amU Faculté d'économie et de gestion Aix Marseille Université

amse école d'économie d'aix-marseille aix-marseille school of economics

M2 DONNEES, ANALYSE, DECISION ET EVALUATION ECONOMIQUE (DADEE)

M2 DATA, ANALYSIS, DECISION, ECONOMIC EVALUATION (DADEE)

FRANCE 2030 amU Aix Marseille Université cnrs amidex Aix Marseille Université L'ÉCOLE DES HAUTES ÉTUDES EN SCIENCES SOCIALES Centrale Méditerranée sciencespo.aix

Cours spécifiques à l'alternance

Cours spécifiques à l'option Magistère Economie, Data Science et Finance

Cours spécifiques à l'option International Diplomacy, Economic Analysis and Law

Dernière mise à jour / last update: juin 2025.

Data Visualisation for Economic Analysis
Visualisation de données pour l'analyse économique

COURSE LANGUAGE
English

TEACHER
Ségal LE GUERN-HERRY – segal.le-guern-herry@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES
The idea of this course is to provide students with a set of tools for data wrangling and data visualization. One of the goal is to learn how to choose the right data visualization in various contexts. The coding part is conducted on R.

COURSE OUTLINE
Theory of data visualization
Starting with R
Data wrangling
Making a plot
Polishing and presenting plots
Exploratory data analysis
Making maps
Data scraping

KEY PROFESSIONAL SKILLS UPON GRADUATION
Data wrangling: Importing, cleaning, manipulating, pivoting data
Data visualization: from simple to complex graphs, dealing with spatial data.
Introduction to data scraping

ORGANIZATION
Semester: S1
Teaching Hours: 24 h of tutorials, in 8 sessions of 3 hours each
Examination Method: 3 assessments throughout the semester

BIBLIOGRAPHY AND TEXTBOOKS
Kieran Healy, « Data Visualization, A Practical Introduction", 2018
Jonathan Schwabish, « An Economist's Guide to Visualizing Data", Journal of Economic Perspectives, 2014
Carl. T. Bergstrom and Jevin D. West, "Calling Bullshit, The Art of Skepticism in a Data- Driven World", 2020
Dacley Wickhman & Garett Grolemund, "R for Data Science", 2017, O'Reilly Media.

RECOMMENDED PREREQUISITES
Highly recommended to have some notions in R.

KEYWORDS
Coding, data, visualization

Practising Data Science in the Real World: Limitations and Challenges
Utilisation de la science des données : limites et défis

COURSE LANGUAGE
English

TEACHER
Dimitri SCRONIAS – dimitri.scronias@inserm.fr

COURSE DESCRIPTION AND OBJECTIVES
The use of data science techniques faces several limitations and challenges that require a multidisciplinary approach, incorporating technical expertise, domain knowledge, ethical considerations, and effective communication and collaboration skills. By acknowledging and mitigating these challenges, data scientists can maximize the value and impact of data science in real-world applications while ensuring responsible and ethical
use of data and technology.

COURSE OUTLINE
Class 1: How to prepare a data science project? Defining a business problem, preparing a data analysis plan, and overview of the methodologies and tools at the disposal of the data scientist.
Lab 1: Refresher on R and the tidyverse packages.
Class 2: Cleaning “bad data”. Definitions of data cleaning, types of “bad data” (missing data, outliers, measurement errors/biased data, non-machine-readable data…) and how to mitigate or solve these issues.
Lab 2: Data cleaning and imputation on a messy dataset to aggregate from different sources, with various problems and multiple patterns of missing data and biases.
Class 3: Focus on different types of bias, bias in the context of causal inference, and methods to solve potential bias issues.
Fairness in Machine Learning: what is fairness, why it matters, and metrics to measure it.
Class 4: Good practices on communicating results to decision-makers and making impactful data visualisations (tables, graphs, dashboards or regression/ML model results).
Presentation of model-agnostic interpretation tools
Lab 3: Interactive dashboard from scratch with R, using the *shiny* and *bslib* packages.
Class 5/Lab 4: Methods and tools to improve your programming skills, the performance of your code, and to handle larger-than-memory datasets.

KEY PROFESSIONAL SKILLS UPON GRADUATION
Being able to develop critical thinking about the use of data science techniques.
Being able to approach problems systematically and identify alternative solutions
Understanding ethical considerations and implications in data science, such as privacy, fairness, and transparency
Knowing how to communicate insights, limitations, and recommendations clearly

ORGANIZATION
Semester: S1
Teaching Hours: 24 h of lectures, 8 sessions of 3 hours each
Examination Method: Partial continuous assessment

BIBLIOGRAPHY AND TEXTBOOKS
Foster Provost and Tom Fawcett, Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking, 2013
Emmanuel Ameisen, Building Machine Learning Powered Applications: Going from Idea to Product, O’Reilly Media, 2020
Q. Ethan McCallum, Bad Data Handbook, O’Reilly Media, 2012
Herbert Weisberg, Bias and Causation: Models and Judgement for Valid Comparisons, Wiley, 2010
Scott Cunningham, Causal Inference: The Mixtape, Yale University Press, 2021
Solon Barocas, Moritz Hard and Arvind Narayanan, Fairness and Machine Learning: Limitations and Opportunities, MIT Press, 2023
Claus O. Wilke, Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures, O’Reilly Media, 2019
Cole Nussbaumer Knaflic, Storytelling with Data: A Data Visualization Guide
Christoph Molnar, Interpretable Machine Learning: A guide For Making Black Box Models Explainable, 2022
Hadley Wickham, Advanced R, Chapman & Hall/CRC Press, 2019
Robert Cecil Martin, Clean Code: A Handbook of Agile Software Craftsmanship, Prentice Hall, 2008

RECOMMENDED PREREQUISITES

Basic R proficiency (Tidyverse is a plus)

KEYWORDS

Data science; bias; data cleaning; communication; R

Econometrics of Impact Evaluation
Econométrie de l'évaluation d'impact

COURSE LANGUAGE
English

TEACHER
Morgan RAUX – morgan.raux@univ-amu.fr
Ségal LE GUERN-HERRY – segal.le-guern-herry@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES
The objective is to advance students' understanding of the scientific approach to evaluation of public policy by drawing on leading articles from literature. Considered as a second course on evaluation, this course will start with a refresher on the evaluation problem and how random assignment solves it. We then provide a more extensive treatment for some of the evaluation methods. The last part of the course is on transparent and reproducible research (replication, meta-analysis and systematic reviews).

COURSE OUTLINE
Part 1: Introduction
Part 2: A choice of evaluation methods
Part 3: Replications/Meta-analysis/systematic reviews

KEY PROFESSIONAL SKILLS UPON GRADUATION
Be able to design, implement and analyze quantitative evaluation projects; Be able to critically evaluate the credibility of empirical evidence.

ORGANIZATION
Semester: S1
Teaching Hours: 24 h of lectures
Examination Method: Oral presentation + Written report

BIBLIOGRAPHY AND TEXTBOOKS
General reference articles and applied resources are provided as support material.
Textbook references include:
Markus Frölich and Stefan Sperlich: Impact evaluation – Treatment effects and Causal Analysis. Cambridge University Press, 2019, 417 pages.
Paul J. Gertler, Sebastian Martinez, Patrick Premand, Laura B. Rawlings, Christel M. J. Vermeersch: Impact evaluation in practice. World Bank Publications. 2010, 264 pages.
Guido Imbens and Donald Rubin: Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction. Cambridge University Press, 2015, 644 pages.

MANDATORY PREREQUISITES
Graduate econometrics, use of statistical analysis software.

RECOMMENDED PREREQUISITES
First course in causal inference methods

KEYWORDS
Applied econometrics, impact evaluation.

Prospective Methods
Méthodes prospectives

COURSE LANGUAGE

English

TEACHER

Eva MORIN – practitioner

COURSE DESCRIPTION AND OBJECTIVES

The course aims to provide students with the skills and knowledge necessary to anticipate future trends, developments, and scenarios, especially in the field of public decision or the decision-making impacting potentially public at large. Prospective methods involve systematic approaches to understanding and forecasting future possibilities, uncertainties, and opportunities.

COURSE OUTLINE

1. Introduction; need for long-term perspective
2. Main methods in prospective analysis ith applications (Monte Carlo, Delphi, trend analysis, horizon scanning, weak signals…); comparison with predictive methods (time-series, deterministic and stochastic models)
3. Scenario building (scenario planning, baseline, adverse, stress scenarios & stress tests) with applications and case studies (bitcoin, stock pricing, climate change, digital euro, inflation and interest rate…)
4. Collecting et analyzing qualitative data (with Python programming for text analysis)

KEY PROFESSIONAL SKILLS UPON GRADUATION

Being able to consider long-term implications and consequences of decisions/actions,
Being proficient in various foresight techniques such as scenario planning, trend analysis, horizon scanning, and weak signal detection,
Creating plausible and internally consistent scenarios that capture different future possibilities and uncertainties,
Being familiar with qualitative research methods such as interviews, focus groups, and content analysis to gather insights and perspectives on future developments.

ORGANIZATION

Semester: S1
Teaching Hours: 12 h of lectures, in 4 sessions of 3 hours each
Examination Method: Project

BIBLIOGRAPHY AND TEXTBOOKS

A movie: *The Big Short*.

Woody Wade, Scenario Planning: A Field Guide to the Future, John Wiley & Sons, 2008
Patricia Lustig, Designing Strategic Foresight: A Toolkit for Scenario-Based Strategy, Routledge, 2015
Bruce L. Berg, Qualitative Research Methods for the Social Sciences, Pearson, 2017

MANDATORY PREREQUISITES

Programming skills, macroeconomics and finance, advanced statistics.

RECOMMENDED PREREQUISITES

Python

KEYWORDS

Prospective methods, Finance, Macroeconomics

Applied Economics Issues
Problèmes d'économie appliquée

COURSE LANGUAGE
English

TEACHER
Ewen GALLIC – ewen.gallic@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES
The objective of this course is to train students to think like economists by applying economic reasoning to realworld issues. The course focuses on a specific developing region: the Middle East and North Africa (MENA). Through the study of current and relevant topics such as the Arab Spring, women's empowerment, the COVID-19 pandemic, and trade dynamics, students will develop critical thinking skills and gain the ability to analyze and interpret complex economic and social phenomena. While the topics are region-specific, they are selected to serve the broader purpose of intellectual engagement and to foster a deeper understanding of economic concepts in action. The course aims to strengthen students' analytical skills and provide them with a solid grasp of applied economic reasoning in a global context.

COURSE OUTLINE
Introduction – Main issues in Mediterranean countries
Part 1 – Openness to trade and development
Part 2 – The private sector: What is holding it back in the region?
Part 3 – New export opportunities after the COVID-19 pandemic
Part 4 – Women empowerment, gender equality, and the COVID-19 crisis
Part 5 – Health systems and challenges in MENA countries

KEY PROFESSIONAL SKILLS UPON GRADUATION
Apply economic reasoning to analyze real-world issues and policy challenges.
Develop critical thinking skills and structure complex arguments using economic frameworks.
Understand and evaluate the economic dynamics specific to the Middle East and North Africa (MENA) region.
Interpret quantitative and qualitative data, as well as academic and policy sources, relevant to the region's economic issues.
Communicate economic arguments effectively, both in writing and orally, and engage in informed discussions and debates.

ORGANIZATION
Semester: S1
Teaching Hours: 24 h of lectures
Comment: The course will be based on lectures combined with interactive discussions. Students are expected to actively participate by preparing readings in advance and contributing to classroom debates. Case studies and topical analyses will be used to contextualize theoretical concepts.
Examination Method: Participation + presentation + final individual written exam

BIBLIOGRAPHY AND TEXTBOOKS
What's holding back the private scetor in Mena ? Lessons from the enterprise survey. European Bank for Reconstruction and Development, the European Investment Bank, the International Bank for Reconstruction and Development and The World Bank
ERF Policy brief
Worldbank Working Papers

MANDATORY PREREQUISITES
Students are expected to have an intermediate-level understanding of both microeconomics and macroeconomics. They should be comfortable with key economic concepts, models, and terminology, and be able to apply them to the analysis of real-world situations.

RECOMMENDED PREREQUISITES
Would benefit from previous coursework in development economics or international economics, as well as a demonstrated interest in political economy and regional studies, particularly related to the MENA region.

KEYWORDS
Applied economics, MENA region, development, trade, gender equality, health policy, COVID-19, private sector, critical thinking.

Transitions and Economic Policies
Transitions et politiques économiques

COURSE LANGUAGE

English

TEACHER

Vincent BIGNON – vincent.bignon@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES

This class uses resources from economic history, theory and empirics to inform on current changes in our economic environment. The goal is to provide an overview of our current knowledge on what explains the appearance or change of major economic institutions. This is a major issue for economists who will have to work and explain the changes that the economy is undergoing or will undergo. To this end, the class draws from today examples in development economics as well as in history.

COURSE OUTLINE

Class 1: How well are we equipped as economists to think about economic evolution? Violence vs trade
Class 2: The invention of money (vs. debt): From Babylon to the cryptos
Class 3: Externalities, productivity and appropriability: A case for the invention of the state or hierarchies?
Class 4: Corruption that glues: Politics, money and Economic Efficiency
Class 5: Transitioning from high to low public debt
Class 6: The "invention" of central banks and the fight against financial and economic crises
Class 7: The macroeconomic cost of physical risks and the transition to a low-carbon economy

KEY PROFESSIONAL SKILLS UPON GRADUATION

Developing the ability to analyze contemporary economic development using concepts and theories in economics or other social sciences and be able to compare them to other cases or historical situations.
Mobilize knowledge learned in other classes or degrees to analyze cases of economic changes (or transitions to use the language of the title of the class) to construct a diagnosis of the situation and think about tools or policies able to address the issue at stake.

ORGANIZATION

Semester: S1
Teaching Hours: 24 h of lectures
Comment: Attendance is compulsory and will be checked.
Examination Method: Presentation of a research paper by pairs of students + writing of an essay on a topic in relation with an issue viewed in class and its defense during the last class + written exam checking the knowledge of the major topics saw in class

BIBLIOGRAPHY AND TEXTBOOKS

Mancur Olson, 1982, *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*: Yale University Press, pp. 36-89.
Mancur Olson, 2000, *Power and Prosperity*, New York: Basic Books. Chapter 1, 2, pp.1-43.
North Douglas K., Wallis John J., Weingast Barry, 2009, *Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History*, Cambridge University Press.
Araujo et al, 2024, On the origins of money, mimeo. Origins.pdf (sciencesconf.org)
Bignon, Vincent, 2018, Exotisme des pièces d'or et gouvernance des systèmes monétaires, Annales des Mines 2018/4, p. 72 à 75
Kiyotaki Nobuhiro and Randall Wright, 1993, A Search-Theoretic Approach to Monetary Economics, American Economic Review, Vol. 83, No. 1 (Mar., 1993), pp. 63-77
Coase, Ronald H., 1937, The Nature of the Firm. Economica, 4: 386-405
https://doi.org/10.1111/j.1468-0335.1937.tb00002.x
(theory paper) Piccione Michele & Ariel Rubinstein, Equilibrium in the jungle, Economic Journal,
Mayshar, Joram, Omer Moav & Luigi Pascali, 2022, The Origin of the State: Land Productivity or Appropriability? Journal of Political Economy 130, p. 825-1145
Arcangelo Dimico, Alessia Isopi, 2017, Origins of the Sicilian Mafia: The Market for Lemons, Journal of Economic History 77(4), 1083-1115
Borcan, O., Olsson, O. & Putterman, L. State history and economic development: evidence from six millennia. J Econ Growth 23, 1–40 (2018). State history and economic development: evidence from six millennia | Journal of Economic Growth (springer.com)

Belloc, M., Drago, F., Galbiati, R. "Earthquakes, Religion, and Transition to Self-Government in Italian Cities". Quarterly Journal of Economics, 131, 4 : 1875-1926
Jack Hirschleifer, 1993, The dark side of the force, Economic Inquiry
Ronald Coase, 1937, The Nature of the Firm
Bignon, Vincent, Marc Flandreau and Stefano Ugolini, 2012, Bagehot for beginners: the making of lender-of-last-resort operations in the mid-nineteenth century1. The Economic History Review, 65: 580-608.
Gorton, Gary and Andrew Metrick. 2012. Securitized banking and the run on repo, Journal of Financial Economics 104(3), 425-451,
Gorton, Gary, and Guillermo Ordoñez. 2020. Fighting Crises with Secrecy, American Economic Journal: Macroeconomics, 12 (4): 218-45.
Barro, Robert, 1987, Government spending, interest rates, prices and budget deficits in England, 1701-1918, Journal of Monetary Economics
Bignon, Vincent et Pierre Sicsic, 2023, Quelles leçons de l'histoire ou comment faire face aux fortes augmentations de la dette publique? Revue d'économie financière
Eichengreen, Barry, Asmaa El-Ganainy, Rui Esteves and Kris Mitchener, 2021, In defense of public debt, Oxford University Press
Holmstrom Bergnt et Jean Tirole, 1998, Public and private supply of liquidity, Journal of Political Economy

Optional readings:

Mauro Paolo, 1995, Corruption and Growth, *The Quarterly Journal of Economics* 110(3), p. 681-712
Decreuse Bruno, Steeve Mongrain et Tanguy van Ypersele, 2022, Property crime and private protection allocation within cities: Theory and evidence, *Economic Inquiry* 60(3), p. 1142-1163
Bloch Marc, 1940 (1946), *L'étrange défaite*, Editions Francs tireurs. Full text available here : http://classiques.uqac.ca/classiques/bloch_marc/etrange_defaite/etrange_defaite.html
Heckelman Jac C., 2007, Explaining the Rain: "The Rise and Decline of Nations" after 25 Years, *Southern Economic Journal* 74(1), p. 18-33 https://www.jstor.org/stable/20111950
Asselain, J.-C., and C. Morrison. 1983. Economic growth and interest groups: The French experience. In *The political economy of growth*, edited by D.C. Mueller. New Haven, CT: Yale University Press, pp. 157–75.
Dormois Jean-Pierre, 2004, *The French Economy in the Twentieth Century*, Cambridge University Press
Eichengreen Barry and Albrecht Ritschl, 2009, Understanding West German economic growth in the 1950s, *Cliometrica, Journal of Historical Economics and Econometric History* 3(3), p. 191-219
Hirshleifer Jack, 1983, The Dark side of the force, presidential address to the Western Economic Association
Alesina, Alberto, 1988, The end of large public debt, in Giavazzi et Spaventa High Public Debt: the Italian experience
Barro, Robert, 1981, Output effects of government purchases, Journal of Political Economy
Bordo Michael et Eugen White, 1991, A Tale of Two Currencies: British and French Finance During the Napoleonic Wars, Journal of Economic History
Eichengreen, Barry, 2011, Un privilège exorbitant : le déclin du dollar et l'avenir du système financier international, Odile Jacob
Gourinchas Pierre-Olivier et Hélène Rey, 2007, From world banker to world venture capitalist: US external adjustment and the exorbitant privilege, in G7 current account imbalances
Lane, Philip et G. Milesi-Ferreti, 2001, The external wealth of nations, Journal of International Economics
North Douglas et Barry Weingast, 1989, Constitutions and commitment: The evolultion of institutions governing public choice in 17th century England, Journal of Economic History
O'Brien, Patrick, 1988, The political economy of British taxation, 1660-1815, Economic History Review
Oosterlinck, Kim, Loredana Ureche-Rangau et Jacques-Marie Vaslin, 2014, Baring, Wellington and the resurrection of French public finnances following Waterloo, Journal of Economic History
Timbeau, Xavier, Elliot Aurissergues et Eric Heyer, 2021, La dette publique au 21ème siècle, Une analyse de la dynamique de la dette publique avec Debtwatch,,OFCE Policy Brief 81

Advanced Business Economics
Méthodes de la décision pour l'entreprise

COURSE LANGUAGE
English

TEACHER
Simon RAY – practitioner

COURSE DESCRIPTION AND OBJECTIVES
This course provides students with a solid foundation in economic principles and their applications in business contexts. It focuses on how economic analyses can be used to support decision-making, strategy development, and market assessment in a business environment. The course aims to develop practical skills that enable students to approach business challenges with an analytical perspective.
Course Objectives are:

- Applying Economic Principles: Introduce students to key economic concepts and analytical tools relevant to addressing business problems, including pricing, investment analysis, and strategic planning.
- Improving Decision-Making: Equip students with the ability to evaluate costs and benefits, consider risks and uncertainties, and assess their implications for business decisions.
- Using Quantitative Methods: Develop competence in applying quantitative techniques to analyze data and support evidence-based business decisions.

By completing this course, students will gain familiarity with the use of economic analyses in business settings and be prepared to apply these tools in practical decision-making scenarios.

COURSE OUTLINE
Introduction: Overview of the use cases of economic analysis in the business environment. Understanding the role of economic principles in business decision-making and strategy formulation.
Case Study: Synthesizing insights from a widely commented economic report to inform top management on key takeaways and actionable recommendations.
Economic Outlook and the Business Environment: Exploring how economic trends and forecasts shape the business environment. Case example: The impact of economic outlook on the shipping industry.
Practical Application - Macro Outlook Analysis: Deriving strategic recommendations based on the macroeconomic outlook to guide business planning.
Modelling Exercise: Developing and presenting a time series model to forecast relevant business metrics.
Reminders of Microeconomic Theory (Consumer behavior, Producer theory, Market structure, Information and strategic behavior), *Business Strategy and Industrial Organization* (Strategic analysis of firms and industries, Entry/exit barriers, Pricing strategies, product differentiation), *Managerial Economics* (Economic calculous applied to managerial decision-making: cost analysis, pricing decisions, and investment analysis), *Market Analysis and Competitive Strategy* (Market structures, Competitive dynamics, Pricing strategies, Product positioning, Market segmentation), *Competition Policy* (Regulation and antitrust policy, Competition policy)

KEY PROFESSIONAL SKILLS UPON GRADUATION
This course focuses on applying economic concepts and tools to real-world business cases, enabling students to develop a deeper understanding of their practical applications in a business environment. Through a combination of presentations and written exercises, the course emphasizes enhancing formal communication and writing skills, equipping students to effectively articulate insights and recommendations in a professional business context.

ORGANIZATION
Semester: S1
Teaching Hours: 24 h of lectures
Examination Method: Group presentations + Participation in class

BIBLIOGRAPHY AND TEXTBOOKS
Michael Baye and Jeff Prince, Managerial Economics and Business Strategy, McGraw-Hill Education, 2020
Andrew Gillespie, Economics for Business, Oxford University Press, 2019, 3rd edition
Gabor Békés, Gabor Kézdi, Data Analysis for Business, Economics, and Policy. Cambridge University Press, 2021
The Draghi report: A competitiveness strategy for Europe – September 2024
World Economic Outlook, April 2025: A Critical Juncture amid Policy Shifts - IMF

KEYWORDS
Business Economics; Macroeconomic Outlook; Industrial Organization

Economics, Finance and Crisis
Economie, finance et crises

COURSE LANGUAGE

English

TEACHER

Marco FONGONI – marco.fongoni@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES

Using both empirical evidences and theoretical concepts, this course aims at explaining how economic and financial issues are closely related, and how shocks and crises can propagate. It also explains the interactions between financial markets and economic cycles (in light of the recent crises).

COURSE OUTLINE

Introduction and macroeconomics refreshers
Financial Markets & Crises
Macroeconomic Policy.

KEY PROFESSIONAL SKILLS UPON GRADUATION

Understanding the determinants of the business cycle,
Understanding the purpose and functioning of financial markets,
Understanding how the business cycle and the financial cycle interact, amplifying and propagating shocks, generating economic crises,
Understanding the role of macroeconomic policy, and how it responds to economic crises,
Analysing, and critically thinking about, recent economic events and crises.

ORGANIZATION

Semester: S1
Teaching Hours: 24 h of lectures, in 6 sessions of 4 hours each
Comment: First 3 classes devoted to lectures for students to understand and acquire the key concepts, last 3 devoted to student presentations on topics related to economic and financial crises and the corresponding policies.
Examination Method: Partial continuous assessment

BIBLIOGRAPHY AND TEXTBOOKS

Mishkin (2011) Over the Cliff: From the Subprime to the Global Financial Crisis.
Bean et al. (2010) Monetary policy after the fall
Kuttner(2018) Outside the Box: Unconventional Monetary Policy in the Great Recession and Beyond.
Dell'Arricciaet al. (2018) Unconventional Monetary Policies in the Euro Area, Japan, and the United Kingdom
Bernanke (2020) The New Tools of Monetary Policy

Development Economics
Economie du développement

COURSE LANGUAGE

English

ENSEIGNANT / TEACHER

Habiba DJEBBARI – habiba.djebbari@univ-amu.fr
Marion DOVIS – marion.dovis@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES

This course is meant to train students on recent topics in development economics, bridging the gap between theoretical and empirical research to inform relevant development policy and actions. This course will focus on microeconomic issues, seeking to understand the factors and constraints influencing individual-level, household-level, or firm-level decision-making in developing countries. We will cover a series of broad topics, including Education, Fertility and gender issues, Health and sanitation, Credit and Financial Markets, Agricultural land markets and technology adoption.

COURSE OUTLINE

INTRODUCTION
Why do countries develop?
HUMAN CAPITAL
1. Determinants of health: household behaviour
- Nutrition based poverty traps
- Health services
2. Education:
- The demand for education and child labour
- Quality of education
3. Fertility, gender gaps and the missing women
FINANCIAL CAPITAL
Access to credit and micro-savings (briefly)
PHYSICAL CAPITAL
Property rights and technology adoption

KEY PROFESSIONAL SKILLS UPON GRADUATION

Being able to understand and replicate simple theoretical models applied to core issues of development economics
Being able to understand and replicate simple econometric analysis to analyze core issues of development economics
Being able to understand how to test relevant theoretical model through econometric techniques
Being able to link the economic analysis of development issues to the design and implementation of effective public policies

ORGANIZATION

Semester: S1
Teaching Hours: 24 h of lectures
Examination Method: Continuous assessment (class presentations: every class one group presentation, it counts for 1/2; replication exercise plus short discussion of presented paper, it counts for 1/2) + Final written exam

BIBLIOGRAPHY AND TEXTBOOKS

Understanding Poverty, Abhijit Vinayak Banerjee (Editor), Roland Benabou (Editor), Dilip Mookherjee (Editor)
Pranab Bardhan and Chris Udry, *Development Microeconomics.*
Angus Deaton, *The Analysis of Household Surveys.*
A must-have undergraduate text: Debraj Ray, *Development Economics*.
A book that takes stock on the evidence generated through RCTs in the decade 2000-2010: Abhijit Banerjee and Esther Duflo, *Poor Economics: A radical rethinking of the way to fight global poverty.* Public Affairs, New York.
Angrist, Joshua, and Jorn-Steffen Pischke. *Mostly Harmless Econometrics*. Princeton University Press

MANDATORY PREREQUISITES

Graduate microeconomics, graduate econometrics

RECOMMENDED PREREQUISITES

Causal inference in applied econometrics

KEYWORDS
Development economics, microeconomics.

Environmental Economics
Economie de l'environnement

COURSE LANGUAGE

English

TEACHER

Fanny HENRIET – fanny.henriet@univ-amu.fr
Charles FIGUIERES – charles.figuieres@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES

This course aims to integrate the natural environment into economic analysis. It introduces students to environmental issues through real-world problems, provides key tools and concepts of environmental economics, and explains how to use them to assess real economic situations.

COURSE OUTLINE

- Why care about the environment?
- Historical and conceptual framework
- Impact of human activities
- Concepts from axiology applied to the environment
- Basic economic concepts: externalities, cost-benefit analysis
- Natural resources (renewable and non-renewable)
- Biodiversity and ecosystem services
- Energy transition (with F. Henriet)

COMPETENCES A ACQUERIR / KEY PROFESSIONAL SKILLS UPON GRADUATION

Apply microeconomic tools to environmental issues
Distinguish between positive and normative analysis
Use economic evaluation methods on environmental topics
Understand incentive mechanisms and economic trade-offs related to the environment

MODALITES D'ORGANISATION / ORGANIZATION

Semester: S1
Teaching Hours: 24 h of lectures

BIBLIOGRAPHIE / BIBLIOGRAPHY AND TEXTBOOKS

Perman, Ma, McGilvray & Common, *Natural Resource and Environmental Economics*, Pearson
Hanley, Shogren & White, *Environmental Economics in Theory and Practice*
Course materials (slides) will be available on AMeTICE.

MANDATORY PREREQUISITES

Master's level Microeconomics (M1)

RECOMMENDED PREREQUISITES

An interest in environmental issues is strongly encouraged.

KEYWORDS

Environmental economics, externalities, natural resources, biodiversity, energy transition, economic evaluation

Health Economics
Economie de la santé

COURSE LANGUAGE
English

TEACHER
Alain PARAPONARIS – alain.paraponaris@univ-amu.fr
Mohammad ABU-ZAINEH – mohammad.abu-zaineh@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES
This course proposes a balanced approach of health economics based on both theoretical and empirical considerations. It deals with the study of the main stakeholders' economic behaviours of the health sector: patients, health professionals (physicians and hospitals), health insurance, companies producing health goods or pharmaceuticals and health authorities. It invites to reconsider some of the basic concepts in economics (supply and demand, public intervention, uncertainty, information asymmetries, incentives, etc.) and models (growth models and human capital, labour supply, etc.), for a deep understanding of the phenomena at work in the sector. Thus, the course is likely to meet the expectations from students willing to specialise in the analysis of the health sector as well as students interested in illustrations of concepts and mechanisms derived from the economic theory.

COURSE OUTLINE
General introduction
Part 1. Micro foundations
- Chap 1 The demand for health and healthcare
  - Introducing health in the utility function and deriving healthcare demand: presentation of several options
  - The demand for healthcare using the concept of health-capital
  - Empirical illustration
- Chap 2 Health supply
  - Self-employed physicians
  - Modelling Quality
  - Payment schemes
  - Empirical illustration

Part 2. Health macroeconomics
- Chap 3 Health as an economic sector
  - Health sector contribution to GDP and growth in France and other OECD countries
  - The irresistible growth of the health sector in the economy (health as a luxury or a necessity good?)
  - Innovation in the health sector
  - Empirical illustration
- Chap 4 Health, development and growth
  - A health-augmented Solow-model
  - Health and the development process, the Sachs report & the econometrics of the health/growth relationship
  - The burden of diseases in Africa and the notion of "Universal Health Coverage"
  - Modelling health in a macroeconomic design: epidemic traps
  - Empirical illustration

Part 3. Topics
- Chap 5 Public regulations in the healthcare market
  - Measuring and reducing social inequalities in health
    - Empirical illustrations
  - Information asymmetries in health insurance
    - Adverse selection in insurance companies' plans
    - Moral hazard and healthcare consumption

KEY PROFESSIONAL SKILLS UPON GRADUATION
Analytical capabilities in health economics
Transferring knowledge to others (non-economists)
Ability to combine theoretical modelling and empirical analysis
Identifying the appropriate estimation strategy
Data creation/collection, handling datasets for health economics purposes.

ORGANIZATION

Semester: S1
Teaching Hours: 24 h of lectures
Comment: The course is taught by specialists in health economics involved in research projects most often implying or concerning health sector stakeholders (self-employed physicians, hospitals, DREES and DGOS of the French Health Ministry, National compulsory health insurance, complementary health insurances, regional health observatories, regional health agencies, National cancer institute, National drug safety agency, Public health research institute, etc.). It will use both theoretical modelling and search for empirical evidence backed by statistical and econometric methods.
Examination Method: Continuous assessment (essay) + Final exam (oral presentation)

BIBLIOGRAPHY AND TEXTBOOKS

Bras PL, de Pouvourville G, Tabuteau D. Traité d'économie et de gestion de la santé, Presses de Sciences Po, 2008
Culyer AJ, Newhouse JP (editors). Handbook of health economics, volumes 1A and 1B, North Holland, 2000
Folland S, Goodman AC, Stano M. The economics of health and health care, Pearson, 7th edition, 2013
Jones AM. The Elgar companion to health economics, Edward Elgar, 2006
Jones AM. Applied econometrics for health economists: a practical guide; Abingdon: Radcliffe Publishing Ltd, 2007
Jones AM, Rice N, Bago d'Uva T, Balia S. Applied Health Economics, Routledge, 2007
Pauly MV, McGuire TJ, Barros PP. Handbook of health economics, volume 2, North Holland, 2011
Phelps CE. Health economics, Pearson, 5th edition, 2013.
Sloan F, Hsieh CR. Health economics, MIT Press, 2012

RECOMMENDED PREREQUISITES

Microeconomics 1-4, Macroeconomics 1-4, Econometrics 1&2, Methodology 2, Health and environmental economics

KEYWORDS

Health and healthcare supply and demand; human and health capital; information asymmetries; health insurance; health professionals' labour supply; payment schemes

Transversal Project: Health, Environment and Development
Projet transversal : santé, environnement et développement

COURSE LANGUAGE

English

TEACHER

Raouf BOUCEKKINE – raouf.boucekkine@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES

Students will learn to apply their skills in data analysis, decision and economic evaluation to a topic in health, environment and development. The multidisciplinary/interdisciplinary nature of the project to be elaborated is a prerequisite. The deep study of market and nonmarket interaction channels between the environment (in a broad sense, not only in the physical meaning of the term), poverty and diffusion of epidemics (in particular zoonotic diseases) is particularly targeted.

COURSE OUTLINE

The course is twofold: A lecture on the academic literature concerned with the interaction channels mentioned above; the multidisciplinary projects elaboration and supervision

KEY PROFESSIONAL SKILLS UPON GRADUATION

Ability to use economic quantitative and analytical skills to an applied cross-disciplinary project in health, environment and development.

ORGANIZATION

Semester: S1
Teaching Hours: 6 h of lectures
Comment: This course is devoted to the preparation of a multidisciplinary project, which will be conducted in work groups. The course includes an academic lecture and supervision/evaluation by the teacher.

BIBLIOGRAPHY AND TEXTBOOKS

Barbier, E. B. (2021). Habitat loss and the risk of disease outbreak. *Journal of Environmental Economics and Management*, 108, 102451. https://doi.org/10.1016/j.jeem.2021.102451
Bennett, E. L. (2002). Is there a link between wild meat and food security? *Conservation Biology*, 16(3), 590-592. https://doi.org/10.1046/j.1523-1739.2002.01635.x
Boucekkine, R., Desbordes, R., & Latzer, H. (2009). How do epidemics induce behavioral changes? *Journal of Economic Growth*, 14(3), 233-264. https://doi.org/10.1007/s10887-009-9041-1
de Merode, E., Homewood, K., & Cowlishaw, G. (2004). The value of bushmeat and other wild foods to rural households living in extreme poverty in Democratic Republic of Congo. *Biological Conservation*, 118(5), 573-581. https://doi.org/10.1016/j.biocon.2003.10.005
Dobson, A., Ricci, C., Boucekkine, R., Fabbri, G., Gozzi, F., Loch-Temzelides, T., & Pascual, M. (2023). Balancing economic and epidemiological interventions in the early stages of pathogen emergence. *Science Advances,* 9, eade6169(2023).DOI:10.1126/sciadv.ade6169
Gottdenker, N. L., Streicker, D. G., Faust, C. L., & Carroll, C. R. (2014). Anthropogenic land use change and infectious diseases: A review of the evidence. *EcoHealth*, 11(4), 619-632. https://doi.org/10.1007/s10393-014-0941-1
Lindsey, P. A., Balme, G., Becker, M., Begg, C., Bento, C., Bocchino, C., ... & Zisadza-Gandiwa, P. (2013). The bushmeat trade in African savannas: Impacts, drivers, and possible solutions. *Biological Conservation*, 160, 80-96. https://doi.org/10.1016/j.biocon.2012.12.020
Nóbrega, A. A., Garcia, M. H., Tatto, E., Obara, M. T., Costa, E., Sobel, J., & Araujo, W. N. (2009). Oral transmission of Chagas disease by consumption of açaí palm fruit, Brazil. *Emerging Infectious Diseases*, 15(4), 653-655. https://doi.org/10.3201/eid1504.081450
Winck, G. R., de Souza, A. R., Rorato, A. C., Escada, M. I. S., & Codeço, C. T. (2022). Socioecological vulnerability and the risk of zoonotic disease emergence in Brazil. *Science Advances*, 8(9), eabo5774. https://doi.org/10.1126/sciadv.abo5774.

MANDATORY PREREQUISITES

Training in statistical and econometric models, training in development economics

KEYWORDS

Applied research, interdisciplinary research, land use, poverty, epidemics

Methodes and Techniques for Speaking
Méthodes et techniques d'oral

COURSE LANGUAGE

English

TEACHER

TBA

COURSE DESCRIPTION AND OBJECTIVES

This course aims at developing and improving students' ability to make oral presentations in English in a professional setting. In this course, students' participation must be very active.

KEY PROFESSIONAL SKILLS UPON GRADUATION

At the end of the course, the student should be able to comfortable in using English in a professional setting, including expressing him/herself with structured and convincing arguments in front of an informed or uninformed audience, taking up criticisms and managing questions from an audience. Also includes individual activities to learn one-to-one, small, and larger groups communication (with HR, with same background colleague, with different background colleagues, with hierarchy).

ORGANIZATION

Semester: S1
Teaching Hours: 12 h of tutorials

Project Management
Management de projet

COURSE LANGUAGE

English

TEACHER

Nicole HANSSEN – practitioner

COURSE DESCRIPTION AND OBJECTIVES

This course aims at training students to design development projects. It is based upon a real EU call for proposals concerning a development project. This course showcases the ”design step” of a Project Cycle Management (PCM) process.

COURSE OUTLINE

Project approach
Presentation and analysis of the study case: Guidelines
Stakeholders’ analysis
problem with tree design
strategic choices step
logical framework design
Detailed Description of means design
Cost Design Session
budget design
sources of financing
time schedule
final project presentation

KEY PROFESSIONAL SKILLS UPON GRADUATION

Students will have acquired a project design methodology that can be applied in any field

ORGANIZATION

Semester: S1
Teaching Hours: 24 h of lectures, in 8 sessions of 3 hours each
Comment: Students will design a real development project for application to EU financing through plenary sessions, practical teamwork and homework
Examination Method: Project

BIBLIOGRAPHY AND TEXTBOOKS

EC Aid Delivery Methods: project cycle management guidelines

MANDATORY PREREQUISITES

Critical thinking and motivation for teamwork

KEYWORDS

Project design, Project Cycle Management, logical framework approach, EU call for proposals, Budget design, Teamwork

Professionalisation Workshops
Ateliers de professionnalisation

COURSE LANGUAGE

English

COURSE LANGUAGE

English

COURSE DESCRIPTION AND OBJECTIVES

This workshop is designed to guide students in their transition from academic training to the job market. **Participation in all activities is mandatory.**

It combines several complementary components:

- **Afterworks** (on campus or online), where companies and institutions introduce themselves to students, share insights into their missions, and discuss opportunities for collaboration.
- A **Career Day**, organized in two parts: first, recent graduates present their career paths, current positions, and how their training helped them enter the job market; second, a large recruitment fair brings together around 50 local, national, and international companies and institutions to offer internships and job opportunities.
- A course entitled *"Building a Strong Application"*, providing practical tools and strategies for professional integration.
  It is divided into two parts:
  - First part (lecture): Preparing for interviews (best practices, preparation methods, and self-presentation); searching for an internship or a job abroad (application strategies, networks, and resources); negotiating salaries (key principles for successful negotiation).
  - Second part (workshops): Small-group sessions offered to M2 students, focusing on CV writing and mock interview practice.

Together, these activities give students concrete experience, direct contact with employers, and essential skills to confidently approach their future careers.

KEY PROFESSIONAL SKILLS UPON GRADUATION

By the end of the workshop, students will possess the essential skills to approach the job market with confidence. They will know how to present themselves effectively, understand recruiters' expectations in France and abroad, and activate a professional network. Through lectures and practical workshops, they will be able to prepare strong applications, succeed in interviews, and conduct salary negotiations with assurance.

ORGANIZATION

Semester: S1

Teaching Hours: 10 h of tutorials

Corporate Strategy
Stratégie d'entreprise

COURSE LANGUAGE

English

TEACHER

Sitraka FORLER – practitioner
Flavien RICHE – practitioner

COURSE DESCRIPTION AND OBJECTIVES

The objective of this course is to provide students with a framework for thinking about the different types of interactions in the professional world. We will focus on the SWOT Matrix. Most topics will be approached from both theoretical and empirical points of view.

COURSE OUTLINE

Foundations of Business
SWOT Analysis
5W2H
Project Management: PDCA, Lean, 6sigmas and PERT.
Applications and Puzzles with Real Business Examples with the use of ICT tools (Python, GitHub, LLms)

KEY PROFESSIONAL SKILLS UPON GRADUATION

Develop proficiency in business strategy concepts, tools, and frameworks.
Develop data-gathering and analytical skills to identify strategic problems and opportunities.
Develop leadership and interpersonal skills as a team member.

ORGANIZATION

Semester: S2
Teaching Hours: 24 h of lectures
Comment: Lectures' notes will be posted on the course webpage. Some readings, practice problem sets, and past exams will be posted at the same webpage.
Examination Method: Practical quiz (1/4 of the final grade) + Final presentation (3/4 of the final grade)

BIBLIOGRAPHY AND TEXTBOOKS

https://sloanreview.mit.edu/
° Personnal MBA
° HBR, Porter

Collaborating with Public Organizations
Collaboration avec les acteurs publics de l'économie

COURSE LANGUAGE

English

TEACHER

Maud FAVRE – practitioner

COURSE DESCRIPTION AND OBJECTIVES

The objective is to develop skills required to contribute to team projects led by the public sector. Illustrative examples of projects can be drawn from various sectors of the economy (labor, finance, health, housing, environment) with a local, regional and international focus.

COURSE OUTLINE

Navigating legal frameworks of projects
Contributing to budgeting
Identifying and quantifying project effects (direct, indirect, external)
Identifying *and quantifying risk and risk-management strategies*

KEY PROFESSIONAL SKILLS UPON GRADUATION

Being able to work in team with diverse disciplinary backgrounds
Being able to contribute with economic insights to the projects
Being able to make use of quantitative skills in the analysis of the project
Being able to learn about public regulations delimiting the scope of the project

ORGANIZATION

Semester: S2
Teaching Hours: 24 h of lectures
Examination Method: Partial continuous assessment

Professional Communication (apprenticeship)
Communication professionnelle (en alternance)

COURSE LANGUAGE
English

TEACHER
Julia MALEK – practitioner

COURSE DESCRIPTION AND OBJECTIVES
This course is designed to help students build a confident, strategic and authentic professional presence. Through an engaging, practice-oriented approach, students will sharpen their communication skills for key professional contexts: job interviews, personal branding, salary negotiations, public speaking, and professional networking (both in-person and online). At the end of the course, each student will have crafted their own impactful professional narrative and acquired concrete tools to thrive in their future career.

COURSE OUTLINE
Pillar 1 — Self-knowledge & Personal Branding Foundations
Pillar 2 — Pitching Yourself Professionally
Pillar 3 — Job Interviews & Recruitment Processes
Pillar 4 — Professional Digital Presence & LinkedIn
Pillar 5 — Ethical Negotiation Strategies
Pillar 6 — Nonviolent Communication in the Workplace

KEY PROFESSIONAL SKILLS UPON GRADUATION
Communicate clearly and persuasively in professional settings
Build a coherent and compelling personal brand, online and offline
Prepare for and manage job interviews with confidence, including tricky and unexpected questions
Approach salary negotiations with strategy, ethics and assertiveness
Pitch themselves with clarity and impact (voice, structure, body language)
Better understand their communication and decision-making style using MBTI insights
Integrate Nonviolent Communication (NVC) techniques to build respectful, constructive dialogue
Reinforce written communication tools (CV, cover letter) through spoken delivery and rhetorical techniques

ORGANIZATION
Semester: S2
Teaching Hours: 20 h of tutorial sessions
Comment: For students doing an apprenticeship. Interactive workshops combining theory, active exercises, and coaching

BIBLIOGRAPHY AND TEXTBOOKS
Les mots sont des fenêtres (ou bien ce sont des murs), Marshall B. Rosenberg

Scientific Communication (apprenticeship)
Communication scientifique (en alternance)

COURSE LANGUAGE
English

TEACHER
Morgan RAUX – morgan.raux@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES
This course provides graduate students with the skills necessary to effectively communicate scientific ideas to diverse audiences, including academics, policymakers, multi-disciplinary audiences, and the general public. Teaching modules will use a range of discursive (focused on theoretical issues) and practical (focused on skills) approaches.

COURSE OUTLINE
Possible modules include: Foundations of Scientific Communication; Writing for Scientific Audiences; Visual and Oral Communication; Communicating with Non-Specialist Audiences.

KEY PROFESSIONAL SKILLS UPON GRADUATION
By the end of this course, students will be able to write clear, concise, and compelling scientific papers/reports and abstracts, and deliver effective oral presentations. They will also be able to write a review/discuss someone else's work and respond to a reviewer. We will pay particular attention to the audience to which a student will communicate. Students will be able to navigate around some digital tools designed for scientific communication.

ORGANIZATION
Semester: S2
Teaching Hours: 24 h of tutorial sessions
Comment: For students doing an apprenticeship. This course is designed to be highly interactive, with an emphasis on practical applications. Students are encouraged to bring their own topics and projects into the coursework to make the learning experience as relevant as possible. Active participation in class is mandatory. The modules will be introduced through activities. Assignments will be to a large extent completed during class time, including short writing assignments and oral presentations.
Examination Method: ontinuous assessment

BIBLIOGRAPHY AND TEXTBOOKS
Mercer-Mapstone, Lucy, and Louise Kuchel. "Core skills for effective science communication: A teaching resource for undergraduate science education." International Journal of Science Education, Part B 7.2 (2017): 181-201.
AAAS Communication Toolkit: https://www.aaas.org/resources/communication-toolkit.
PLOS blog on scientific communication: https://scicomm.plos.org
Additional journal articles and online resources provided by the instructor.

RECOMMENDED PREREQUISITES
Basic communication in a professional setting.

KEYWORDS
Scientific communication.

Big Data Tools (MAG)
Outils des Big Data (MAG)

COURSE LANGUAGE

English in Marseille

TEACHER

Hervé MIGNOT – practitioner from Equancy

COURSE OUTLINE

1. Hadoop. HDFS. MapReduce. Stockage et calculs distribués. Déploiement d'un cluster.
2. Préparation, stockage et traitement des big data : Pandas, Hive and Pig
3. Data visualisation avec matplotlib & seaborn
4. Alternatives : solutions propriétaires, bases NoSQL, ElasticSearch

ORGANIZATION

Semester: S1
Teaching Hours: 24 h of lectures
Comment: Class exclusive for Magistere students.

Machine Learning and New Data (MAG)
Machine learning et nouvelles données (MAG)

COURSE LANGUAGE

English in Marseille

TEACHER

Quentin LIPPMANN – quentin.lippmann@univ-amu.fr

COURSE DESCRIPTION AND OBJECTIVES

This course proposes to study the processing and analysis of unstructured data, and more specifically textual data and images.

COURSE OUTLINE

This course is divided in two parts of 12 hours each. The first part covers text as data. The second is about image as data.

Part 1 – Text as Data

Block 1 – Foundations of NLP

Students will learn about the complete document-pre-processing pipeline, beginning with tokenisation and the construction of n-grams. They will create Bag-of-Words representations and apply TF–IDF weighting to highlight discriminative terms. We will then move to distributed word representations through word embeddings, extract entities with Named-Entity Recognition, and analyse sentence structure by performing dependency parsing.

Block 2 – Large Language Models

Students will learn about the transformer architecture and its self-attention mechanism, compare pre-training with fine-tuning, and experiment with in-context learning. They will study Reinforcement Learning from Human Feedback as an alignment method and practice prompt-engineering patterns to steer model behaviour. We will tackle hallucination and explore retrieval-augmented generation as a mitigation strategy.

Part 2 – Image as Data

Block 1 – Image Fundamentals

Students will learn about digital image representation and colour spaces, then examine convolution operations—kernel size, stride, padding—and their effect on the receptive field. They will study activation and pooling layers for feature extraction and understand bounding-box regression. Anchor-based and anchor-free object-detection strategies will be compared.

Block 2 – Facial Analysis, Segmentation & Generative AI

Students will learn about classical Haar cascades versus modern RetinaFace detectors for face localisation. They will map facial landmarks, build embedding-based recognition pipelines, and evaluate systems using FAR, FRR, ROC curves, and demographic-bias checks. Promptable segmentation models will be introduced, followed by diffusion-based generative models for image synthesis.

All the concepts are applied and illustrated in Python applications.

KEY PROFESSIONAL SKILLS UPON GRADUATION

To learn how to process and analyse textual data
To learn how to process and analyse images

ORGANIZATION

Semester: S1
Teaching Hours: 24 h of lectures
Comment: Class exclusive for Magistere students.

End-of-Studies Project (MAG)
Projet de fin d'études (MAG)

COURSE LANGUAGE

French in Marseille

TEACHER

A teacher + a practitioner

COURSE DESCRIPTION AND OBJECTIVES

The end-of-studies project is carried out in collaboration with a company from October to March. This project enables students to carry out operational engineering work in data science and to compare theory with applications in the professional world.

KEY PROFESSIONAL SKILLS UPON GRADUATION

To be able to tackle a data science problem and write a report to answer it.
To know how to work as a team and to meet a set of specifications.

ORGANIZATION

Semester: S1
Comment: Class exclusive for Magistere students. Bimonthly meetings with supervisors, and autonomous work between meetings.
Examination Method: Project + Defense

Topics in Data Science (MAG)
Sujets en Data Science (MAG)

COURSE LANGUAGE

English in Marseille

TEACHER

Pierre MICHEL – pierre.michel@univ-amu.fr
Christophe HURLIN – practitioner

COURSE DESCRIPTION AND OBJECTIVES

This course aims to raise students' awareness of topical issues in data science.

COURSE OUTLINE

1. Conformal prediction
   a. Introduction and theoretical foundations
   b. Conformal prediction for regression
   c. Conformal prediction for classification
2. Algorithmic fairness
   a. Introduction to algorithmic fairness
   b. Framework for fairness in machine learning
   c. Measuring algorithmic fairness
   d. Testing for algorithmic fairness
   e. Mitigating algorithmic biases

KEY PROFESSIONAL SKILLS UPON GRADUATION

Understand how to make conformal prediction for regression and classification
Understand algorithmic fairness, and how to measure it, test it and mitigate its biases.

ORGANIZATION

Semester: S2
Teaching Hours: 24 h of lectures
Comment: Class exclusive for Magistere students.

Cours spécifique Magistère
Dernière mise à jour / last update: juin 2025.

Projects in Data Science (MAG)
Projets en Data Science (MAG)

COURSE LANGUAGE
English in Marseille

TEACHER
Pierre MICHEL – pierre.michel@univ-amu.fr
Christophe HURLIN – practitioner

COURSE DESCRIPTION AND OBJECTIVES
This course is complementary to the course of « Topics in data science ». The goal of this course is to make students work on projects related to the topics studied in the other course.

KEY PROFESSIONAL SKILLS UPON GRADUATION
To be able to tackle a data science problem and write a report to answer it.

ORGANIZATION
Semester: S2
Teaching Hours: 24 h of lectures
Comment: Class exclusive for Magistere students.

Cours spécifique option IDEAL
Dernière mise à jour / last update: septembre 2024.

Green Lobbying (IDEAL)
Lobbying vert (IDEAL)

COURSE LANGUAGE
?

TEACHER
Sciences Po

COURSE DESCRIPTION AND OBJECTIVES

COURSE OUTLINE

KEY PROFESSIONAL SKILLS UPON GRADUATION

ORGANIZATION
Semester: S1
Teaching Hours: 20 h of lectures
Comment: Class exclusive for IDEAL students.

BIBLIOGRAPHY AND TEXTBOOKS

MANDATORY PREREQUISITES

RECOMMENDED PREREQUISITES

KEYWORDS

Cours spécifique option IDEAL
Dernière mise à jour / last update: septembre 2024.

Climate, Biodiversity and Planetary Limits (IDEAL)
Climat, biodiversité et limites planétaires (IDEAL)

COURSE LANGUAGE
?

TEACHER
Sciences Po

COURSE DESCRIPTION AND OBJECTIVES

COURSE OUTLINE

KEY PROFESSIONAL SKILLS UPON GRADUATION

ORGANIZATION
Semester: S1
Teaching Hours: 20 h of lectures
Comment: Class exclusive for IDEAL students.

BIBLIOGRAPHY AND TEXTBOOKS

MANDATORY PREREQUISITES

RECOMMENDED PREREQUISITES

KEYWORDS

Cours spécifique option IDEAL
Dernière mise à jour / last update: septembre 2024.

Supervised Work (IDEAL)
Travaux encadrés (IDEAL)

COURSE LANGUAGE
?

TEACHER
Sciences Po

COURSE DESCRIPTION AND OBJECTIVES

COURSE OUTLINE

KEY PROFESSIONAL SKILLS UPON GRADUATION

ORGANIZATION
Semester: S1
Teaching Hours: 20 h of tutorials
Comment: Class exclusive for IDEAL students.

BIBLIOGRAPHY AND TEXTBOOKS

MANDATORY PREREQUISITES

RECOMMENDED PREREQUISITES

KEYWORDS

Cours spécifique option IDEAL
Dernière mise à jour / last update: septembre 2024.

History of International Relations (IDEAL)
Histoire des relations internationales (IDEAL)

COURSE LANGUAGE
?

TEACHER
Sciences Po

COURSE DESCRIPTION AND OBJECTIVES

COURSE OUTLINE

KEY PROFESSIONAL SKILLS UPON GRADUATION

ORGANIZATION
Semester: S1
Teaching Hours: 20 h of lectures
Comment: Class exclusive for IDEAL students.

BIBLIOGRAPHY AND TEXTBOOKS

MANDATORY PREREQUISITES

RECOMMENDED PREREQUISITES

KEYWORDS

Cours spécifique option IDEAL
Dernière mise à jour / last update: septembre 2024.

International Terrorism (IDEAL)
Terrorisme international (IDEAL)

COURSE LANGUAGE
?

TEACHER
Sciences Po

COURSE DESCRIPTION AND OBJECTIVES

COURSE OUTLINE

KEY PROFESSIONAL SKILLS UPON GRADUATION

ORGANIZATION
Semester: S1
Teaching Hours: 20 h of lectures
Comment: Class exclusive for IDEAL students.

BIBLIOGRAPHY AND TEXTBOOKS

MANDATORY PREREQUISITES

RECOMMENDED PREREQUISITES

KEYWORDS

The Role of Legislation in Environmental Protection (IDEAL)
Le rôle de la législation dans la protection de l'environnement (IDEAL)

COURSE LANGUAGE

?

TEACHER

Sciences Po

COURSE DESCRIPTION AND OBJECTIVES

COURSE OUTLINE

KEY PROFESSIONAL SKILLS UPON GRADUATION

ORGANIZATION

Semester: S2
Teaching Hours: 20 h of lectures
Comment: Class exclusive for IDEAL students.

BIBLIOGRAPHY AND TEXTBOOKS

MANDATORY PREREQUISITES

RECOMMENDED PREREQUISITES

KEYWORDS

Cours spécifique option IDEAL
Dernière mise à jour / last update: septembre 2024.

Diplomacy and International Crisis (IDEAL)
Diplomatie et crises internationales (IDEAL)

COURSE LANGUAGE
?

TEACHER
Sciences Po

COURSE DESCRIPTION AND OBJECTIVES

COURSE OUTLINE

KEY PROFESSIONAL SKILLS UPON GRADUATION

ORGANIZATION
Semester: S2
Teaching Hours: 20 h of lectures
Comment: Class exclusive for IDEAL students.

BIBLIOGRAPHY AND TEXTBOOKS

MANDATORY PREREQUISITES

RECOMMENDED PREREQUISITES

KEYWORDS

Cours spécifique option IDEAL
Dernière mise à jour / last update: septembre 2024.

Diplomacy in Practice (IDEAL)
Diplomatie en pratique (IDEAL)

COURSE LANGUAGE
?

TEACHER
Sciences Po

COURSE DESCRIPTION AND OBJECTIVES

COURSE OUTLINE

KEY PROFESSIONAL SKILLS UPON GRADUATION

ORGANIZATION
Semester: S2
Teaching Hours: 20 h of lectures
Comment: Class exclusive for IDEAL students.

BIBLIOGRAPHY AND TEXTBOOKS

MANDATORY PREREQUISITES

RECOMMENDED PREREQUISITES

KEYWORDS