STEM Competition

July 31 - August 6, 2026

5-12 Grade

Each team is 4-6 students

The competition will be organized on

Lasell University

LASELL UNIVERSITY

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Accommodation

Our students live and learn on real university campuses, offering a true preview of campus life in the U.S. While each university is unique, here's what you can generally expect:

Wi-Fi Access

All campuses offer free Wi-Fi. Access may vary by university—some require a login, while others allow open access. CSL works closely with campus staff to ensure all students are connected as soon as possible.

Laundry

Laundry facilities are available at all universities. In some locations, laundry is free of charge; in others, students will need to pay a small fee per wash and dry cycle. Students are responsible for bringing their own laundry pods, as these are not provided or sold on campus.

Bathrooms

Most of our campuses offer **communal bathrooms and showers**, separated by gender and located on each floor. Some universities may offer **ensuite bathrooms**, but this is not the standard arrangement.

Security

University security is present 24/7. Most of the campuses we work with are **open campuses**, meaning they are accessible to the public. However, each university has protocols in place to ensure student safety. CSL staff and counselors also live in the residence halls and conduct nightly room checks for added supervision.

Other Amenities

Facilities vary by campus but they all include dining halls, student lounges, classrooms, and recreational areas. Smoke detectors and fire safety protocols are maintained by the universities in accordance with local regulations.

Program plan

	Morning	Afternoon	Evening
July 31	Arrival Day		Welcome Activities
August 1	Class		Downtown Boston
August 2		Six Flags Theme Park	
August 3	Class	Class	Evening Party
August 4	Whale watching	MIT & Harvard tour	Free Time
August 5	Class	Competition + Award Ceremony	Packing
August 6	Departure		

Innovation Starts Here

STEM helps students explore the foundations of technology, data analysis, and creative problem-solving.

Through engaging lessons and real-world projects, each course helps learners understand how innovation works — encouraging them to think critically, work collaboratively, and apply ideas in meaningful ways.

OLYMPICS GRADE 5–8

Artificial Intelligence Projects with Scratch Coding

Students learn how computers can recognize images, sounds, and text while creating fun projects like chatbots, smart assistants, and emotion-recognition games. Using Scratch's visual coding platform, they explore the basics of machine learning and turn abstract concepts into interactive creations.

OLYMPICS GRADE 9–12

AI and Machine Learning for Teenagers (Python Coding)

Designed for students with prior coding experience, this course introduces real- world artificial intelligence and machine learning using Python. Students build working models, analyze data, and discuss the ethics and applications behind AI.

STEM program includes four classes (2.5 hours each) that blend learning, teamwork, and hands-on projects. Students are encouraged to create, collaborate, and present their ideas — turning curiosity into innovation.

OLYMPICS GRADE 5–8

ARTIFICIAL INTELLIGENCE PROJECTS

OVERVIEW

Students learn how computers can recognize images, sounds, and text while creating fun projects like chatbots and smart assistants. Using Scratch's visual coding platform, they explore the basics of machine learning and turn abstract concepts into interactive creations that blend logic, creativity, and technology.

LEARNING OUTCOMES

By the end of the course, students will:
Understand how machine learning differs from rule-based programming.
Gain hands-on experience training models to recognize sound, images, and text. Apply AI concepts through creative projects like chatbots, virtual pets, and emotion-recognition games.
Develop computational thinking and digital problem-solving skills in a fun, accessible way.

PROGRAM PROPOSAL

The course is taught in four classes (2.5 hours each). Each class combines theory and guided projects, progressively introducing new AI concepts. Students learn to train models, test results, and refine their projects — leading up to a final showcase where they present their creations to their peers.

OPTIONAL PRE-CAMP COURSE

For students who want extra preparation, we offer Project-Based Scratch for Kids — a 4-session online class (1 hour 45 minutes each) introducing coding fundamentals before camp begins.

Lesson plan

LESSON 1

What is Artificial Intelligence?
Theme: Introduction to Artificial Intelligence and how computers learn using data, sound, and text.

Content:
Students are introduced to the concept of Artificial Intelligence and Machine Learning.

They learn:

What is AI?
A brief history of AI and examples in daily life.
How machines learn using image, text, and sound data.
The difference between rule-based and data-based models.
They will build their first machine learning model to detect whether someone plays rock, paper, or scissors using image recognition.

Next, they explore how machines can "listen" and respond to voice input by creating a Pet Command project.
Students record their own voice clips to train a sound recognition model that allows an animated pet to follow voice commands and perform tricks.

The class concludes with the Smart Light project, where students learn how text-based commands can control actions. They compare rule-based text-matching with data-based models and discuss real-world applications like smart home devices.

Projects Completed:

Rock, Paper, Scissors Image Recognition Game
Voice-Controlled Pet (Sound Recognition)
Smart Light (Text Recognition)

LESSON 2

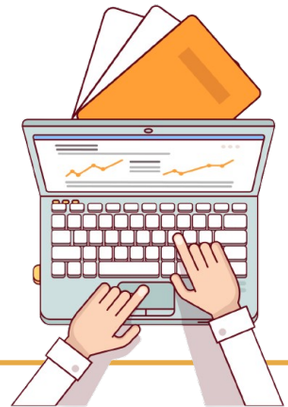
Teaching Machines to Understand and Communicate
Theme: Image recognition, emotion detection, and chatbot creation.

Content:
Students explore how computers can identify emotions using images.
They train an image recognition model that can read facial expressions or hand-drawn faces and visually represent the confidence of its predictions inside Scratch.
They also learn about the importance of high-quality training data and how bias or insufficient samples can affect model performance.

Then, the class transitions into text-based AI, where students compare rule-based and data-based solutions for building interactive systems.
They use text recognition to create a simple animal chatbot that answers user questions about a chosen topic, learning how machine learning enables chatbots to understand natural speech.

Projects Completed:

Emotion Recognition System
"Ask an Animal" Chatbot



Lesson plan

LESSON 3

Sound, Sentiment, and Intelligent Games

Content:
Students build The Riddle Master, a voice-based game that listens for correct answers using sound recognition. They record voice clips for training data and learn how Scratch can “listen” for specific phrases one at a time.

Next, they explore sentiment analysis in the “How Are You Doing?” activity, where they train a model to interpret emotional tone in text. They compare rule-based and data-based systems for understanding human language and emotions.

Finally, students compete in the Maze Game Challenge, training a mouse to reach the finish line using only voice commands. This activity teaches optimization, testing, and how to improve a model’s performance using better data input.

Projects Completed:

Riddle Master Voice Game
How Are You Doing? Sentiment Character
Maze Game with Sound Recognition

LESSON 4

AI in the Real World & Final Projects
Theme: Applying AI to real-world scenarios and showcasing student innovation.

Content:
Students explore biometric technology by creating a Face Unlock simulation, similar to security features used in smartphones. They train an image recognition model to recognize their face and discuss how this type of AI is used in everyday life.

For their Final Project, each student designs an original AI-based project — combining the skills they’ve learned (sound, image, and text recognition). They will present their creations to the class, share what their model does, explain how they trained it, and reflect on what they learned.

Students receive peer and teacher feedback and suggestions for improvement.

Projects Completed:

Face Unlock Simulation
Final AI Project Presentation

OLYMPICS GRADE 9–12

AI AND MACHINE LEARNING

OVERVIEW

This advanced course introduces students with coding experience to the world of artificial intelligence and machine learning. Using Python and professional tools like Scikit-learn, NumPy, and Pandas, learners design, train, and evaluate real AI models — gaining both technical skills and a deeper understanding of how AI impacts our world.

LEARNING OUTCOMES

By the end of the course, students will:
Build and test machine learning models using Python.
Understand the key types of learning — supervised and unsupervised — and when to use each.
Explore neural networks and real-world AI applications such as handwriting recognition.
Discuss the ethical implications and biases of AI systems.
Strengthen teamwork, coding, and problem-solving skills through collaborative projects.

PROGRAM PROPOSAL

Taught over four classes (2.5 hours each), this course combines theory, coding labs, and guided mentorship. Students move from understanding algorithms to building their own predictive models and neural networks. The program culminates in a final project presentation showcasing their work.

Lesson plan

LESSON 1

Foundations of AI, Python, and Data Science
Theme: Understanding what Artificial Intelligence and Machine Learning are — and starting the first real coding project.

Content:
Students begin by exploring the concepts of intelligence and artificial intelligence, learning how AI impacts daily life — from recommendation systems to facial recognition. They'll understand the difference between AI, Machine Learning (ML), and Data Science, and the way machines use data to learn patterns and make predictions.

After an introduction to Google Colab, a professional online coding environment, students will set up their first Python notebooks and experiment with simple code to understand input, output, and data handling.

They'll then dive into the fundamentals of Machine Learning, covering:

Types of ML (supervised, unsupervised, and reinforcement learning)
How algorithms identify and predict patterns
An introduction to essential Python libraries such as NumPy and Pandas, used for numerical and data analysis
Students will begin their first ML project, Predicting Favorite Music, where they use sample data to train a simple classification model and see how machines can make predictions.

The class concludes with an introduction to data visualization using Matplotlib, where students learn how to plot and interpret graphs showing patterns in their data.

Projects Completed:

"Predict Your Music Taste" (Beginner ML Project using NumPy, Pandas, and Matplotlib)
Key Concepts:

AI vs. ML vs. Data Science
Supervised and unsupervised learning
Working with Google Colab and Python
Using Pandas for data handling and Matplotlib for visualization

LESSON 2

Working with Data and Linear Regression
Theme: Exploring data structures and creating predictive models using regression.

Content:
Students learn how to prepare, clean, and analyze data — one of the most important skills in Machine Learning. Using Pandas DataFrames, they work with real and synthetic datasets to organize and visualize information, focusing on how clean data improves model accuracy.

They then move into Scikit-learn, one of the most powerful libraries in Python for building and evaluating machine learning models. Students learn how to import data, split it into training and testing sets, and measure performance.

Through the Height vs. Weight Comparison Project, students discover how correlation and linear patterns can be modeled mathematically.

They then begin a new prediction project using Linear Regression — predicting student grades based on study hours — learning:

How to create regression models in Scikit-learn
How supervised learning algorithms work
How to visualize model performance and interpret output data
Projects Completed:

Height vs. Weight Data Comparison
Study Hours vs. Grades Linear Regression Project
Key Concepts:

Data preprocessing and analysis with Pandas
Linear regression and prediction modeling
Using Scikit-learn for supervised learning
Understanding how models "learn" relationships from data

Lesson plan

LESSON 3

Algorithms, Evaluation, and Real-World Data
Theme: Exploring key algorithms, accuracy testing, and working with real-world datasets.

Content:
Students now dive deeper into algorithms — learning how Nearest Neighbors (KNN) works to classify data based on similarity. They'll explore different distance measurements (Euclidean, Manhattan) and see how model predictions change depending on parameters.

Students are introduced to model evaluation, learning how to:

Split data into training and testing sets
Use confusion matrices to visualize errors
Understand accuracy, precision, recall, and F1 score
Recognize overfitting and underfitting problems
Next, they'll work with one of the most famous ML datasets — the Iris Dataset — and apply what they've learned to classify flower types using the KNN algorithm. They'll also explore loss functions and understand how they measure model errors.

Projects Completed:

K-Nearest Neighbors Classification (using custom datasets)
Iris Dataset Classification and Evaluation
Key Concepts:

K-Nearest Neighbors algorithm
Model evaluation and accuracy testing
Working with real-world datasets
Understanding loss functions and prediction errors

LESSON 4

Neural Networks and Final Machine Learning Projects
Theme: Understanding neural networks, model training, and creating final AI projects.

Content:
In this final session, students explore Neural Networks, the foundation of deep learning and modern AI systems. They learn about the structure of a neural network — including nodes, layers, weights, and activations — and how these mimic how the human brain processes information.

Students will complete the Handwriting Classification Project, using neural networks to train a model that recognizes handwritten digits. They'll explore:

The history and evolution of neural networks
How data flows through input and output layers
How to measure performance using loss and accuracy functions
After completing this guided project, students will start their Final AI Project, where they design their own machine learning model. They can choose topics such as image recognition, recommendation systems, or prediction tools.

They will then present their final project to the group, explaining their idea, process, and what their model learned.

Projects Completed:

Neural Networks Handwriting Classifier
Student's Own Final AI Project (presentation & peer feedback)
Key Concepts:

Neural network structure and concepts
Handwriting recognition and deep learning
Model improvement and optimization
Presentation and communication of technical results

The package includes

- Lessons
- Award ceremony
- Accommodation
- Meal plan
- Excursions
- Transfer

Awards

Each category

I Place - Medals + 5,000 USD

II Place - Medals and iPads

III Place - Medals

All participants will get certificates