

## **ETHICAL AI INNOVATION CHALLENGE COURSE SYLLABUS**

*Create Innovative Solutions to Society's Complex Challenges*

**Instructor:** Program Lead: New York Academy of Sciences

**Course Time & Format:** 10 weeks; approximately 2-4 hours weekly

**Format:** Blended; Online

**Age Level:** 13 - 17 years old

### **NOTE TO TEACHERS**

This is a sample Innovation Challenge course syllabus and rubric that has been developed for the Civics 2a. Project. Each Innovation Challenge will be adapted and modified depending on the overarching topic. The Innovation Challenge project is property of The New York Academy of Sciences' Junior Academy.

### **COURSE DESCRIPTION & OBJECTIVES**

Innovation Challenges are an introduction to foundational concepts of design thinking with an emphasis on developing and testing new solutions to society's greatest challenges. The Junior Academy Innovation Challenges require students to work in self-selected, distributed teams, requiring cross-cultural communication, dynamic problem solving, deep critical thinking related to society, leadership and project management skills.

Students must first identify their project team and then work together with a mentor to apply design thinking processes to approach the real-world problems of an innovation challenge with the Junior Academy. While each student must identify their own role within the team, together they will learn how to identify and map out a real problem and ways to build and test solutions quickly through an iterative, scientific approach. This course requires extensive student collaboration and regular engagement through The Academy's Junior Academy and its online platform, [Launchpad](#).

### **THE CHALLENGE**

Artificial intelligence (AI) is rapidly reshaping our world and offers significant opportunities to improve our quality of life. Precision diagnostics and personalized treatments are revolutionizing healthcare, and AI-driven automation is enhancing efficiency in industry. These technologies make complex tasks easier and safer by using huge amounts of data to make informed decisions,

reduce human error, and potentially prevent hazards, such as in self-driving cars that promise to lower traffic accidents.

This technological revolution is not without its challenges, especially when it comes to ethics and fairness. Deep-fakes – AI-created fake videos and images that make it look like someone did or said something they never actually did – can manipulate the news and erode trust. Biased data sets and algorithms can perpetuate existing inequalities. AI's role in creative fields, such as art and literature, raises questions about originality and intellectual property. The potential for misuse or unintended consequences will require a careful balancing act to ensure that advancements do not come at the expense of fairness and integrity. Your challenge is to develop a solution to address one specific issue that AI poses. The solution can include innovations and or alterations of existing technology, and data collected from online open sources. Teams will also be asked to integrate a proposal plan to governing bodies, schools, and communities to maximize their solutions' impact.

**Student Challenge: To design a technical solution that addresses and considers one clearly outlined and defined issue that AI poses in our global society.** Students will work collaboratively to consider the following when designing their teams' solution:

- What are some of the issues that AI poses in our society? What are the impacts or implications of those issues?
- Focus on one specific issue that AI poses. How could your solution be used by society at large? How would you propose governments use your solution?
- Are there any downsides to your solution? What else would you and your team have to consider to create an ethical solution?
- Who is your solution calling upon to act or implement? How does your data or solution support that societal change or law?
- How can you integrate community co-design into your solution?

## LEARNING OBJECTIVES

---

**INNOVATION CHALLENGE LEARNING OBJECTIVES** *At the end of this course, students will be able to:*

- Develop critical thinking and problem-solving skills through brainstorming techniques to develop ideas and design a solution to a complex problem.
- Develop their own arguments and analyze competing perspectives to a complex problem with supporting evidence.
- Develop a deeper, personal civic identity and clearly identify their role in their community.

- Develop a solution that could play a part in transforming a specific societal need regarding a larger issue that is transferable to a specific community and larger global community.
- Use data and insights of an inquiry to answer a research question using scientific terms in charts, tables, or graphs.
- Utilize a social justice lens when applicable to interpret the data and critically think about which groups are not represented around decision making.
- Effectively communicate ideas, data and insights using various forms of media.
- Effectively collaborate with team members with empathy and mutual respect, and develop an expanded perspective about how people from other countries see the world.
- Effectively communicate challenge specific variables that impact the environment, society, and economy including examples of the effect on local communities.
- Understand how to apply Design Thinking methods to understand what users need, and how to develop solutions to meet those needs.
- Learn how to actively listen, work through any disagreements, and solicit input from people in creative ways to generate new ideas.
- Learn how to test ideas and develop rapid prototypes.
- Identify corresponding careers connected to Innovation Challenge.

## COURSE OUTLINE

TIME	TOPIC	ASSIGNMENTS	FORMAT
Week 1	<ul style="list-style-type: none"> <li>• Getting Started w/Junior Academy</li> <li>• Onboarding</li> </ul>	<ul style="list-style-type: none"> <li>• Join <a href="#">Launchpad Platform</a></li> <li>• Review <a href="#">Junior Academy Orientation</a></li> <li>• Attend Virtual Kick Off Week</li> <li>• Complete Course Pre-Survey</li> </ul>	Individual
<b>PHASE 1</b> Challenge Team Formation			
Week 2	Challenge introduction <ul style="list-style-type: none"> <li>• Background on your Challenge</li> <li>• Finding Mentors &amp; Experts</li> <li>• Reaching out to experts</li> </ul>	<ul style="list-style-type: none"> <li>• Complete Required Weekly Reading</li> <li>• Engage in Launchpad Discussions</li> <li>• Complete activities found in resource library</li> </ul>	Collaborative
Week 3	Team Building <ul style="list-style-type: none"> <li>• Forming Your Team</li> <li>• Holding a Virtual Team Building</li> <li>• Creating a Team Comm's Plan</li> </ul>	<ul style="list-style-type: none"> <li>• Engage in Launchpad Discussions</li> <li>• Hold 1st Team Meeting</li> <li>• Complete Required Weekly Reading</li> <li>• Due Milestone #1: <a href="#">Team Dynamics</a></li> </ul>	Collaborative
<b>PHASE 2</b> Research, Brainstorm & Plan			

Week 4	<p>Researching</p> <ul style="list-style-type: none"> <li>Gathering relevant and diverse materials, articles, books, and sources</li> <li>Developing research questions and interviewing</li> </ul>	<ul style="list-style-type: none"> <li>Engage in Launchpad Discussions</li> <li>Engage/Meet with your Team</li> <li>Complete Required Weekly Reading</li> </ul>	Individual Collaborative
Week 5	<p>Brainstorming</p> <ul style="list-style-type: none"> <li>Team Concept Brainstorm</li> <li>Develop How "Might We" Ideas</li> <li>Building Team Empathy</li> </ul>	<ul style="list-style-type: none"> <li>Engage in Launchpad Discussions</li> <li>Engage/Meet with your Team</li> <li>Complete Required Weekly Reading</li> </ul>	Collaborative
Week 6	<p>Design &amp; Plan</p> <ul style="list-style-type: none"> <li>Categorizing &amp; Bundling Ideas</li> <li>Deciding &amp; creating your concept</li> <li>Developing a user testing plan</li> </ul>	<ul style="list-style-type: none"> <li>Engage in Launchpad Discussions</li> <li>Engage/Meet with your Team</li> <li>Complete Required Weekly Reading</li> <li>Due: Milestone #2: <a href="#">Design &amp; Test Plan</a></li> </ul>	Individual Collaborative
<b>PHASE 3</b> Build, Test & Analyze			
Week 7	<p>Build</p> <ul style="list-style-type: none"> <li>Creating a Prototype</li> <li>Build storyboard &amp; journey map</li> <li>Identifying your variables</li> <li>Rapid Prototyping</li> </ul>	<ul style="list-style-type: none"> <li>Engage in Launchpad Discussions</li> <li>Engage/Meet with your Team</li> <li>Complete Required Weekly Reading</li> </ul>	Collaborative
Week 8	<p>Test &amp; Analyze</p> <ul style="list-style-type: none"> <li>Conducting User Testing</li> <li>Getting User Feedback</li> <li>Analyzing your data Results</li> </ul>	<ul style="list-style-type: none"> <li>Engage in Launchpad Discussions</li> <li>Engage/Meet with your Team</li> <li>Complete Required Weekly Reading</li> <li>Due: Milestone #3 <a href="#">Analyze Results</a></li> </ul>	Collaborative
<b>PHASE 4</b> Iterate & Develop Final Projects			
Week 9	<p>Iterate</p> <ul style="list-style-type: none"> <li>Modifying your concept design based on your results</li> <li>Refining &amp; re-test your prototype</li> </ul>	<ul style="list-style-type: none"> <li>Engage in Launchpad Discussions</li> <li>Engage/Meet with your Team</li> <li>Complete Required Weekly Reading</li> </ul>	Individual Collaborative
Week 10	<p>Develop Final Project</p> <ul style="list-style-type: none"> <li>Creating draft of Final Project</li> <li>Project Feedback &amp; revision</li> <li>Submitting Final Project</li> <li>Complete Course Post-Survey</li> </ul>	<ul style="list-style-type: none"> <li>Due: <a href="#">Executive Summary</a></li> <li>Due: <a href="#">Final Team Presentation</a></li> <li>Due: <a href="#">Personal Reflection</a></li> <li>Complete Course Post-Survey</li> </ul>	Individual Collaborative
New York Academy Challenge Final Project Review & Grading			

COURSE ASSIGNMENTS	% of FINAL GRADE
--------------------	------------------

Milestone #1: Team Dynamics: This assignment is focused on team building and planning for how students will work together.	10%
Milestone #2: Design & Test Plan: This assignment is focused on the Team's proposed solution, hypothesis and test plan.	10%
Milestone #3: Build, Test & Analyze: This assignment is focused on building, testing and analyzing data related to your solution.	10%
Team Collaboration & Online Engagement throughout course	20%
Final Presentation, Executive Summary & Personal Reflection <a href="#">Final Presentation Rubric</a>	50%
(100%) <b>Final Grade</b>	

## GRADING POLICY

**Late-work policy:** Milestones 1–3 are allowed to be submitted late for point deduction. Late submissions of the Final Solution Presentation for this course will not be accepted after the due date unless previously arranged with **the Academy** for extenuating circumstances. It is important to stay up-to-date on assignments since much of the work builds on previous assignments and will impact students' ability to be effective in providing solutions for their teams' projects.

**Re-grade policy:** If a student thinks there has been a technical error in the grading of an assignment, they should email program administration at the Academy within one week of receiving the graded assignment, otherwise the assignment will not be regraded. Feedback is provided upon request.

## REQUIRED READING LIST

Students are expected to read and refer to a wide variety of texts throughout this course; all of which can be found in the Launchpad Resource Library and are organized by week.

### Week 1

[Launchpad Platform](#), Launchpad

[Junior Academy Orientation](#), Launchpad

### Week 2

[Ethical AI Innovation](#) Challenge Background, Launchpad

[Incredible Advantages and Benefits of AI](#), Simplilearn

[What is AI Ethics?](#), IBM

### Week 3

[What is Human Centered Design?](#), Video Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Design Thinking for Problem Solving](#), Video Design Kit, Innovation, Design, Engineering & Organization (IDEO)

## Week 4

[What is \(AI\) Artificial Intelligence?](#), University of Illinois Chicago

[The Turing Test and our shifting conceptions of intelligence](#), *Science*, V 385, eadq9356, 2024

[Greetings, People of Earth Act 1: First Contact](#), This American Life

[Top Generative AI Industry Applications: An In-Depth Look](#), Turing

[What is Predictive AI?](#), Cloudflare

[AI Shields Kids By Revolutionizing Child Safety And Online Protection](#), Forbes

[AI's new eyes in the sky helping Colorado get a jump as wildfires spark every few hours](#), The Colorado Sun

[Yann LeCun Emphasizes the Promise of AI](#), New York Academy of Sciences

[The inside story of ChatGPT's astonishing potential](#), TED Talk

[The Complex Ecosystem of Artificial Intelligence](#), New York Academy of Sciences

[In the Age of A.I., What Makes People Unique?](#), New Yorker

[Will AI Be Reviewing Your College Application?](#), Forbes

[Artificial Intelligence and Privacy – Issues and Challenges](#), Office of the Victorian Information Commissioner

[The SAG-AFTRA Strike is Over, But the AI Fight in Hollywood is Just Beginning](#), Center for Democracy & Technology

[The era of blind faith in big data must end](#), TED Talk

Birhane, Abeba [The unseen Black faces of Algorithms](#), *Nature*, V 610, 451-452, 2022.

[The incredible creativity of deepfakes – and the worrying future of AI](#), TED Talk

[Will artificial intelligence transform school?](#), Economist

[Report of the NEA Task Force on Artificial Intelligence in Education](#), National Education Association

[A Practical Guide to Building Ethical AI](#), Harvard Business Review

Mittermaier, Mirja, Marium M. Raza & Joseph C. Kvedar [Bias in AI-based models for medical applications: challenges and mitigation strategies](#), *npj Digit. Med.* 6, 113 (2023)

[In The Age Of AI, Critical Thinking Is More Needed Than Ever](#), Forbes

Birhane, Abeba, William Isaac, Vinodkumar Prabhakaran, Mark Diaz, Madeleine Clare Elish, Iason Gabriel, Shakir Mohamed [Power to the People? Opportunities and Challenges for Participatory AI](#), EAAMO '22: Proceedings of the 2nd ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization

Article No.: 6, Pages 1 – 8

[How we can build AI to help humans, not hurt us](#), TED Talk

[The urgent risk of runaway AI – and what to do about them](#), TED Talk

[Interviewing Experts](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Interviewing Individuals](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Interviewing Groups](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

## Week 5

[How Might We](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Brainstorming Rules](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[How to Facilitate a Brainstorm](#), Stanford D School, 2020

## Week 6

[Bundling Ideas](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Doing a Gut Check](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Creating a Concept](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

Week 7

[Determine What to Prototype](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Rapid Prototyping](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Prototype to Test](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Identify a Variable](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Storyboards & Journey Maps](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

Week 8

[Get Feedback](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Testing with Users](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[Research Methods](#), Launchpad

Week 9 - Week 10

[Integrate Feedback & Iterate](#), Design Kit, Innovation, Design, Engineering & Organization (IDEO)

[How to Create a Presentation](#), Launchpad

[How to Create Video Presentations](#), Movavi

[Presentation Guidelines](#), Launchpad