15h00-16h40
DS4H Minors
http://ds4h.univ-cotedazur.eu/minors
DS4H Minors in a nutshell

https://ds4h.univ-cotedazur.eu/minors
DS4H minors
https://ds4h.univ-cotedazur.eu/minors

Additional courses allowing you to access new disciplines alongside your major.
* Check Prerequisites!

« Personal development »
- Tools 2 Communicate
- Introduction to Scientific Research
- Organize your activity in project mode

« Innovation and Creativity »
- Sociology of Creative Industries
- Innovation and Creativity

« Technical »
- Web Technologies / Javascript introduction
- Advanced AI: Advanced Machine Learning and Deep Learning
- Quantum Computing and Networking
- Quantum

« Digital Culture »
- Introduction to AI: Data Analysis and Machine Learning
- Technological challenges in the IoT domain
- ICT and Environment

« Business »
- Digital Strategy
- Website creation Workshop
Amel Attour (online)
15h00-15h05

https://ds4h.univ-cotedazur.eu/education/minor-digital-strategy-1
Module’s lecturers
(UCA, CNRS, GREDEG)

Lise Arena
Amel Attour

Module’s objectives:
Develop your skills about digital strategy!

Two main competencies:
• Manage your digital strategy!
• Design your business model and your digital ecosystem!
Digital transformation is trendy … but what is it and what is it for?

SAP’s clients move to the cloud and redesign their internal organizational processes

Burberry invest millions in its CRM and develop a 360 client strategy

Michelin changes its economic model and redefines its business model and its strategy

Skills developed at the end of the module:
- Identify what degree (maturity) of digital transformation a project could have?
- Acquire the fundamentals in project management through the analysis of real case-studies
- Our playground: Digital transformation’s success and failure projects
• What is a business model of smart innovation?
• How do economic actors innovate?
• What is the role of knowledge management in open business ecosystems?
• What are digital platforms designed for?
What are the groups?

• Group 1: « Get collective! Maîtrisez vos réunions projet »

• Group 2: « 4Privacy - Secure your private communications! »

• Group 3: « Gowwiz - l’appli pour vaincre le décalage horaire! »

What is expected?

• A 30 (max) minutes oral presentation (team work) on 16th December 2021

• An individual written essay (recto-verso) to bring to the final session

Suggestions

1) Present the digital strategy in your business case (15 min, approx.)
   ▪ General presentation: Industry, size of the firm, market position, main activity, short history of the firm (cf. session 1)
   ▪ Digital strategy: Type of technologies involved in the product, impacts on the industry, users’ perceived acceptability, effective use, success/ failure? (cf. sessions 2 & 3)

2) Design your business case’s business model and ecosystem (15 min approx.)
   ▪ Build you Business Model canvas (using the matrix of Osterwalder and Pigneur)
   ▪ Map and analyze the value architecture of your ecosystem
   ▪ Highlight the main strategic arguments of your solution and your strategic positioning
lise.arena@univ-cotedazur.fr
M. Buffa
15h05-15h10

https://ds4h.univ-cotedazur.eu/education/minor-web-technologies-javascript-introduction
Web Technologies (aka JavaScript Intro)

- You will learn
  - HTML5 and CSS basics
  - JavaScript and how to add interactivity to Web Pages and Apps
  - Write a small 2D game using graphics and animation
    - CS Master students will write a full scale 2D action game
- And most of all, practice coding techniques thanks to multiple interactive examples
- Online course + weekly 1h zoom session
- Continuous support by email and private chat
- **FREE CERTIFICATION W3C obtained (value 200 euros/dollars) if you succeed!**
1. Embedded quizzes at the end of each online Module
2. Final exam also as an online quizz
3. Two assignments to send to me (interactive program written in HTML/CSS/JS),
   • one in the middle of the course schedule,
   • one at the end.

• Steps 1 and 2 represent 40% of the final grade
• Assignments: 30% each

• CS students: only project 60% + online exam and quizzes 40%
David-Olivier Saban  
15h15-15h20

https://ds4h.univ-cotedazur.eu/education/minor-artificial-intelligence-and-video-game
<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Course title</th>
<th>Location / room</th>
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</thead>
<tbody>
<tr>
<td>13/10/2022</td>
<td>9-12h</td>
<td>About Artificial Intelligence</td>
<td>Campus Georges Meliès,</td>
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<td>E1-83</td>
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<tr>
<td>20/10/2022</td>
<td>9-12h</td>
<td>Path Finding Step 1</td>
<td>Campus Georges Meliès,</td>
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<tr>
<td>27/10/2022</td>
<td>9-12h</td>
<td>Modelisation</td>
<td>Campus Georges Meliès,</td>
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<td>9-12h</td>
<td>Algorithms</td>
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<tr>
<td>17/11/2022</td>
<td>9-12h</td>
<td>Programming Practices and CODINGAME</td>
<td>Campus Georges Meliès,</td>
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<td>E1-83</td>
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<tr>
<td>24/11/2022</td>
<td>9-12h</td>
<td>Pathfinding Step 2</td>
<td>Campus Georges Meliès,</td>
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<tr>
<td>01/12/2022</td>
<td>9-12h</td>
<td>Complexity</td>
<td>Campus Georges Meliès,</td>
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<td>E1-83</td>
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<tr>
<td>08/12/2022</td>
<td>9-12h</td>
<td>Deep Learning</td>
<td>Campus Georges Meliès,</td>
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<td>E1-83</td>
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What you will learn

- Review AI basis and algorithms
- Limits and thought process to start AI project
- Discuss, Analyse and Apply proper solutions
- State of the art agile organisation and sizing
Step by step approach

Step by step, you will progress learning

- Algorithms
- Models and Mathematical tools
- Workshops and Projects
- Organize your work
- Resources on MIRO
What this course is NOT

- Complex AI course
- Applied mathematics
• Learn to work
• Being pragmatic to scope your AI projects
• You will deliver a challenging and fun project
• You will have fun and grow
François Verdier
15h25-15h30
To be contacted

THE INTERNET OF THINGS
AN EXPLOSION OF CONNECTED POSSIBILITY

BILLIONS OF DEVICES

2018
50.1 BILLION
Smartphones and other internet-enabled devices

2016
42.1 BILLION

2014
34.8 BILLION

2012
22.9 BILLION
Internet-enabled medical devices

2010
14.4 BILLION
Signals from small objects collected in the form of temperature data

2008
10.2 BILLION

2006
8.7 BILLION

2004
6.7 BILLION

2002
4.5 BILLION

2000
1.5 BILLION

1998
1 BILLION

1996
0.5 BILLION

1992
0.5 BILLION

1990
1,000,000

1,000,000

1992
IoT INCEPTION

1994
IoT INCEPTION

1996
IoT INCEPTION

1998
IoT INCEPTION

2000
IoT INCEPTION

2002
IoT INCEPTION

2004
IoT INCEPTION

2006
IoT INCEPTION

2008
IoT INCEPTION

2010
IoT INCEPTION

2012
IoT INCEPTION

2014
IoT INCEPTION

2016
IoT INCEPTION

2018
IoT INCEPTION

YEAR

1992
2001
2009
2018
This course mixes different topics of Electronics and Computer Science related to the development of the Internet-of-Things with both technical and societal viewpoints:

- Distributed infrastructures for connected objects
- Environmental issues in IoT
- Introduction to data valorization
- Security and privacy for IoT

It starts with an introduction to high-level infrastructures used to design connected objects and their infrastructures. It goes down to the level of the devices addressing environmental issues (power consumption, DAS, antennas). Then, it covers basic high-level solutions to exploit all the data produced by large infrastructures of connected objects. Finally, it gives the fundamental notions to understand security and privacy issues raised by IoT systems and ideas of the effort required to address those issues.
Nicolas Fogliarini
15h25-15h30

https://ds4h.univ-cotedazur.eu/education/minor-website-creation
MINOR’S SUMMARY

• Introduction on various online portfolio’s platforms
• Website / Online Portfolio creation from scratch:
• Practical courses

LEARNING OUTCOMES

• Learn how to showcase the best of your work, skills through various medias : websites, online portfolios, blogs, social networks.
• Learn how to create assets (posts, photos, videos, graphics, podcasts...) using free tools and your smartphone and computer.
• Work on your online presence and learn how to avoid pitfalls.
Introduction on various online portfolio’s platforms
Video: Vimeo / Youtube / Smash
Graphic design: Behance
Sites: wordpress / wix
Selling your work on platforms: behance / fiveer / 5euros / malt

Website / Online Portfolio creation from scratch
Writing the specs of your future portfolio
Finding and buying a domain name + hosting plans (need a small investment for each student)
Choosing between Wix and Wordpress
Finding the right theme and plugins
Creating content using adobe suite or free services (canva, pixabay)
Uploading using FTP client
Security (backup / SSL)
Google my maps optimisation
Working on your Linkedin page and your personal online presence.

Creating your own personal online portfolio
At the end of the minor, the students will be noted on their online portfolio creation.
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<tr>
<th>Date</th>
<th>Time slot</th>
<th>Course title</th>
<th>Room</th>
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<tbody>
<tr>
<td>13/10/2022</td>
<td>9h00-12h00</td>
<td>Introduction on various online portfolio’s platforms</td>
<td>Campus Valrose, Bât. M, room M11</td>
</tr>
<tr>
<td>20/10/2022</td>
<td>9h00-12h00</td>
<td>Preparation work and wordpress intro</td>
<td>Campus Valrose, Bât. M, room M11</td>
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<tr>
<td>27/10/2022</td>
<td>9h00-12h00</td>
<td>Creating content</td>
<td>Campus Valrose, Bât. M, room M11</td>
</tr>
<tr>
<td>10/11/2022</td>
<td>9h00-12h00</td>
<td>Working with themes and plugins, uploading, security...</td>
<td>Campus Valrose, Bât. M, room M11</td>
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<tr>
<td></td>
<td>18h00-19h00</td>
<td>Focus on Google Maps (former google my business)</td>
<td>Online live tutorial session</td>
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<tr>
<td>17/11/2022</td>
<td>9h00-12h00</td>
<td>Working on your own online portfolio</td>
<td>Campus Valrose, Bât. M, room M11</td>
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<td></td>
<td>18h00-19h00</td>
<td>Focus on SEO</td>
<td>Online live tutorial session</td>
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<tr>
<td>24/11/2022</td>
<td>9h00-12h00</td>
<td>Working on your own online portfolio</td>
<td>Campus Valrose, Bât. M, room M11</td>
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<tr>
<td></td>
<td>18h00-19h00</td>
<td>Online advertising: FB ads, Youtube ads...</td>
<td>Online live tutorial session</td>
</tr>
<tr>
<td>01/12/2022</td>
<td>9h00-12h00</td>
<td>Working on your own online portfolio</td>
<td>Campus Valrose, Bât. M, room M11</td>
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Emmanuel Le Roy
15h30-15h35

https://ds4h.univ-cotedazur.eu/education/minor-organize-your-activity-in-project-mode
Organize your Activity in Project Mode

>>> Watch the video
Giovanni Neglia
Online for the chat session
giovanni.neglia@inria.fr

https://ds4h.univ-cotedazur.eu/education/minor-quantum-computing-and-networking
Guillaume Urvoy-Keller
15h40-15h45

https://ds4h.univ-cotedazur.eu/education/minor-ict-and-environment
Environment will become a key issue in every human activity in the coming years.

Information and Communication Technologie, ICT, such as any activity sector, has to take part to this global effort.

Hence the question:

Is ICT a cure or a curse for the environment?
Our objectives

• Assess the carbon footprint of ICT and the Internet
  Based on state-of-the-art scientific studies

• Provide a holistic view of ICT: from mineral to e-waste (life cycle analysis)

• Discuss the basics of eco-friendly software design and green algorithms

• Beyond the pure technical perspectives: law and digital world
Contents

• Session 1 - The Anthropocentric age
• Session 2 - Background on Energy and ICT
• Session 3+4 - Measuring ICT and Internet Footprint
  Hands-on session
• Session 5 - Green Algorithm Design
• Session 6 - Eco-friendly software design
  Hands-on session
• Session 7 - Law, Environment and Digital world
• Session 8 - Oral presentation of personal projects
MINOR

https://ds4h.univ-cotedazur.eu/education/minor-introduction-to-scientific-research
Being born a genius...

...or not,

under all circumstances,

scientific methodology will help you think, understand, deduce, anticipate...
in a remarkably efficient manner.
Scientist is a profession, but also *a way to be*.

Science has rules, practices, methodology...

*Work the scientist out of you!*
Why this minor?

Far beyond the film that made Woody Allen famous...

Everything you always wanted to know about science (but were afraid to ask)
• Epistemology (*Eric Picholle, INPHYNI*)
• Research: a vocation (*Anne-Laure Simonelli, DS4H*)
• Method for research (*Marco Winckler, I3S*)
• Bibliography (*Sid Touati, I3S/Inria*)
• Scientific writing (*Fabien Ferrero, LEAT*)
• Hands-on workshop: experiments and statistics (*Sid Touati, I3S/Inria*)
• Hands-on workshop: antenna measurements (*Claire Migliaccio, LEAT*)
• Deontology (*Anana Postoaca, GREDEG*)
• PhD and opportunities (*Anne-Laure Simonelli, DS4H*)
• Scientific collaborations (*Fabien Ferrero, LEAT*)
• Article analysis (*Gilles Bernot, I3S*)
• *Oral evaluation*: report on hands-on workshops and Article analysis
Prerequisites:
none

Capacity:
24 students (including students from EUR SPECTRUM)

Evaluation:
- Bibliographic report
- Oral presentation of the hands on workshops
Jérôme Lanteri for Jean-Marc Ribero
15h55-16h00

https://ds4h.univ-cotedazur.eu/education/minor-sensors-and-network-devices
The objective of this module is to program a Cherokey robot in Arduino language to go from point A to point B avoiding obstacles.
Introduction to sensor:
  Principle of functioning
  The main families of sensor
  Data extraction

Wireless Communication:
  Working principle
  Study of wireless protocol, application vs protocol
  Definition of main feature (metric) to quantify and qualify wireless communication
Using an arduino BLE board: Bluetooth low energy, identical to the Arduino Uno board + bluetooth control

The language - based on C / C++

Goal : make this robot work on a course avoiding obstacles
It will have to cross the circuit first independently and then with a Bluetooth command (with Smartphone).
MINOR

Manuel Boutet
16h00-16h05

https://ds4h.univ-cotedazur.eu/education/minor-sociology-of-creative-industries
Sociology of Creative Industries

Manuel Boutet
Sociology of Creative Industries

Contents

- Technics as culture
- Industrialization & the City
- From communication to media
- Cultural Industry and Mass Culture
- The rise of the communities
- Community (micro-)management
- Creativity as team management
- The careers of the creative professions
Learning Outcomes

• Understanding the place of technics in society
• Learning the history of modern industry
• Identify the major tensions and contradictions within the creative industries to better understand debates and polemics
• Thinking differently the relation between creativity and organizations
• Acquire some keys to understand the relationship between creativity and careers today
• Conceptual and methodological tools to go further in investigating
Anne-Laure Simonelli
16h05-16h10

https://ds4h.univ-cotedazur.eu/education/minor-tools-to-communicate
Learning Outcomes

To become aware of the importance of becoming an effective communicator.

To identify the audience, the main purpose of the communication and adapt the communication adequately.

You’ll learn:
- how to communicate specifically to enter the work force
- how to communicate effectively to a wider audience
Tools 2 Communicate

How to communicate specifically to enter the work force

How to write / improve your CV...

... a cover letter / an email

With Frédéric Arnault
How to set up and edit my LinkedIn profile + personal branding

NB! professional photo shoot offered at the end of the session
Internships/Apprenticeship/job search strategies:
spontaneous application, jobbards,
cooptation / networking, being hunt...

How to prepare a job interview
The job market: Parallel sessions organized

- IT job market (S. Lareyre)
- Strategy Digital
- Electronic job market (Matthias Raucoules-Aimé)
- Law (Vincent de Bonnafos)

How to communicate effectively to a wider audience

Short Video production (Oritse Emore)
Oral communication (AL Simonelli)
Prerequisites:
To already have a LinkedIn Profile created and a written Resume/CV

Capacity:
12 students

Evaluation:
- Engagement throughout the session (10%)
- Quality of revised CV (30%)
- LinkedIn Profile (30%)
- Short video production (30%)
Virginia D’Auria
16h10-16h15

https://ds4h.univ-cotedazur.eu/education/minor-quantum-engineering
Quantum Engineering

Virginia D’Auria and Fabrice Raineri
Institut de Physique de Nice

>>> Watch the video
Cindy De Smet
16h15-16h30

https://ds4h.univ-cotedazur.eu/education/minor-innovation-and-creativity
The “Innovation and creativity” course aims to develop the creative competencies of the participants, learn them how to think out of the box or how to generate more qualitative ideas.

We achieve this through a series of exercises and activities in which individual and collaborative approaches will be developed.

Students embark on a journey of both self-introspection and collective effort with their peers. They are invited to leave their comfort-zone and to push their boundaries.
Innovation and creativity

Coordinator
Cindy De Smet

Course Content

5 chapters:

• We discuss the link between innovation and creativity...

• You’re invited to think like Leonardo da Vinci, shut down your smartphone, discover your creative self and to enhance your creative abilities...

• You will learn how to picture your ideas...

• You will discover how collaboration leads to the generation of creative ideas...

• And you can explore the link between creativity and critical thinking
Innovation and creativity

MINOR

Coordinator Cindy De Smet

Course Modalities

100% online course + 3 online tutoring sessions + 2 tasks

Theoretical basis of this course

Creativity has been a very popular research topic since the 1950s.

In this course, besides an introduction to creativity (chapter 1) and a short reflection on the ethics of creativity we will mainly focus on creativity techniques to promote idea generation.

Assignment module LMS

13/10 - 18:30 PM
17/11 - 18:30 PM
08/12 - 18:30 PM (optional)
Since September 2019, more than 150 students passed this course as a DS4H minor.

“I thank you for all your efforts and I am really happy to have passed this minor. It is not only a minor but also instructive because of the personal development included in the articles. I read Chris Lewis' book thanks to you.”

“This course has given me a lot of good things. All the knowledge you shared with us is really necessary and useful. It helps me a lot, not only for work but also for everyday life, in my "creative" life.”

Note: anonymised comments
What is Machine learning?

- **Machine Learning** systems
  - discover hidden patterns in data, and use these patterns to make predictions about future data.

- An example
  - I want to predict the tomorrow weather...
    - from yesterday's time and today's time.
  - Two ways to proceed:
    1. I know a set of physical laws, and I build a model that implements these laws
    2. I have enough data \((X, y)\),
       \(X\) being the time over two days and \(y\) the time to predict
       I try to build a model – a function \(M\), which solves equation \(M(X) = y\)
There are many methods based on statistical approaches, on the search for the nearest neighbors, on the line that best represents the data or on the plane that best separates the data, etc.

Lecture goal: study the main approaches and we will ask the question of how to evaluate the relevance of the results
What is Deep Learning?

- **Deep Learning** is a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called **artificial neural networks**.
Common organisation for 2 minors

• Give you the keys to understanding the issues in the field and the tools to deal with simple data sets.
  • Emphasize how an algorithm works and especially its use
    • Not on the programmation of the algorithm
  • Place ourselves from the point of view of a user

• Lab in Python 3.0.
  • A minimum of programming experience in Python is desirable
    • Advanced: student in computer science
    • Beginner: other student with an experience in Python Programming
  • Several online tutorials allow you to learn Python
    • French:
      • Python : des fondamentaux à l'utilisation du langage (fun-mooc)
    • English:
      • Python tutorial (w3schools)
      • Introduction to Data Science in Python (Coursera)
Syllabus

- Python → learn by ourself:

- Rodrigo Cabral
  1. General introduction
     - The different problems of ML
     - The learning process
  2. Regression with the linear model
  3. Classification - Régression logistique
  4. Test at the beginning of 4th class, 40% of total grade
     SVM

- Lionel Fillatre
  5. LDA / Naive Bayes
  6. CART / Decision Tree / Random Forest

- Michel Riveill
  7. Clustering (k-means, hclust)
  8. Test at the beginning of 8th class, 40% of total grade
  9. M - Dimension reduction (PCA, t-SNE)
Organization

• Use of the sklearn library with Google Colab
• 3 classrooms
  • DS4h/Sophia Antipolis - presence of the teacher for the course, presence of a 3IA PhD student
    • python tutorials (advanced)
  • LIFE /Sophia Antipolis - distance learning, presence of a 3IA PhD student
    • Python tutorials (beginner with bio/health data)
  • Spectrum/Nice - distance learning, presence of a 3IA PhD student
    • python tutorials (beginner)
• MCC : 1 lecture note (MCQ) + 1 TD/Project note
Syllabus

• Michel Riveill
  1. An introduction to Natural Language Processing
  2. Deep learning – General principles
  3. Deep learning - Multi-Layers perceptron
  4. Deep learning - Recommender Systems
  5. Deep learning - Recurrent Neural Network
     Test at the beginning of 5th class, 40% of total grade

• Diane Lingrand
  6. Deep learning - Convolutional Neural Network
  7. Deep learning – Model Explainability
  8. Deep learning - Reinforcement Learning
     Test at the beginning of 8th class, 40% of total grade
Organisation

• Use of the nltk + sklearn + Tensorflow/Keras libraries with Google Colab

• The principles of machine learning are supposed to be known

• 2 classrooms
  • Sophia Antipolis – presence of the teacher for the course, presence of a 3IA PhD student
    • python tutorials (advanced)
  • Nice – distance learning, presence of a 3IA PhD student
    • python tutorials (beginner)

• MCC : 1 lecture note (MCQ) + 1 TD/Project note
To summarize the proposals:

- Introduction to machine learning
  - For all students (master or PhD)
  - DS4h
    - Computer Science → lecture/lab in Sophia Antipolis
  - Other diploma – you have the choice
    - → lecture/lab in Sophia Antipolis with LIFE students
    - → lecture/lab in Nice with SPECTRUM students
- LIFE
  - Lecture/lab in Sophia Antipolis with "bio" dataset
- SPECTRUM
  - Lecture/lab in Nice

- Introduction to deep learning
  - For all students (master or PhD), if you have followed an introduction lecture
    - You are a Python programmer → lecture/lab in Sophia Antipolis
    - You don't program regularly (and not in Python) → Lecture/lab in Nice