Information Technology Essentials — Lecture 01

Dr. Karim Lounis

Fall 2023

Who am I?

Dr. Karim Lounis

Assistant Professor at ENISA (since October 2022).

Research area: ISs Security (Wireless Security).

Ph.D. in Computing (Queen's Univ, Canada, 2020).

MSc in IS Security (Paris-XII Univ, France, 2014).

MSc in Networks & DSs (USTHB, Algeria, 2013).

BSc in Networks & Telecom (USTHB, Algeria, 2011).

Research Assistant in cybersecurity (Germany, Luxembourg, & Canada).

Can visit my website for more details: https://lounis.weebly.com/.

Shoot an email to: karim.lounis@ensia.edu.dz.

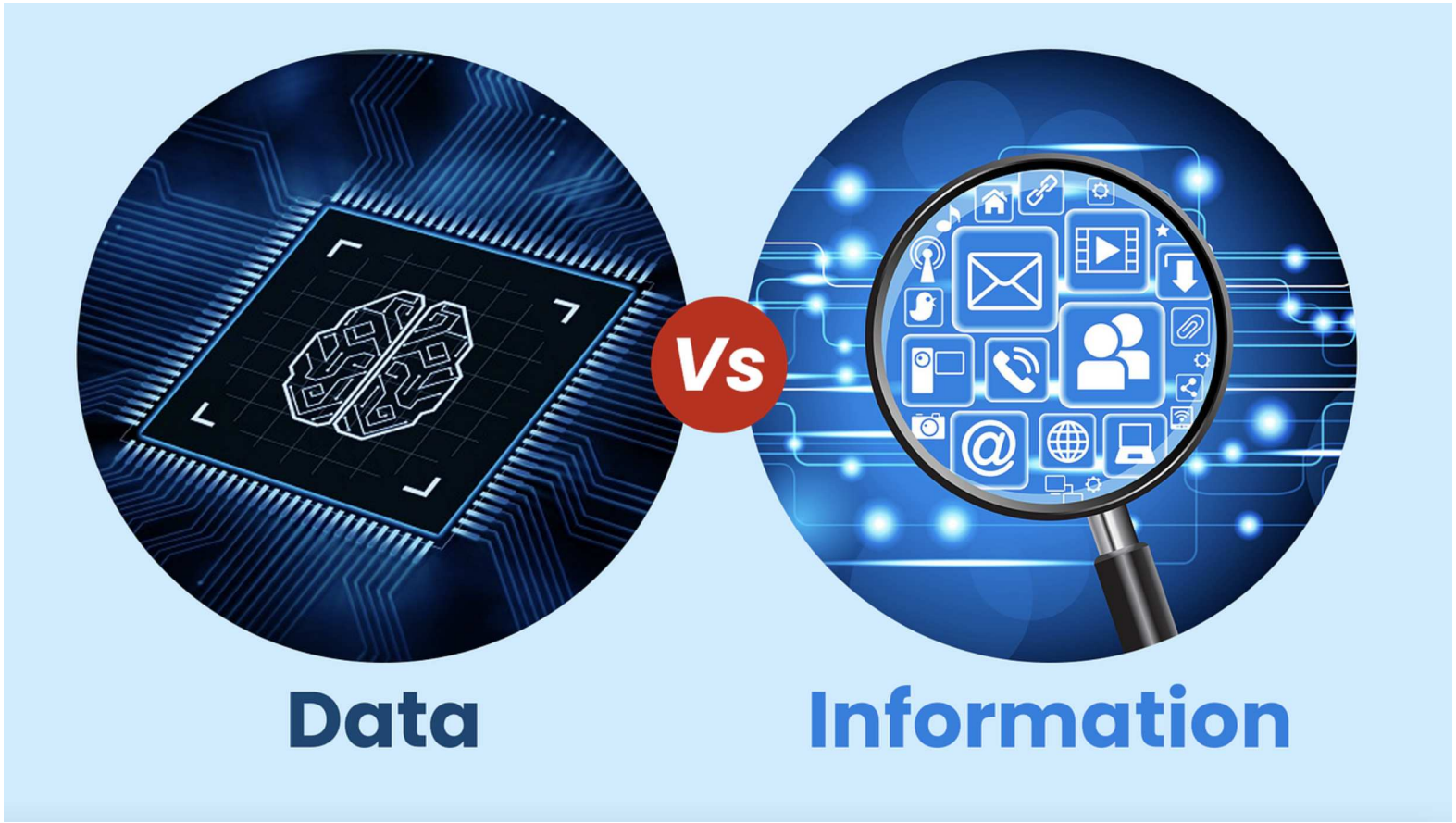
Walk in to office: TBC (Set up a meeting).

Some Questions

What is this course about?

Information Technology Essentials

Let's first start by defininig the following two terms:



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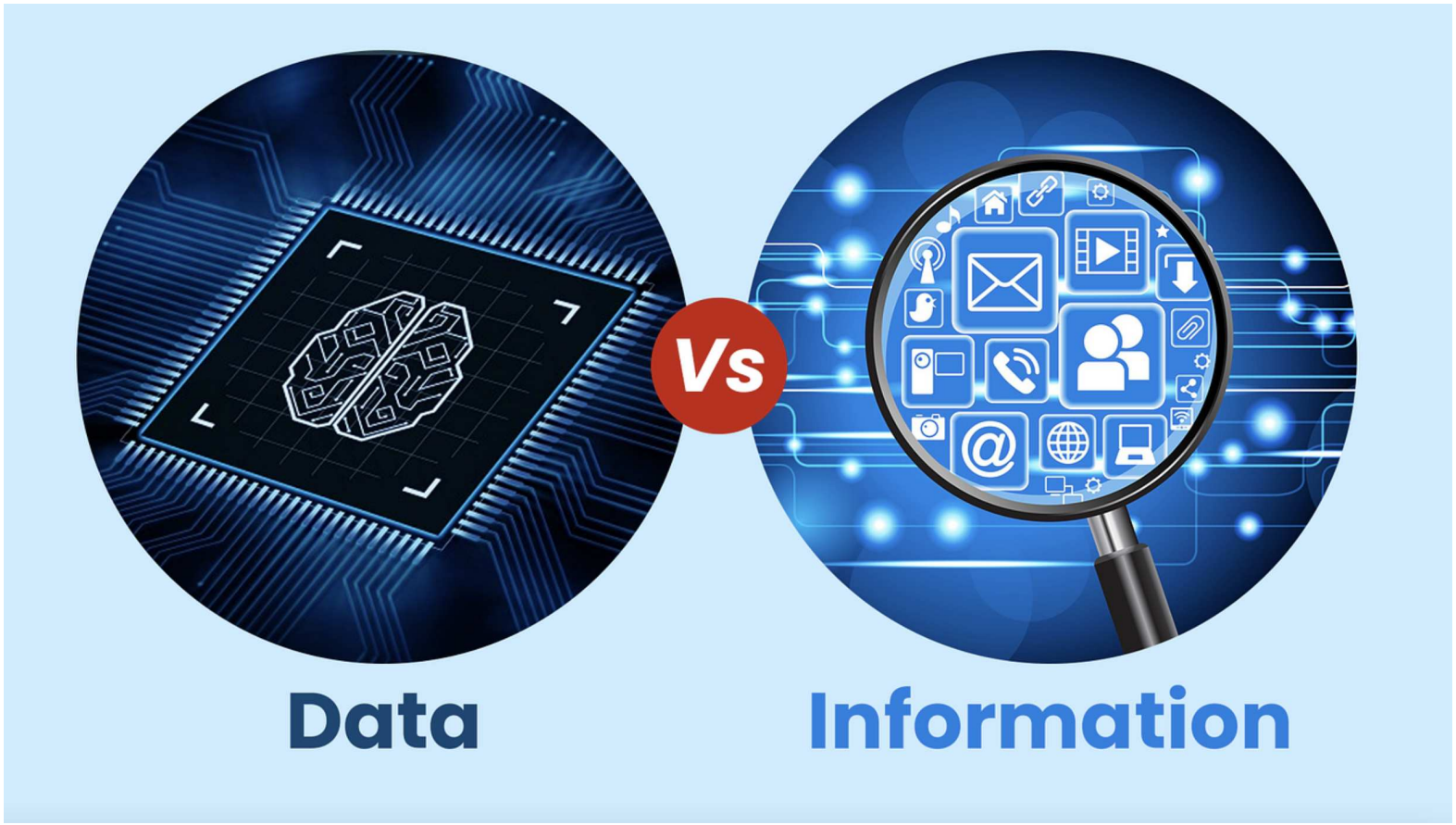


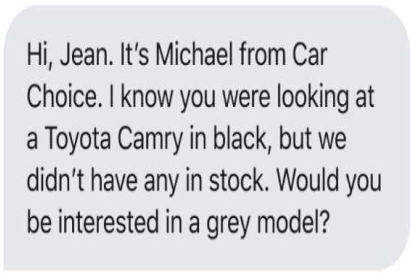
"Data is the raw material, and information is the meaningful output derived from processing and organizing that data." — ChatGPT

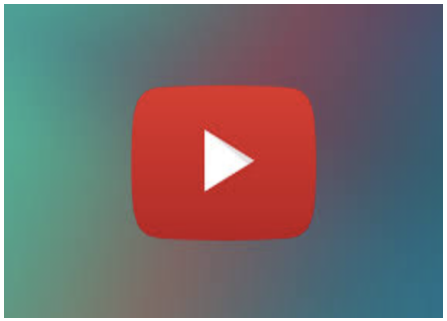
Let's first start by defining the following two terms:

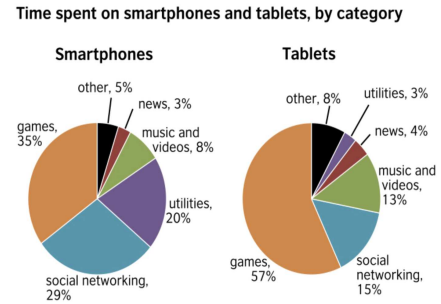
1. Data. Refers to raw facts, figures, symbols, or values that represent something but lack context or meaning on their own. E.g., a list of numbers.

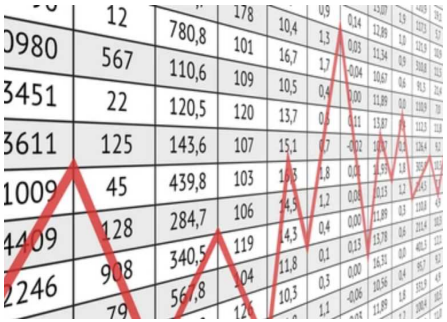
... **10101110 11110010 00101010 00101110 11111101** 01011110 ...

2. Information. Information is the result of processing and organizing data in a way that gives it context, meaning, and relevance.









Of course, here we are referring to digital data and information.

Information Technology Essentials

Information Technology

A.k.a., IT, refers to the use of computers, software, networks, and electronic systems to store, process, transmit, and manage digital information.

Information and Communication Technology

A.k.a., ICT, refers to the use IT and communication technology (i.e., the various ways in which IT is used to communicate, share information, and interact).

Essentials. Refers to the fundamental and necessary components that are necessary for something to function and operate properly and effectively.

Some Questions

Why are you taking this course?

Some Questions

Why should you care about taking this course?

Motivation

There are various reasons for why you should like and enjoy information technology:

- Real-world relevance:

  How do computers impact your daily lives?

- Connection with your interest:

  How does the use of computers intersect with your activities of interest?

- Career opportunitiest:

  What are the different opportunities that you see as promising career paths in computing?

- Challenges and Curiosity

  What are the challenges and puzzles that computer scientists face?

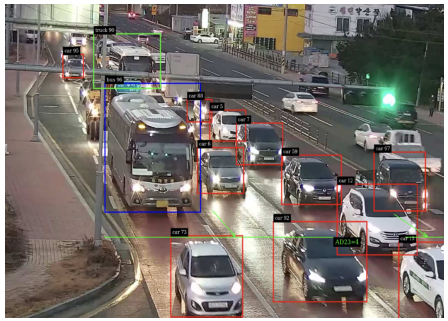
- Showcase Innovation

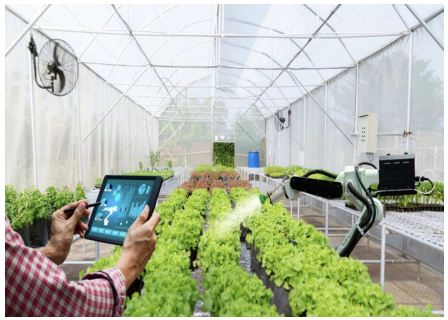
  What are the most recent technological breakthroughs that you heard of?

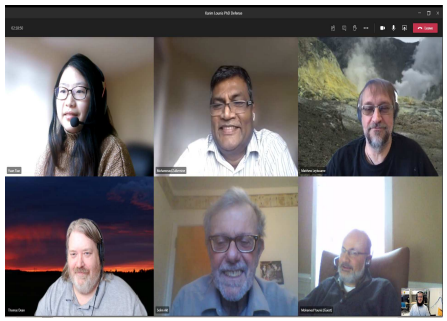
Motivation

- Real-world relevance: How do computers impact your daily lives?








Motivation

- Connection with your interest: How does the use of computers intersect with your activities of interest?

Motivation

- Career opportunities: What are the different opportunities that you see as promising career paths in computing?

Motivation

- Challenges and Curiosity:

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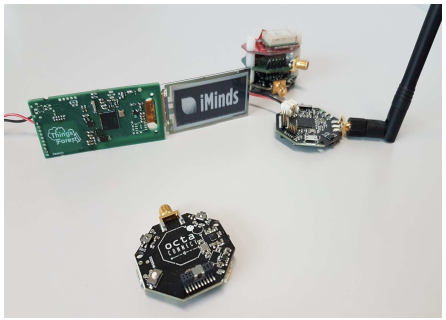
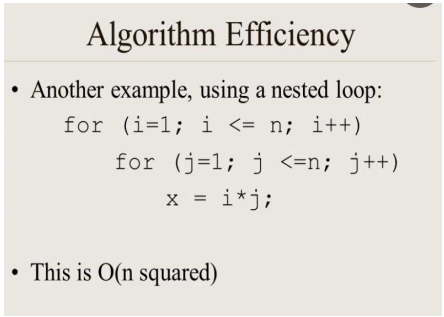
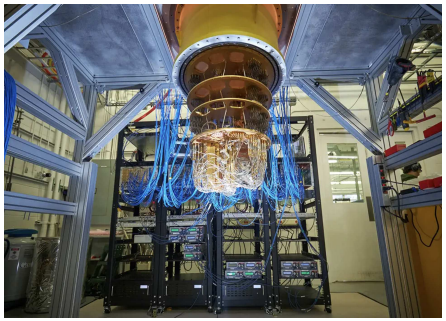


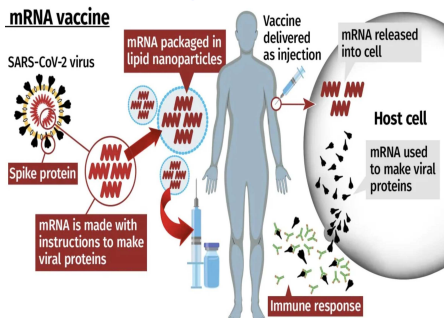


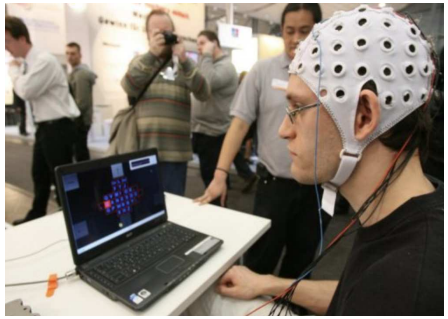
Motivation

- Showcase Innovation

What r the most recent technological breakthroughs that u heard of?







Issues in Information Technology

There are vairous ethical, legal, environmental, and social issues related to information technology and ICT:

- **Ethical Issues:**
  - Privacy: To what extent do we have the right to privacy?
  - Inclusivity: To what extent does computing marginalise people?
  - Professionalism: Does IT help in a working context?
- **Environmental Issues:**
  - Health: How is physical and mental health affected?
  - Energy use: More computing power means more electricity. Most devices are inefficient.
  - Resources: IT resources consume a significant amount of raw materials that some of which are hard to properly recycle and can have environmental impact.

Issues in Information Technology

There are vairous ethical, legal, environmental, and social issues related to information technology and ICT:

- **Cultural Issues:**
  - Social media. How it is changing interactions. It may bring a lot of positivity, holding businesses and politics, etc. Might be used to influence opinions and personalities, easier to spread abuse, misinformation, etc.
  - Employment. It has changed job market, online jobs, etc.
  - Globalism. Spreading arts, language (English), ...
- **Legal Issues:**
  - Cybersecurity. It is illegal to make any unauthorized access to computer materials... and commit further crimes.
  - Intellectual Property (IP) — creation of mind, generally protected with a patent, copyright (legal ownership), and trademarks.

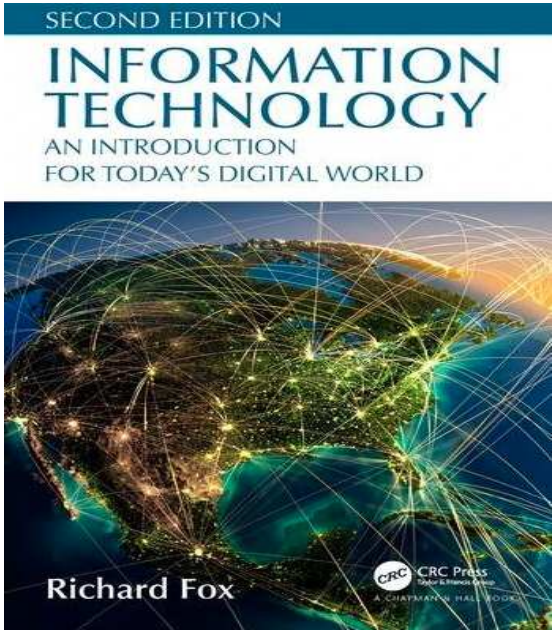
What does this have with the course?

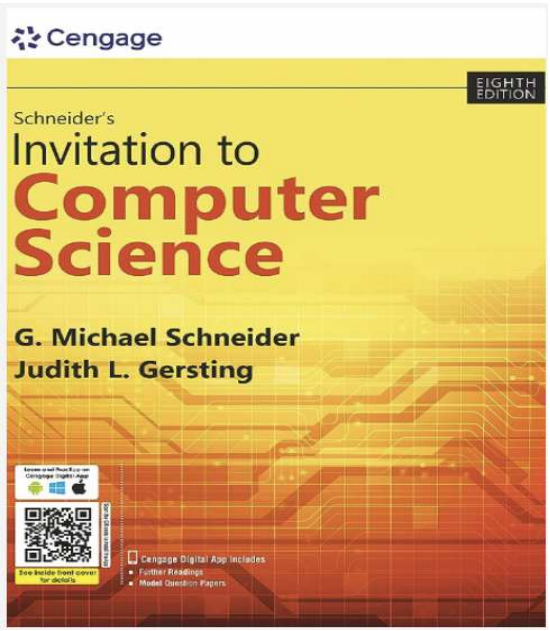
Are you feeling motivated?

Let's get things started then ...

What do you need for the course?

Textbook. We've two interesting textbooks:





Miscellaneous:

- Online materials: Course videos (e.g., Youtube), online books, ..., course materials from other universities.
- Offline materials: Computer, Books (viz., additional books on the website), ...,

What Do You Need for the Course?

Lecture slides: Will be available for download from the course website.

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What Do You Need for the Course?

Background:

Void

Course Delivery

The course will be delivered as follows:

- **Lectures.** Lectures (90 minutes) are held on:
  - Sundays, from 08:30 to 10:00, for Groups 9, 10, 11, & 12, in Amphi 6.
  - Sundays, from 10:10 to 11:40, for Groups 5, 6, 7, & 8, in Amphi 4.
  - Thursdays, from 11:50 to 13:20, for Groups 1, 2, 3, & 4, in Amphi 1.
- **Labs.** These are practical sessions that run for 90 minutes. During these sessions, you're gonna be using your computers (or an ENSIA lab computer) to use some software or write computer programs.
- **Office Hours.** If you had questions and needed further clarification about the lecture slides, or the labs, then office hours will be the perfect location for you to get your questions answered and clarified. They are held every Thursday, from 13:30 pm to 15:00 pm.

Course Evaluation

The course grade will be evaluated based on the following:

- **CE.** In class participation and weekly quizzes (**worth 10%**).
- **Labs.** Some lab tasks have to be evaluated (**worth 10%**).
- **Midsemester exam.** There will be one 1h-exam (**worth 20%**).
- **Final Exam.** There will be a 90m-final exam (**worth 60%**).

What do you Need to do to Succeed in this Course?

Few things:

1. Attend the course lectures, focus while I am talking, take note, ask questions if not clear.
2. Complete your labs.
3. If you did not understand something during the lecture or lab sessions, try not to miss office hours.
4. In the worst case, shoot an email (avoid after 9:00 PM).
5. If you are facing difficulties following this course, reach out as soons as possible before things get worse.
6. Use the question box at the end of the lecture.

More things: Class policy.

What's the Course Content?

- Syllabus, motivation, and overview.
  - Course syllabus.
  - Motivation.
  - Course content.
  - Information technology.
  - Information and communication technology.
  - Issues related to IT and ICT.
- Concepts, notions, and terminologies in computers
  - The concept of systems
  - Computers
  - Problems and decidability
  - Algorithm and problem solving
  - Programming language
  - Computer programs
  - Compiler
  - Machine code

What's the Course Content?

- Computer Architecture
  - The Von Neumann architecture model
  - Hardware in computers
  - Central processing unit
  - Central memory and storage devices
  - Processor instruction set
  - Single and multi-processor systems
  - Multicore systems
  - A brief history of computers
  - Type of computers
  - Processors Vs microcontrollers
  - The notion of network and computer network

What's the Course Content?

- Software and Operating Systems
  - The notion of software
  - Application software vs system software
  - Software, firmware, and malware
  - Libraries
  - Documentation
  - Data and information
  - Software Development lifecycle
  - Closed-source and open-source software
  - Software licensing and ethics
  - Operating system
  - Services of operating systems
  - Type of operating systems
  - How does an operating system start
  - Computer system
  - Unix Vs GNU/Linux operating systems.

What's the Course Content?

- Information Systems :
  - Introduction to Information systems
  - The notion of information technology
  - Information systems and information technology
  - Ethical, legal, and social issues in information technology
  - Office suite: Word, Excel, and latex
- Telecommunication Networks
  - Standardization
  - Networks
  - Types of networks
  - Mobile networks
  - Network architecture and devices
  - Ethernet, Intranet, and Internet
  - Addressing in networks
  - Network protocols
  - Network paradigms
  - Emerging networks (IoT, WSNs, 5G, 6G, etc.)

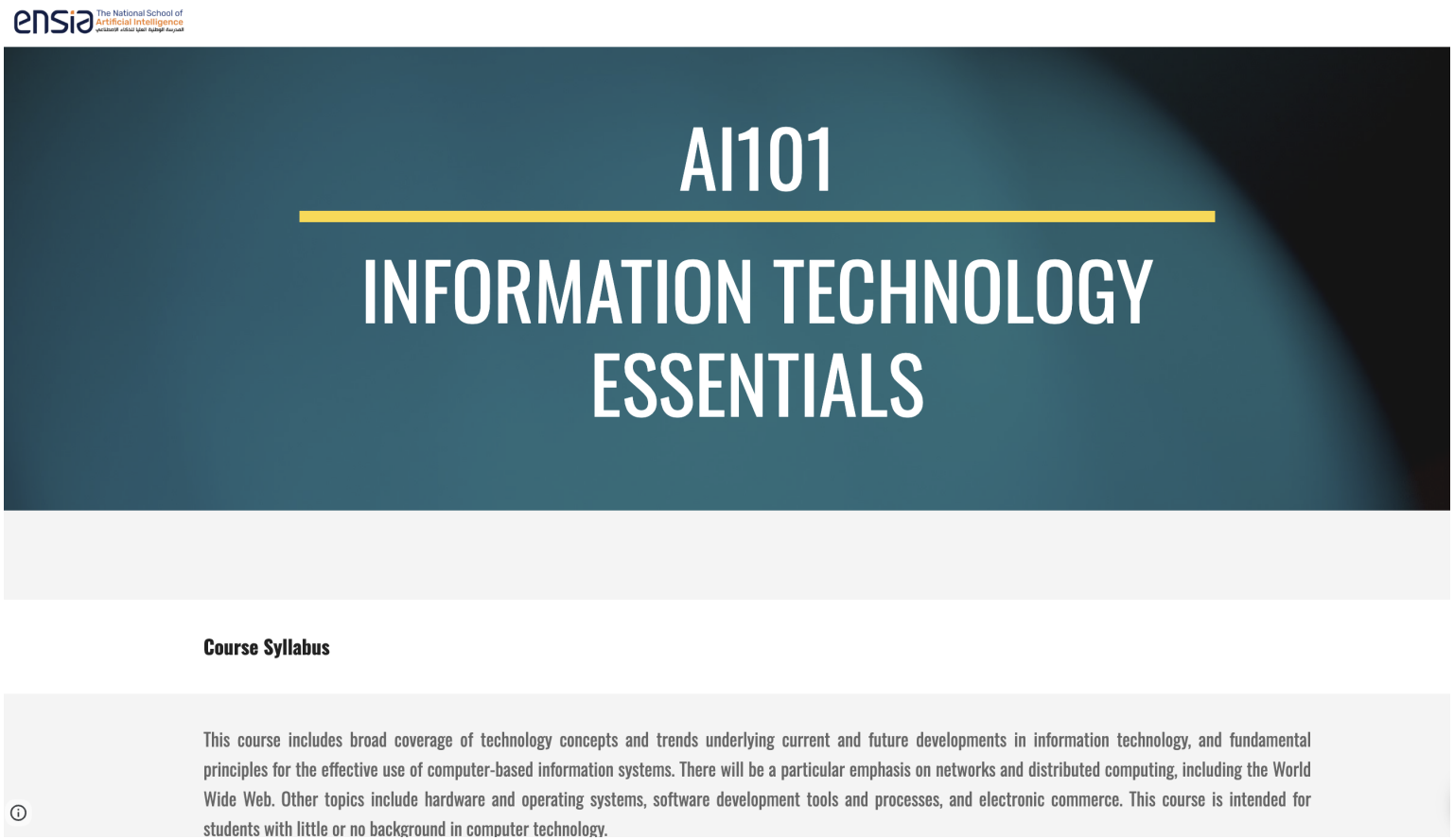
What's the Course Content?

- Web technology
  - The Internet and WWW
  - HTML basics
  - CSS for styling
  - Search Engines
  - Websites
- Trends in Information Technology
  - Internet of Things (IoT)
  - Social Networks
  - Security, privacy, and cybersecurity
  - Data analytics
  - Artificial Intelligence
  - Quantum Computing

Course Website

You can visit the course website for more information and updates:

https://sites.google.com/ensia.edu.dz/ai101/home



Great! when do we start?

- End.