



Form for Developing the Syllabus of Courses for the International Week

The purpose of this document is to complete the information for the preparation of the syllabus of courses for the international week in the empty boxes.

Please complete the following mandatory fields requested in each of the boxes below:

I. General Information

Complete the following general information:

Name of the course:

Artificial Intelligence applied in the industry: Unlocking the potential of intelligent systems

Teacher's name:

Dr. Raúl Calderón

II. Introduction

Describe briefly, simply and synthetically what the course consists of and its formative scope. To do so, indicate what the course offers or provides to the student, mentioning its practical and theoretical usefulness.

Type the course introduction in the following box:

In a world where AI is currently shaping everything from healthcare to mobility, this course shows how intelligent systems transform industries, streamline operations, and spark innovation.

Designed as a clear, comprehensive entry point to Artificial Intelligence, this course equips students to understand and critically evaluate modern AI solutions. Core domains such as machine learning, neural networks, natural language processing, and computer vision are taught through practical examples. Real cases analysis that demonstrate how AI solves complex problems and improves decision-making are also part of this program.

The course combines foundational theory with in-depth case analysis. A dedicated module on ethics, covering data privacy, bias, and responsible use, ensures graduates can apply AI with confidence and integrity. This course is ideal for those eager to unlock the potential of AI in today's data-driven economy. By the end, students will have a sharp grasp of AI's capabilities and limits, enabling informed strategic choices and hands-on application in their own fields

III. Final Learning Achievement of the Course

The final learning achievement is a precise and assessable statement of what a student is expected to be able to do at the end of the course. They are essential for guiding the teaching process, assessing student progress, and verifying the acquisition and application of knowledge.



To develop the learning achievement of the course, consider the following elements to develop the final learning achievement of the course:

Write the final achievement of the course in the following box:

1- Understanding core AI concepts

By the end of the course, the student will be able to explain the foundational principles of artificial intelligence, including machine learning, neural networks, natural language processing, and computer vision, through a mix of theoretical learning and hands-on activities.

2- Application of AI tools to real-world problems

The student will be able, through real-world case study, to explain how specific AI tools are applied to improve decision-making and operational efficiency.

3- Decision-Making with AI-Driven insights

The student will be equipped to interpret and leverage AI-driven insights for informed decision-making in various professional and project contexts.

4- Ethical AI use and data privacy awareness

The student will recognize and evaluate ethical considerations in AI, including data privacy, security, and bias, by engaging in discussions and reflective exercises on responsible AI use.

IV. Learning Units

In this section the final learning achievement of the course is moved and the thematic contents to be developed are indicated.

Now, write the name of the course after “Learning Unit 1”. Also, move the final learning achievement of the course into “Learning Achievement” and list the topics to be worked on under “Contents”:



Learning Unit 1: Understanding Core AI Concepts

Learning Achievement:

At the end of this unit, the student will understand foundational principles of data, artificial intelligence, including machine learning, neural networks, natural language processing, and computer vision

Contents:

- Introduction to Artificial Intelligence: History, definitions, and types.
- Machine Learning Basics: Supervised, unsupervised, and reinforcement learning.
- Neural Networks: Structure, types, and applications.
- Natural Language Processing: Basics, applications, and real-world examples.
- Computer Vision: Introduction and fundamental techniques.

Learning Unit 2: Application of AI Tools to real-world problems

Learning Achievement:

Upon completing this unit, the student will learn how to apply AI tools to solve complex real-world challenges, showcasing AI's potential to enhance decision-making and operational efficiency across industries.

Contents:

- Overview of AI tools and software used in industry.
- Hands-on activities with AI tools for problem-solving.
- Case studies on AI impact in various domains.

Learning Unit 3: Decision-Making with AI-Driven insights

Learning Achievement:

At the end of this unit, the student will be able to interpret and leverage AI-driven insights for effective decision-making in various professional and project contexts.

Contents & Evaluations:

- Data Interpretation in AI: Understanding insights from AI models.
- Decision-Making Frameworks: Using AI-driven insights for strategic choices.
- Case studies on AI-enabled decision-making in real-world scenarios.
Group activities to analyze and present findings from AI models.

Learning Unit 4: Ethical AI use and data privacy awareness

Learning Achievement:

By the end of this unit, the student will recognize and assess ethical considerations in AI, including data privacy, security, and bias, and engage in discussions on responsible AI use.

Contents & Evaluations:

- Ethical Challenges in AI: Privacy, fairness, transparency, and accountability.
- Data Privacy and Security: Legal and ethical frameworks.
- Bias and Fairness in AI: Recognizing and mitigating bias in AI models.
- Reflective exercises on ethical dilemmas in AI applications.



V. Teaching Strategies

The teaching strategies respond to the characteristics of the course and the teaching methodology used by the teacher.

Below are some teaching strategies that can be selected. Write an “x” in the box corresponding to the teaching strategies you use in your course. If one of these strategies does not fit your course, add the strategy at the end of the list and describe it:

Teaching Strategy	Write an x
Interactive presentation: <i>It consists of the explanation and demonstration of contents by the teacher, with the intervention of the students, either through questions or presentations of work prepared by the students.</i>	X
Exercise and problem solving: <i>It consists of asking students to solve exercises and/or problems by using formulas or algorithms, applying procedures and interpreting the results.</i>	X
Case studies: <i>It consists of an in-depth analysis of a fact, problem or real or hypothetical event in order to interpret it, generate hypotheses, diagnose it and solve it.</i>	X
Group dynamics: <i>It consists of activities of a different nature conducted collaboratively between two or more students, and their purpose is to learn how the groups interact and thus facilitate learning from experience.</i>	X
Structured discussions/ discussions: <i>It consists of moderating a systematically organized discussion of divergent opinions between two or more students on a topic or problem.</i>	X
Role playing: <i>It consists of providing a real or simulated scenario in which students are required to assume fictitious or real roles in order to be able to deploy all their abilities to resolve conflicts, as well as to understand or experience a reality according to the role assumed.</i>	X
Reflective dialogue: <i>It consists of the interaction of two participants who exchange ideas and opinions through a conversation with the purpose of reflecting critically and deeply on a specific topic. In this dynamic, students not only share their points of view, but are required to be open to listen and consider the other's perspective in order to build a more comprehensive knowledge of the topics discussed.</i>	X
Collaborative learning: <i>It consists of providing instructions for students in small groups to exchange information and work on a task until all participants understand it (not necessarily equally) and have completed it.</i>	X
Peer learning: <i>It consists of promoting collaborative spaces between a pair of students who exchange their knowledge, information, experiences and problem solving, being guided by the teacher (for example: students exchange their solutions among peers, on an activity or exercise, before the teacher presents it to everyone).</i>	X
Active learning: <i>It consists of encouraging students' participation and continuous reflection through activities aimed at deepening knowledge through interaction with the content, which involves the analysis and synthesis of information.</i>	X
Inverted classroom:	



<i>It consists of establishing pre-class activities for the review of conceptual materials and information (e.g., through videos, infographics, readings and other teaching resources), which allows students to prepare for a practical and active classroom session through collaboration, discussion and problem solving.</i>	
Experiential learning: <i>It consists of developing conditions for students to experience real or simulated situations (for example: debates, national or international learning visits, immersive experiences, internships, among others) that allow them to feel or perform actions and share them with their peers to strengthen their learning.</i>	
Service learning: <i>It consists of preparing students to apply the contents and tools provided by the course to the real needs of the community in order to develop a sense of social responsibility and, thus, improve their environment.</i>	
Spaces for creation: <i>It consists of facilitating physical or virtual spaces for students to create projects or prototypes based on computer programs or physical tools (for example: game labs software, design software, innovation labs, 3D printers, laser cutters, among others).</i>	
Design thinking: <i>It consists of the development of solutions or products focused on user needs, through strategies and tools (e.g. empathy map, user journey, Canva, among others) that allow students to develop their empathy to understand the environment, generate ideas and solutions, as well as prototype solutions or products that can be tested and adjusted to achieve user satisfaction.</i>	
Problem-based learning: <i>It consists of a complex real-world or hypothetical problem posed by the teacher, with the intention that students (generally in groups) gather more information and analyze the problem in order to propose solutions.</i>	X
Research-based learning: <i>It consists of connecting teaching with research through the application of scientific concepts, theories and methods in order to generate new knowledge about a particular aspect of reality or the exploration of an unknown phenomenon in order to suggest theoretical or methodological guidelines for its approach.</i>	
Project-based learning: <i>It consists of the design and development of projects (generally in groups of students) for the student to manage a set of planned, interrelated and coordinated activities to achieve an objective within a given time frame.</i>	
Challenge-based learning: <i>It consists of providing a situation or general context in a social or physical environment so that students can collaboratively choose a challenge to be solved based on the learning of the contents offered by the course.</i>	X
Gamification for learning: <i>It consists of developing a physical or virtual learning environment by applying the principles and elements of the game to encourage student motivation and participation.</i>	
Write other strategies not included in the above list that you need to detail:	

VI. Evaluation Systems

In this section, write the names of the evaluations to be used in the course, the evaluation criteria to be used in each one of them, coherently with the final learning achievement of the course, as well as the percentage of weighting that each type of evaluation will have in the final score, which must add up to 100%.

The evaluations contemplate different types of evaluations such as:

- Activity: group presentation, exposition, debate, dynamics, simulations, among others.
- Product: essay, final paper, reports, prototypes, designs, resolution tasks, case solutions, program development, among others.
- Instrument: partial exam, final exam, graded tests, reading controls, self-evaluations,



questionnaires, among others.

Then, write in the corresponding boxes the considerations for the evaluations (optional), the name of the evaluations, the weighting percentage (%), the evaluation criteria and comments (optional):

Considerations for evaluations (optional)

Attendance is essential for the evaluation activities to be graded.

Name of evaluation	%	Criteria	Comments
Group Assignment: AI Case-Study and Presentation	50	<ol style="list-style-type: none"> 1. Application Analysis: Analyzes the tool’s impact on business/society and the decision-making process 2. Ethical Evaluation: Evaluates the ethical challenges, biases or privacy concerns of the case 3. Presentation Quality: Clarity, organization and professionalism of the group presentation 	<p>The presentation is a group activity. The grade will be based on the collective work, including the submitted report/slides and the oral presentation</p>
Final Exam	50	<ol style="list-style-type: none"> 1. Understanding of core concepts: Demonstrates understanding of foundational AI principles (ML, NNs, NLP,..) 2. Ethical reasoning: Ability to recognize and articulate solutions for ethical dilemmas and bias in given scenarios 	<p>This is an individual exam that will use a combination of short-answer questions and a case-based essay to assess individual learning</p>

VII. References

In this section the sources and resources of information should be indicated, pointing out the required and recommended readings. It is necessary to consider that this material must be available to students and must include safe and reliable links that are unlikely to change domain, for example, DOI, handle, reliable websites, etc. Likewise, avoid considering class handouts, teacher's notes, evaluations, among other teacher's own work materials that are not referenced.



Mandatory References

- Iansiti, M. y Lakhani, K. (2020). Competing in the Age of AI. Harvard Business Review Press.
- Géron, A. (2019). Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow (2.ª ed.). O'Reilly Media.
- Russell, S. y Norvig, P. (2020). Artificial Intelligence: A Modern Approach (4.ª ed.). Pearson.
- Edquist, A., Grennan, L., Griffiths, S. y Rowshankish, K. Data ethics: What it means and what it takes. McKinsey.

Recommended: list the references that you consider suggested for the course

Then, write in the corresponding box the bibliographic references to be recommended for the course.

Recommended References

- O'Neil, C. (2016). Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy. Crown.
- Theobald, O. (2017). Machine Learning For Absolute Beginners: A Plain English Introduction (2.ª ed.).
- Goodfellow, I., Bengio, Y. y Courville, A. (2016). Deep Learning. MIT Press.
- Noble, S. U. (2018). Algorithms of Oppression: How Search Engines Reinforce Racism. NYU Press.
- Shalev-Shwartz, S. y Ben-David, S. (2014). Understanding Machine Learning: From Theory to Algorithms. Cambridge University Press.
- Floridi, L. y Cows, J. (2022). A Unified Framework of Five Principles for AI in Society. Harvard Data Science Review.



The schedule is a reference for the management of the course, as well as the topics and contents that will be developed, organized in the week. It also includes the contents and activities or evaluations to be carried out, as well as the resources and materials.

Next, write the name of the course after “Learning Unit” and its respective contents, activities to be performed and resources to be used, as well as the evaluations and bibliographic references for the week:

Learning unit	Contents, activities, and resources	Evaluations	References
Week 1: from 03/16/2025 to 03/20/2025			
Day 1: 03/16	Unit 1: Understanding Core AI Concepts Contents: Introduction to AI (History, definitions, types). Activities: Dialogic presentation, structured discussion on AI. Resources: Slides, selected readings.		<ul style="list-style-type: none">● Iansiti, M., Lakhani, K., Competing in the Age of AI, Harvard Business Review Press; Illustrated Edition (7. Januar 2020)● Edquist, A., Grennan, L., Griffiths, S., and Rowshankish, K., Data ethics: What it means and what it takes https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/data-ethics-what-it-means-and-what-it-takes
Day 2: 03/17	Unit 2: Application of AI Tools to real-world problems Contents: Machine Learning Basics & NLP Basics. Overview of AI tools and software. Activities: Case studies on AI impact. Resources: Case-Study, Usage of AI-Tools.		<ul style="list-style-type: none">● Géron, A. (2019). Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow (2nd ed.). O'Reilly Media.● Shalev-Shwartz, S., & Ben-David, S. (2014). Understanding Machine Learning: From Theory to Algorithms. Cambridge University Press.● Chollet, F. (2021). Deep Learning with Python (2nd ed.). Manning Publications.● Theobald, O. (2017). Machine Learning For Absolute Beginners: A Plain English Introduction (2nd ed.).

<p>Day 3: 03/18</p>	<p>Unit 3: Decision-Making with AI-Driven Insights</p> <p>Contents: Data Interpretation in AI. Decision-Making Frameworks.</p> <p>Activities: Case studies on AI-enabled decision-making. Dedicated group work session for the Group Assignment.</p> <p>Resources: Case study materials.</p>	<p>Group assignment</p>	<ul style="list-style-type: none"> ● Russell, S., & Norvig, P. (2020). Artificial Intelligence: A Modern Approach (4th ed.), Chapter 16: Making Simple Decisions. Pearson. ● Kahneman, D. (2011). Thinking, Fast and Slow. Farrar, Straus and Giroux. ● Simon, H. A. (1977). The New Science of Management Decision. Prentice Hall. ● Salesforce Trailhead (2024). Decision-Making Frameworks & AI Models. https://trailhead.salesforce.com/content/learn/modules/decision-making-frameworks-ai-models
<p>Day 4: 03/19</p>	<p>Unit 4: Ethical AI Use and Data Privacy Awareness</p> <p>Contents: Bias and Fairness in AI. Data Privacy and Security</p> <p>Activities: Group Presentations (Assessment 1). Reflective exercises/dialogue on ethical dilemmas.</p> <p>Resources: Ethical dilemma scenarios.</p>	<p>Group Presentations</p>	<ul style="list-style-type: none"> ● O'Neil, C. (2016). Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy. Crown. ● Noble, S. U. (2018). Algorithms of Oppression: How Search Engines Reinforce Racism. NYU Press. ● Floridi, L., & Cowls, J. (2022). A Unified Framework of Five Principles for AI in Society. Harvard Data Science Review. ● Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. Nature Machine Intelligence, 1(9), 389-399.
<p>Day 5: 03/20</p>	<p>Course Wrap-up & Final Assessments</p> <p>Contents: Course review and Q&A.</p> <p>Activities: Final Exam (Assessment 2)</p> <p>Resources: Presentation/Exam material</p>	<p>Final Exam</p>	<ul style="list-style-type: none"> ● Harvard Business Publishing (2024). Student Use Cases for AI. https://hbsp.harvard.edu/student-use-cases-ai ● University of Waterloo (2024). Guide to Assessment in the Generative AI Era. https://uwaterloo.ca/centre-for-teaching-excellence/catalogs/tip-sheets/guide-assessment-generative-ai-era ● MagicSlides (2025). How to Use AI for Group Projects: Collaborative Presentation Creation. https://magicslides.app/blog/ai-group-projects