly level**.



Computer Architectures

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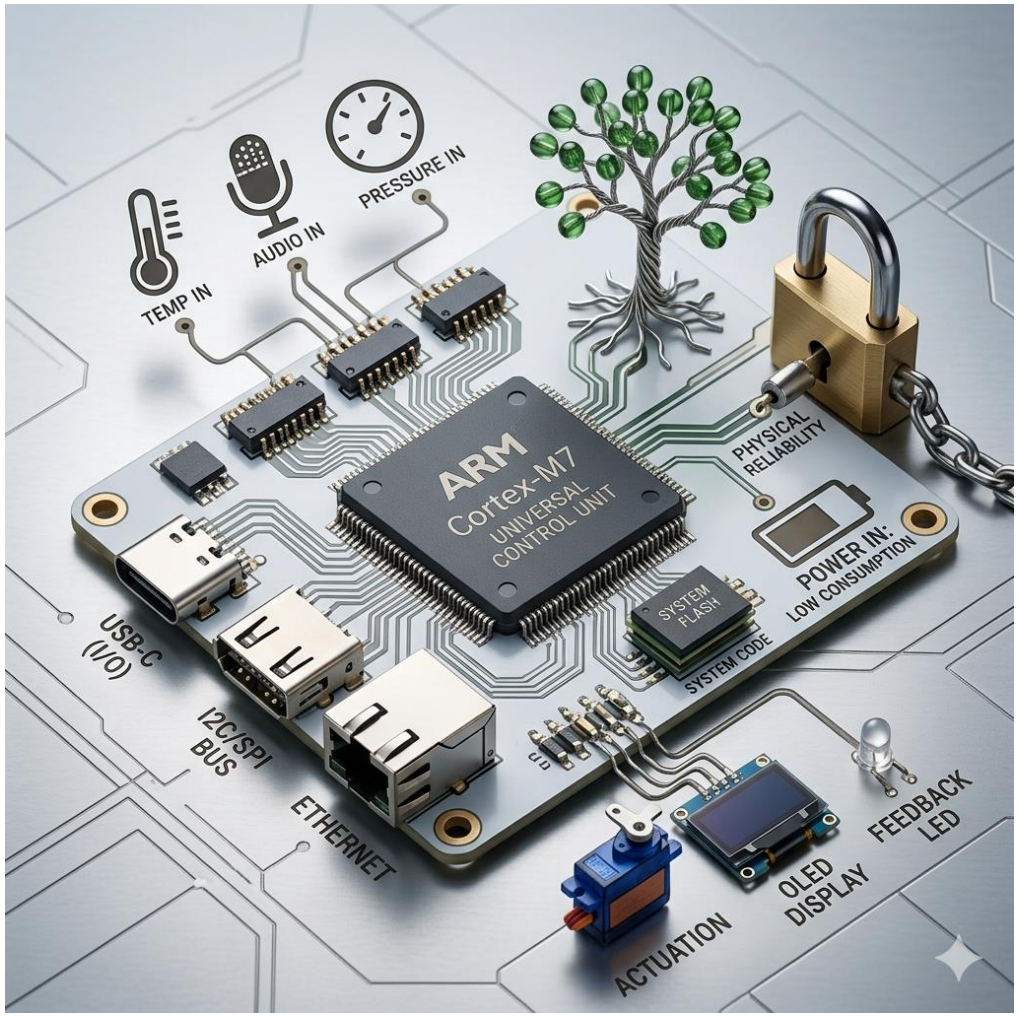
Analyzes the several components from the microprocessor internal architecture, up to system bus for peripheral devices management. It also covers **programming at assembly level**.

- Modern AI owes (the other) part of its existence to efficient hardware
- Expertise on the hardware and low-level programming allows edge computing and embedded AI



Computer Network Technologies and Services

Delves into the design principles of basic technologies underlying **modern computer networks (Ethernet, IPv4, IPv6)**, addresses advanced topics related to the workings of the Internet, such as **routing architecture and protocols**, and presents a number of solutions that play a key role in services commonly offered through the Internet.

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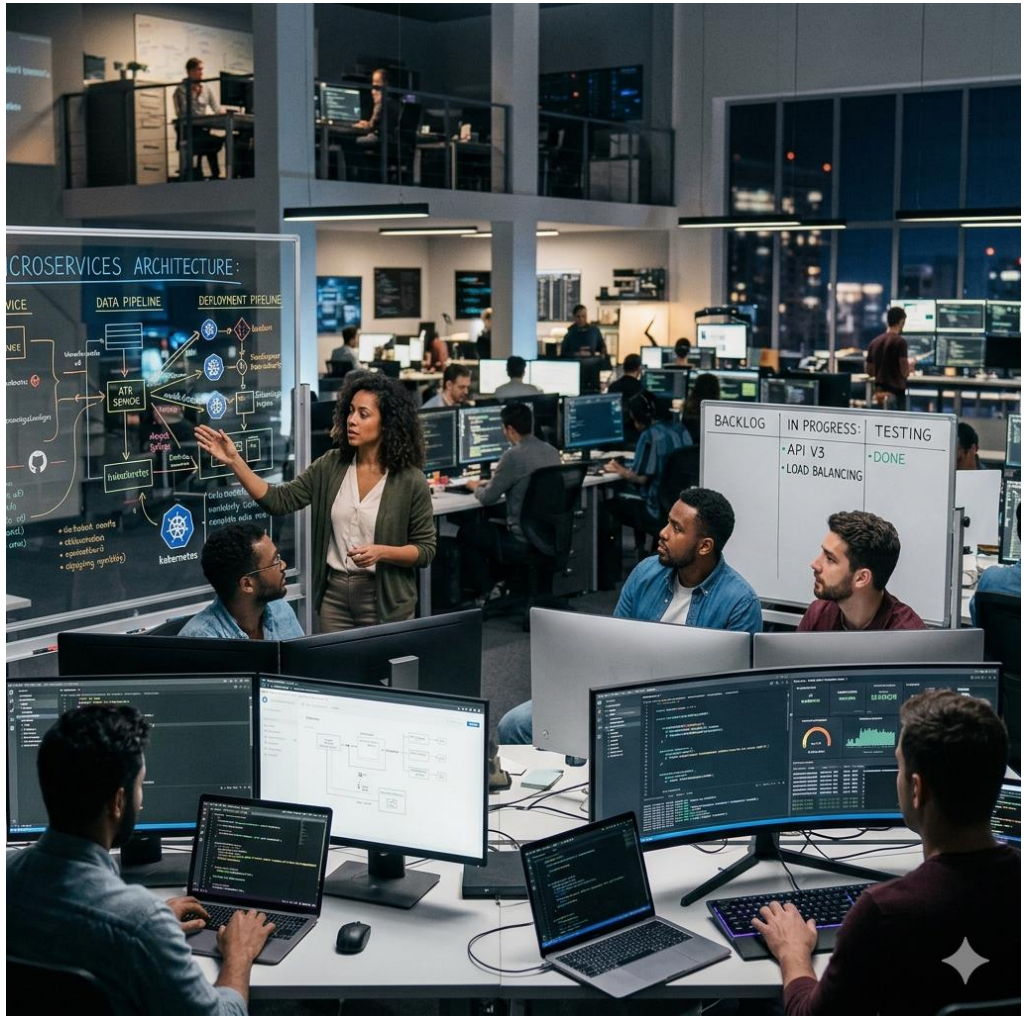
- Without these competences you might know how to create AI but not how to bring it to the users.

1° year – Second Semester

https://www.polito.it/en/education/master-s-degree-programmes/computer-engineering/programme-curriculum

Code	Course	Language	Semester	Credits
05BIDYG	Ingegneria del software		2	8
	or			
04GSPYG	Software engineering		2	8
01UDFYG	Applicazioni Web I		2	6
	or			
01TXYYG	Web Applications I		2	6
01GRSYG	Programmazione di sistema		2	10
	or			
03NYHYG	System and device programming		2	10
01URTYG	Machine learning and pattern recognition		2	6

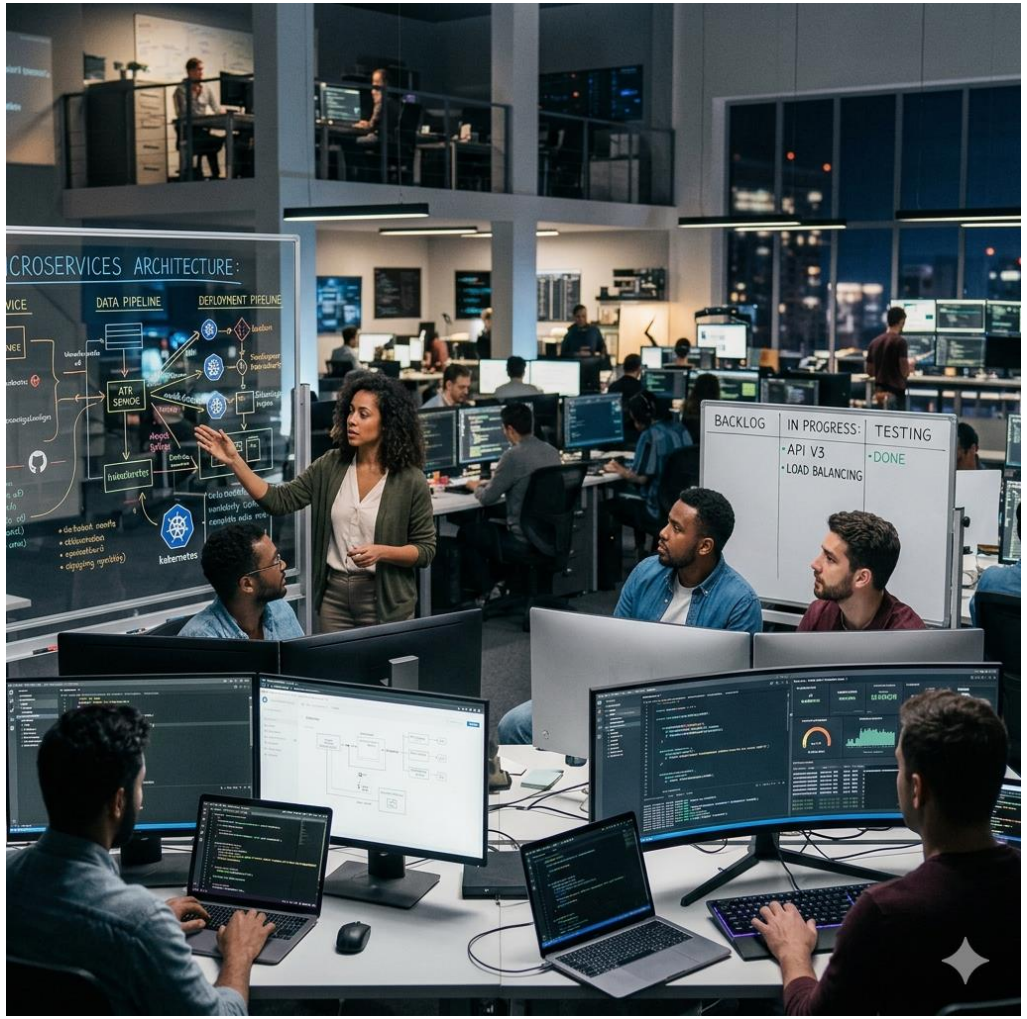
Software Engineering



Provide knowledge on how to tackle common issues in the **development of large software systems** (communication and coordination between contractors and developers, evolution, correctness, reliability, usability).

Software life cycles. The Unified Modeling Language. Operational **modeling and prototyping**. Verification and validation. **Management and support of software projects**.

Software Engineering



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Software life cycles. The Unified Modeling Language. Operational **modeling and prototyping**. Verification and validation. **Management and support of software projects**.

- An AI model is only a sub-part of an AI-based system
- No real AI system is developed by just one person in one go.

Web Applications

Presents the main techniques for **creating distributed web applications**, focusing in particular on the front-end programming, using the JavaScript language and a client-side programming framework.

Manage the main **design choices**, analyze their impact in term of native JavaScript code, and study **different types of formats for data exchanges** with application examples.

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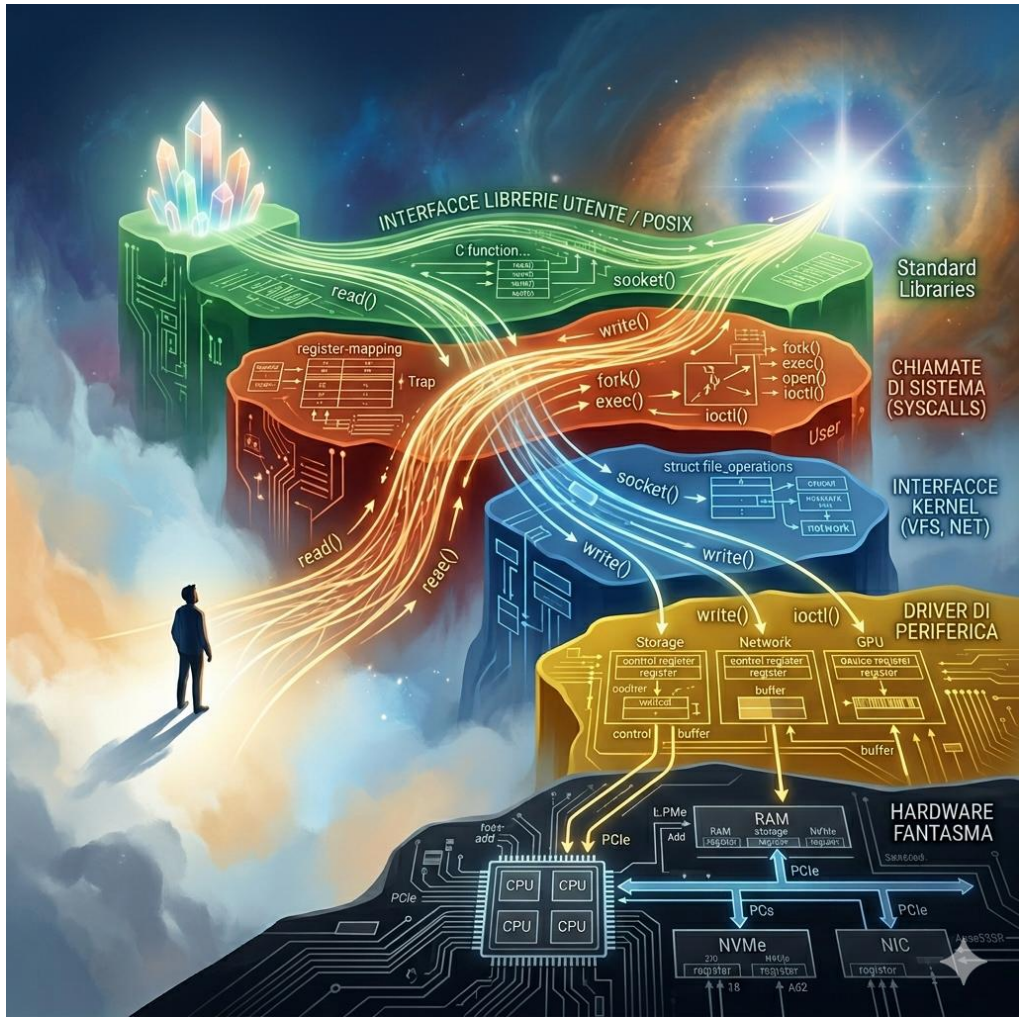
Manage the main **design choices**, analyze their impact in term of native JavaScript code, and study **different types of formats for data exchanges** with application examples.

- Knowing how to build web applications is what turns an AI model into a real product

System and Device Programming

It introduces the **architecture and the design principles of an operating system**.
It deals with internal operating system modules, together with the leading **techniques and strategies for efficiently managing the resources** of a computer, such as processors, memories, peripheral devices, files, etc.

The second part describes the **interfaces for system programming, resource management and concurrent programming**. It introduces system programming techniques within state-of-the-art operating systems, such as Unix/Linux, Windows, and macOS.



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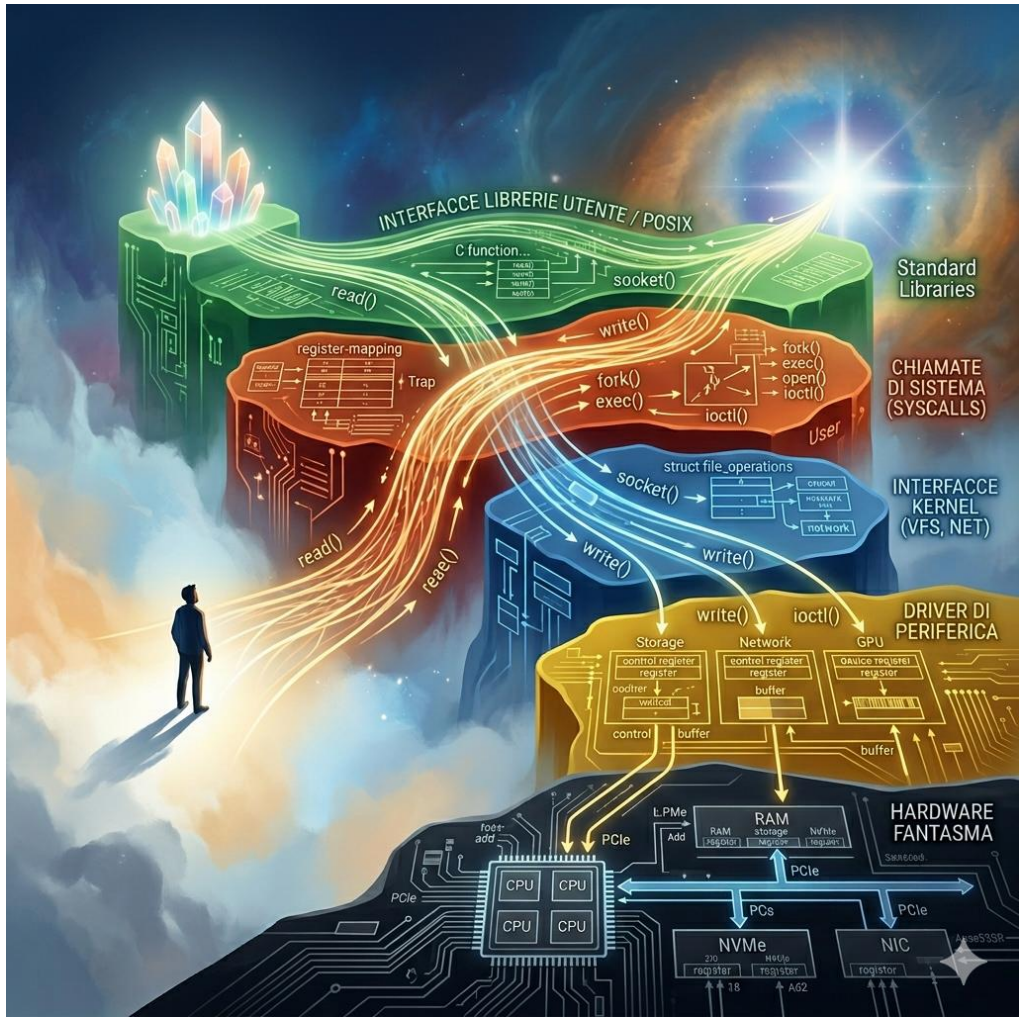


- Modern AI training and inference happen almost exclusively on GPUs. CUDA allows C++ to talk to that hardware.
- You'll learn how to prevent memory leaks that could crash a training three days into a week-long run.

Machine Learning and Pattern Recognition

The course covers the basic concepts of **statistical machine learning**. The objective is to provide the students with solid theoretical bases that will allow them to **select, apply and evaluate different classification methods on real tasks**. The students will also acquire the required competencies to devise novel approaches based on the frameworks that will be presented during the classes. The course will include laboratory activities on real data using modern programming frameworks.

2° year – First Semester

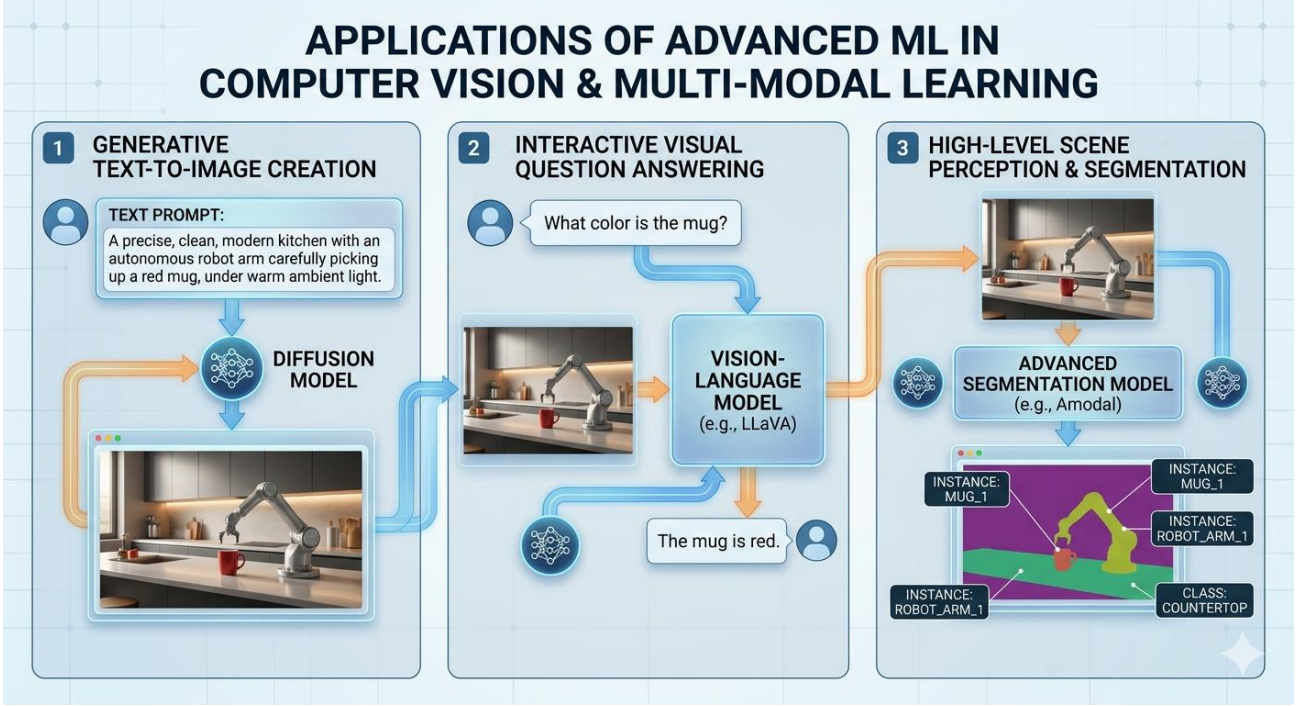
https://www.polito.it/en/education/master-s-degree-programmes/computer-engineering/programme-curriculum

Code	Course	Language	Semester	Credits
01URWYG	Advanced Machine Learning		1	6
02TZHYG	Insegnamento a scelta 1 (view Full curriculum)	-	1	6
01TYMYG	Information systems security *or*		1	6
01UDUYG	Sicurezza dei sistemi informativi		1	6

Advanced Machine Learning

The course addresses **core topics of modern Artificial Intelligence and Machine Learning**, presenting the principles underlying **Deep Neural Networks** and their applications in **Computer Vision and Multi-modal learning**.

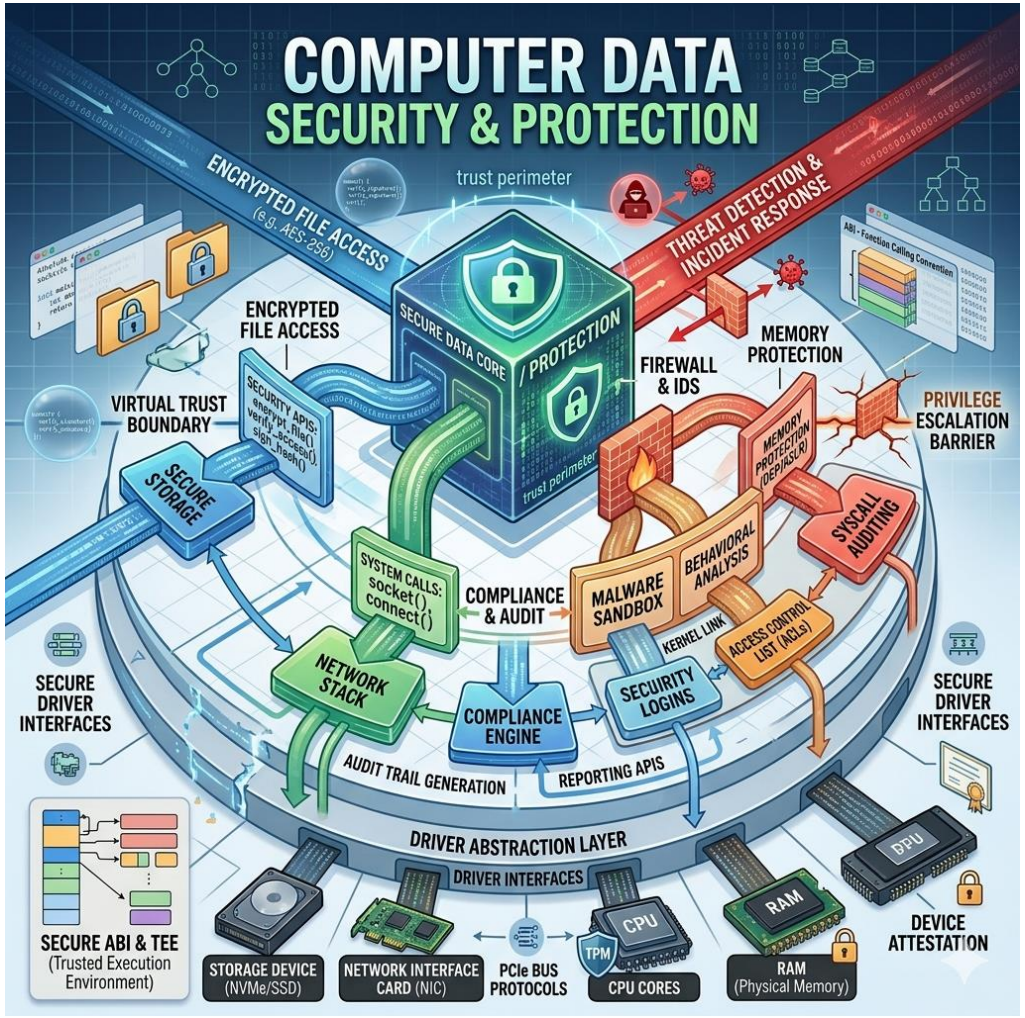
The students will be guided through the relevant literature and will learn how to design and use deep learning algorithms. Lab activities will equip students **with first-hand experience on modern optimization methods and programming framework**, applied on specific case studies.



Information System Security

This course aims to teach the skills needed to perform both **the analysis and the high-level design of security solutions** for systems, devices, or infrastructure protection.

The most widely encountered cybersecurity attacks will be introduced and the security properties of components and information systems will be extensively discussed through practical examples. The course presentes the **main cryptographic algorithms**, the methods used for the **implementation of the security properties**, as well as the **architectures** put in place for trust establishment and commonly used **secure data** formats.



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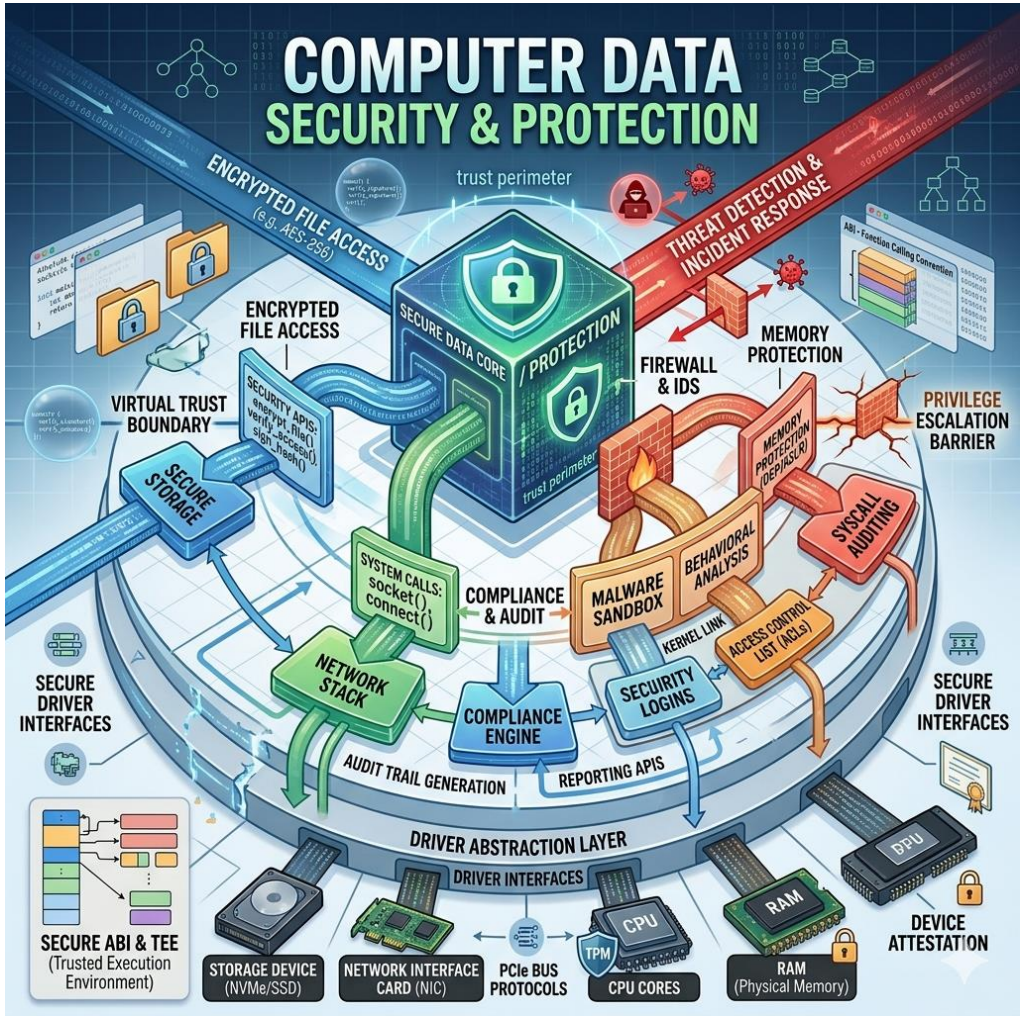
- AI without security is not innovation, it is a risk.



2° year – Second Semester

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Code	Course	Language	Semester	Credits
02UEWYG	Challenge		1,2	8
	or			
63ICPYG	Crediti liberi (view Full curriculum)	-	1,2	6
29EBHYG	Tesi (view Full curriculum)	-	1,2	30
02TZJYG	Insegnamento a scelta 2 (view Full curriculum)	-	2	6

2° year – 2° semester – «Insegnamenti a scelta»

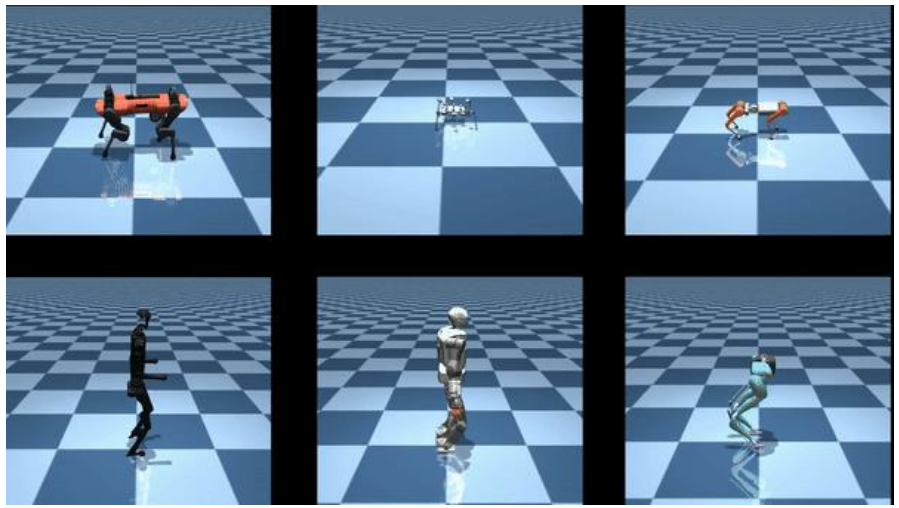
Insegnamento a scelta 1

Semester	Code	SSD	Course	Language	Credits
1	**01HFPYG**	6 cfu - ING-INF/05 (IINF-05/A)	Cloud Computing Technologies		6
1	**01URRYG**	6 cfu - ING-INF/05 (IINF-05/A)	Computational intelligence		6
1	**01TXZYG**	6 cfu - ING-INF/05 (IINF-05/A)	Distributed systems programming		6
1	**01WMRYG**	6 cfu - ING-INF/05 (IINF-05/A)	HCI Fundamentals		6
1	**01VRTYG**	6 cfu - ING-INF/05 (IINF-05/A)	Large Language Models for Software Engineering		6
1	**01OUVYG**	6 cfu - MAT/09 (MATH-06/A)	Optimization methods and algorithms		6
1	**01HFNYG**	6 cfu - ING-INF/05 (IINF-05/A)	Robot Learning		6
1	**01SQNYG**	6 cfu - ING-INF/05 (IINF-05/A)	Software Engineering II		6

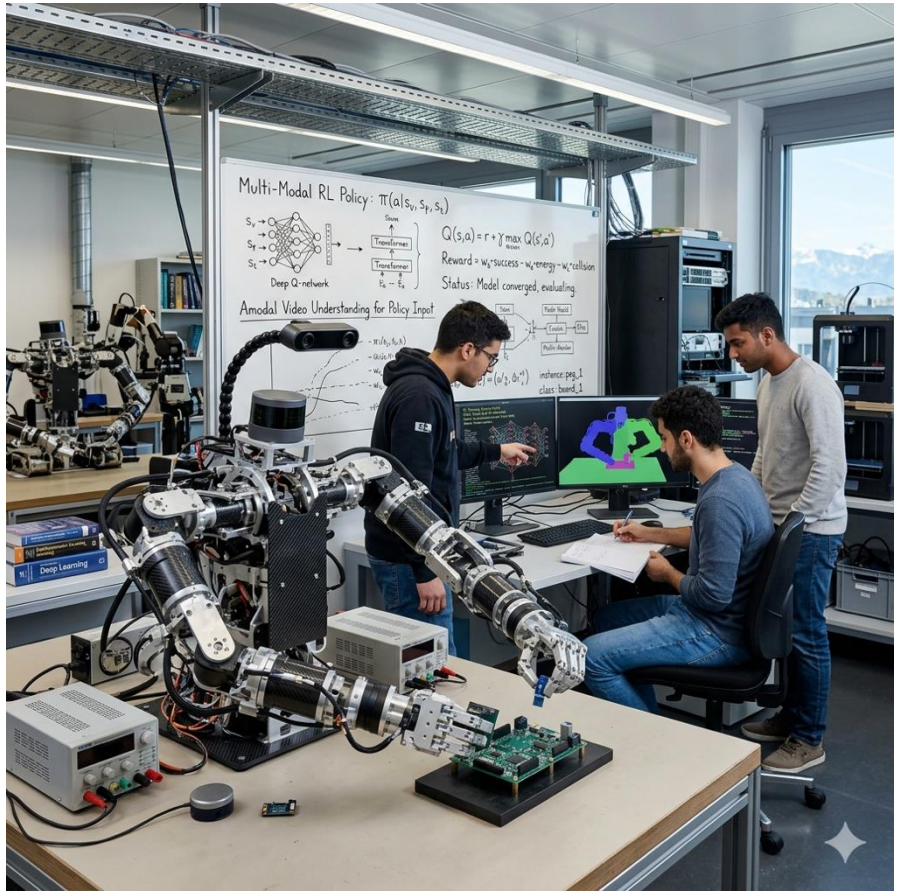
https://didattica.polito.it/pls/portal30/sviluppo.offerta_formativa_2019.vis?p_coorte=2027&p_sdu=37&p_cds=562

Robot Learning

This course will provide foundational knowledge on **robot systems and their control**, with the purpose of developing robots with an **embodied intelligence**, able to learn how to perceive and interact with the surrounding world. Lectures will focus on theoretical and practical knowledge on **machine learning solutions for autonomous systems**.



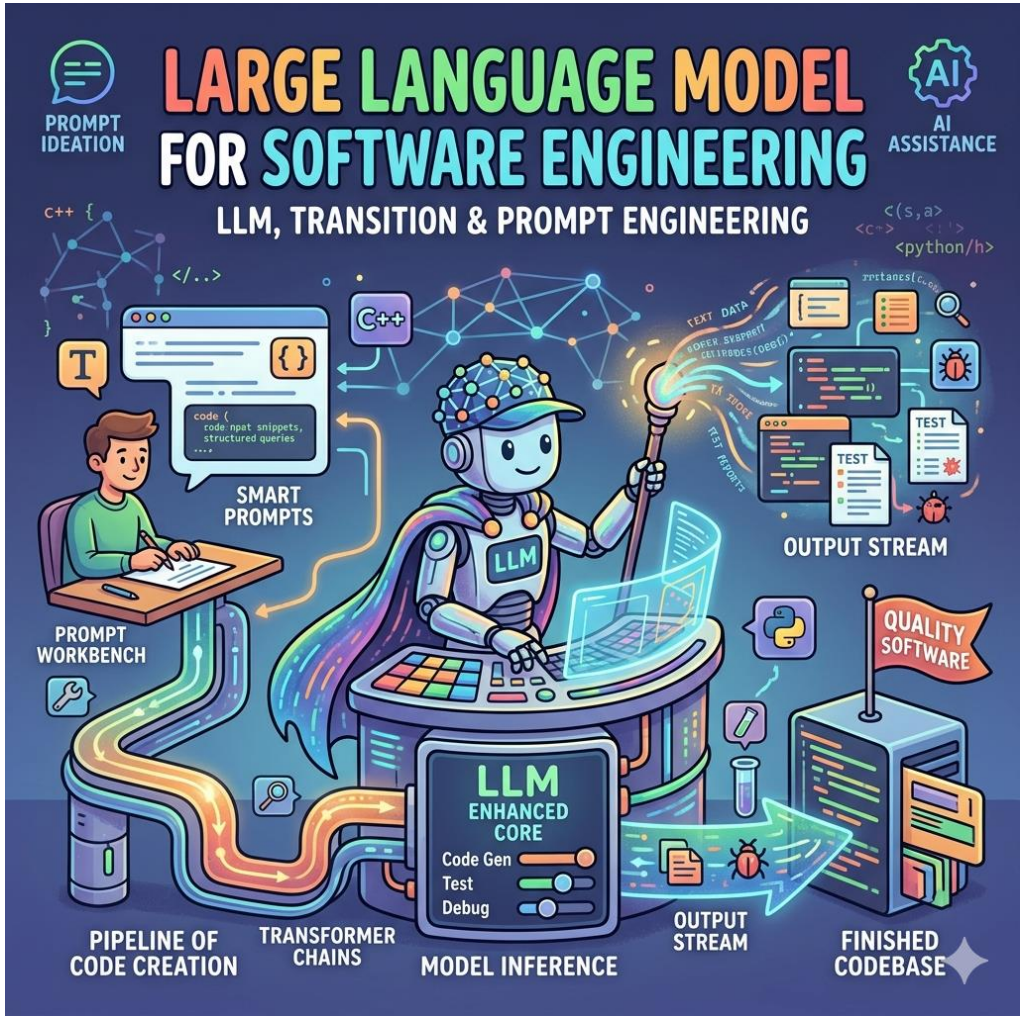
https://www.ias.informatik.tu-darmstadt.de/Research/Locomotion



Large Language Model for Software Engineering

Theoretical foundations of LLM
- **Transformers** architecture
- LLM taxonomy and evolution
- LLM training, fine-tuning, evaluation

Practical applications of LLM to SE
- Understanding of SE
- **Prompt engineering**
- Ethical & Societal impacts



2° year – 2° semester – «Insegnamenti a scelta»

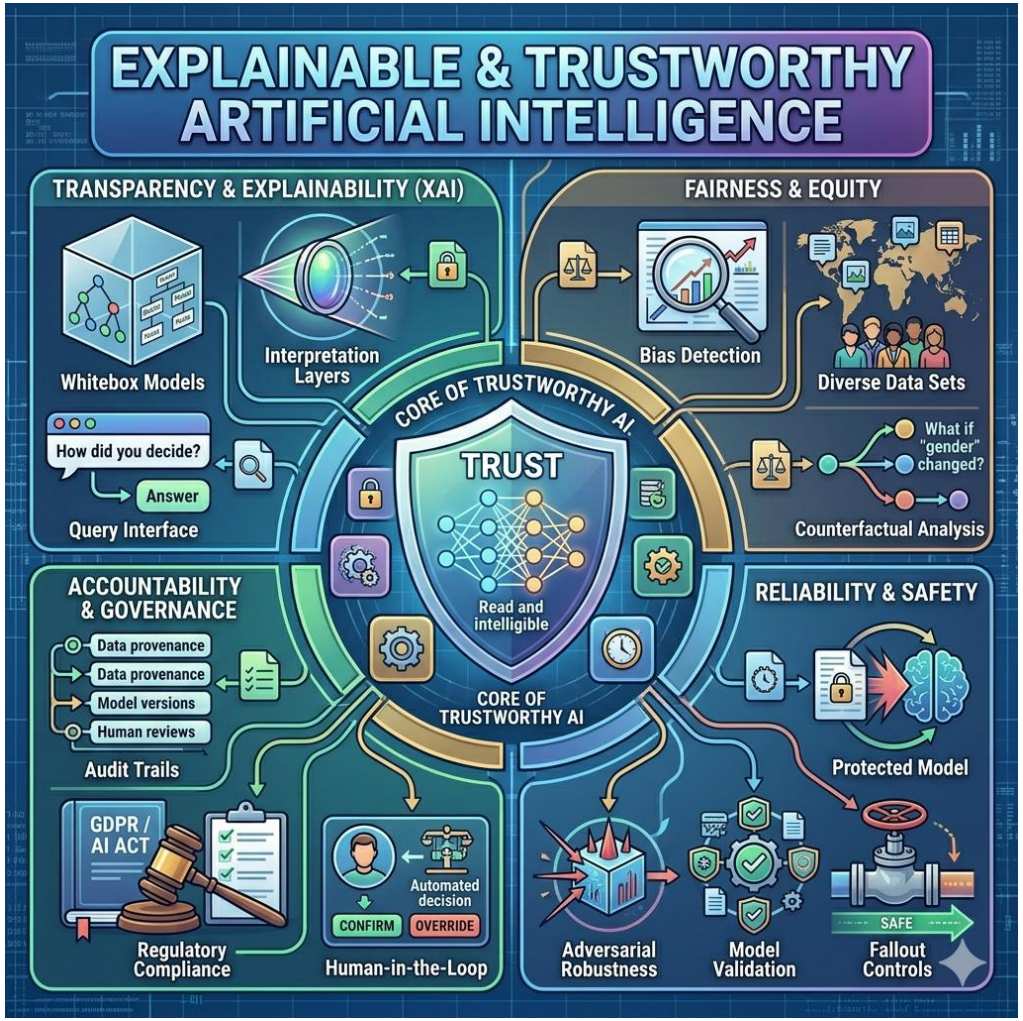
Insegnamento a scelta 2

Semester	Code	SSD	Course	Language	Credits
1	**01TXSYG**	6 cfu - ING-INF/05 (IINF-05/A)	Web Applications II		6
2	**01HZOYG**	6 cfu - ING-INF/05 (IINF-05/A)	Advanced data modeling and management		6
2	**01OVFYG**	6 cfu - ING-INF/05 (IINF-05/A)	Bioinformatics		6
2	**01HFOYG**	6 cfu - ING-INF/05 (IINF-05/A)	Explainable and trustworthy AI		6
2	**01WMSYG**	6 cfu - ING-INF/05 (IINF-05/A)	Intelligenza Artificiale: catene del valore, etica e geopolitica		6
2	**01URXYG**	6 cfu - ING-INF/05 (IINF-05/A)	Machine learning in applications		6
2	**01PFPYG**	6 cfu - ING-INF/05 (IINF-05/A)	Mobile application development		6
2	**01OUZYG**	6 cfu - ING-INF/05 (IINF-05/A)	Model-based software design		6
2	**01SQHYG**	1 cfu - ING-IND/14 (IIND-03/A); 2 cfu - ING-INF/04 (IINF-04/A); 3 cfu - ING-INF/05 (IINF-05/A)	Technologies for Autonomous Vehicles		6

Explainable and Trustworthy AI

This course will cover **explanation methods for both predictive and explorative Machine Learning algorithms**, with a specific attention to their exploitation in deployed machine learning frameworks.

Experimental activities in lab will allow the practical evaluation of the presented explanation methods on real-world datasets, considering both the ML developer and final user perspectives.



Dal Regolamento didattico del Corso di laurea magistrale in INGEGNERIA INFORMATICA (COMPUTER ENGINEERING) - Progettista di sistemi informatici per applicazioni di intelligenza artificiale e analisi dei dati
https://www.polito.it/sites/default/files/2025-07/Regolamento_didattico_LM_ING%20INFORMATICA_25_26-1-1-1.pdf

FUNZIONE IN UN CONTESTO DI LAVORO: L'ingegnere informatico magistrale che ricopre il ruolo di data analyst svolge le seguenti funzioni:

- analizza i requisiti dei sistemi e dei processi di analisi dei dati,
- progetta sistemi e processi informatici per l'estrazione, la trasmissione sicura, la memorizzazione, la visualizzazione e l'analisi di grandi moli di dati eterogenei,
- sviluppa e implementa metodologie per la realizzazione dei processi di analisi dei dati,
- utilizza e ridisegna algoritmi di machine learning e intelligenza artificiale per effettuare analisi sui dati, modelli predittivi e ottimizzazione di processi.

COMPETENZE ASSOCIATE ALLA FUNZIONE: Il data analyst ha la capacità di svolgere analisi dei requisiti, progettare sistemi informatici e processi di analisi dei dati, grazie alle seguenti competenze:

- conoscenza di sistemi IoT, e delle tecniche per la progettazione delle comunicazioni tra diversi dispositivi e la distribuzione della computazione edge/cloud
- conoscenza dei sistemi distribuiti e delle basi di dati NoSQL utilizzati per raccogliere, memorizzare e analizzare grandi moli di dati eterogenei,
- capacità di risoluzione di problemi data-driven,
- conoscenza delle metodologie e dei linguaggi di programmazione utilizzati per realizzare applicazioni in ambito big data,
- conoscenza di algoritmi di machine learning, deep learning e intelligenza artificiale utilizzati per l'analisi dei dati.
- capacità di integrare e riprogettare metodologie di learning e di intelligenza artificiale.

SBOCCHI PROFESSIONALI:
Dipartimenti IT di aziende medio-grandi.
Società di consulenza informatica e non.
Società di sviluppo software.
Grandi società con dipartimenti per l'analisi dati e la generazione di modelli predittivi.
Società di sviluppo metodologie di intelligenza artificiale.

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Department of Control
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Politecnico di Torino

COLLEGIO ICM

#TOMORROW STARTS TODAY

Aperitivo di Benvenuto

Venerdì **27 Marzo** 2026 H. **17:30**

2° piano Dipartimento **DAUIN**, **Corso Castelfidardo 34/d** (ingresso lato MixTo)

Occasione perfetta per fare nuove conoscenze, scoprire i laboratori DAUIN del collegio ICM ed incontrare i docenti dei relativi corsi di studio!