TEL AVIV UNIVERSITY INVITES YOU TO
A UNIQUE ONLINE LEARNING EXPERIENCE!

Heard the term "Artificial Intelligence" but not sure what it's all about? Want to understand the connection between the natural world and technology?

We are pleased to offer two five-day courses for middle school students to take a deep dive into some of the latest developments in science!

MACHINE BRAINS:
A PEEK INTO THE WORLD OF AI AND MACHINE LEARNING

From playing "Hide and Seek", winning at games such as "Chess" and "GO", to helping doctors during COVID-19 by sanitizing surfaces in hospitals and delivering medicines, machines powered by Artificial Intelligence can do it all. How does it work? How do we make these machines? What are the latest trends? How are these machines affecting everything we know about technology? This course will provide answers to all these questions and many more!

THE WONDERS OF SCIENCE:
BIOTECHNOLOGY

What do bananas have to do with vaccines? How can jellyfish help us study Alzheimer's disease? Moreover, why are bacteria not always a bad thing? Humans have always aspired to understand the world around them, but modern science – and specifically the field of *biotechnology* – attempt to translate that understanding into new technologies that will benefit humankind. Our course will introduce students to the key concepts of biotechnology as well as to innovative biotechnological developments.

The courses are open for middle school students at age of 12–15 (from Form 1 to Form 4).
Courses will take place via zoom on the following dates:

Thursday 10/3 HKT 3:20-4:50pm   Friday 11/3 HKT 2:50-16:00pm   Sunday 13/3 HKT 4:00-5:50pm

Monday 14/3 HKT 2:30-4:00pm   Tuesday 15/3 HKT 3:20-4:50pm

Total teaching hours: 7.5
Students who complete the course will receive a certificate from Tel Aviv University.

For more information and to register please contact: Mr Elvis Chu, Programme Director, Inspire Education Association . **Tel:** 9826-1852 | **Email:** elvis.chu@inspire-education.org. Or Mrs Michal Shtorch, Asian Representative of TAU University | Tel: 91726714 | Email: michalms@tauex.tau.ac.il

COURSE SYLLABUS:

MACHINE BRAINS:
A PEEK INTO THE WORLD OF AI AND MACHINE LEARNING

From playing "Hide and Seek", winning at games such as "Chess" and "GO", to helping doctors during COVID-19 by sanitizing surfaces in hospitals and delivering medicines, machines powered by Artificial Intelligence can do it all. How does it work? How do we make these machines? What are the latest trends? How are these machines affecting everything we know about technology? This course will provide answers to all these questions and many more!

1 INTRODUCTION TO ARTIFICIAL INTELLIGENCE

This lecture will introduce you to some of the very basic modules, architectures and algorithms that lie underneath powerful smart systems such as self-driving cars, smart robots, stock price predictors and more. It will include a lot of demos and tutorials related to the technology that is used today.

2 GANS – CREATING CELEBRITIES OUT OF THIN AIR

What if I told you that machines could create images of fake people and you would think they are actual celebrities? Freaky, right? This topic covers basic ideas and concepts that go into making a Generative Adversarial Network (GAN) that is the fundamental idea behind this.

3 HOW IS GOOGLE ASSISTANT SO COOL? – A BRIEF INTRO TO NATURAL LANGUAGE PROCESSING

Google Assistant can do everything – listen to the waiting music on a customer care call, make an appointment for you on your behalf, turn the lights on/off, translate from languages so you don't need to know so many, and a lot more. How do they do that? This part of the course gives you that answer. We will discuss key concepts in NLP such as LSTMs, Transformers, etc.

4 CAN ROBOTS BE CURIOUS AND CREATIVE?

What do you think? If you are curious to know, then this lecture will help you out. We will discuss Reinforcement Learning – what we use to play (and win) games like Go and Chess – and how it can be used to make robots curious and creative.

5 ETHICS AND LIMITS OF AI

AI does a lot, but it can't do everything we dream of. We will discuss what we *can't* do and finally what we *shouldn't* do with AI. This knowledge is extremely important if you are going to use these tools ever in your life.

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BIOTECHNOLOGY

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1 WHAT IS BIOTECHNOLOGY?

From agriculture, through fashion, medicine, and beyond, biotechnology is playing an increasingly important role in the world around us. In this introductory lecture, we will be acquainted with the major principles and approaches of biotechnological research and even design a study of our own.

2 BIO-INSPIRED TECHNOLOGIES

You may know the story of the invention of Velcro, designed by the Swiss engineer George de Mestral who was inspired by hooked seeds that kept sticking to his dog's fur. The Velcro, however, is just one of numerous technologies that were inspired by the striking problem-solving ability of the natural world, to which we will dedicate our second lecture.

3 THE MYSTERY OF OUR GENETIC MATERIAL

Perhaps one of most fascinating, as well as most controversial, application of biotechnology is the intervention in the genetic make-up of organisms. In this lecture, we will learn about the experiments that made such interventions possible.

4 GENETIC ENGINEERING – HOW DOES IT WORK?

In this lecture, we will explore some remarkable genetically engineered organisms – from insulin-producing bacteria, to glowing mice and cloned sheep. We will learn about classic as well as new groundbreaking techniques for genetic engineering and discuss their potential and their implications.

5 BIOTECHNOLOGY AND THE BRAIN

What has biotechnology taught us about our nervous system? Can brain-computer interfaces enhance our cognitive abilities? And is it possible to implant memories? This final lecture will be dedicated all things brain.