

ENGINEERING CAMP

Tue 27th – Fri 30th
August 2024

At Esplora Interactive Science
Centre & UM Engineering Labs

Price | €30

Ages | 12–15

	Tue 27th Aug	Wed 28th Aug	Thurs 29th Aug**	Fri 30th Aug**
	At Esplora	At Esplora	At UM	At UM
08:30-09:00	Arrival & Registration	Arrival & Registration	Arrival & Registration	Arrival & Registration
09:00	Introduction of the topic by UM	Ready, Set, Go! Roller Coaster Challenge	Introduction	Introduction
09:15			Alloy Allies: Uniting Materials	Meet your new colleague...dive into the world of collaborative robotics!
09:30				
09:45				
10:00	Ice breaker by Esplora	Mobile phones: how do they work?	Aeroplanes – enjoy the view!	Rainwater alarm
10:15				
10:30	Creative Collisions (Bridge Edition)			
10:45				
11:00	Break*	Break*	Break*	Break*
11:15				
11:30				
12:00	Spacecraft Materials Workshop	Electro-Dough Workshop	Electricity Generation & Electric Bikes	Big Robots. Small Robots.
12:15				
12:30				
12:45				
13:00	Q&A discussion	Q&A discussion	Q&A discussion	Q&A discussion
13:15				
13:30	End of Day			

*Participants are to bring their own lunch since there will be a short break time and we won't have time to go to the EsploraCafé when at Esplora or any shops when at the University of Malta.

Day 1

Engineering Explorers: A journey through the wonders of technology

Let's get to know more about the topic before we kick off the summer camp!

Ice breaker

Let's get to know each other before we start our sessions!

Bridge Builders

Are you up for the challenge to build a bridge and test its limits? Immerse yourself in construction engineering and build your own bridge using our own K'Nex education kits. You need to think outside the box and ensure that the bridge is aesthetically pleasing whilst being strong enough to withstand all kinds of external factors. You and your team should plan, design, and build to be successful in your challenge!

Spacecraft Materials Workshop

Prepared by the European Space Agency, this is an innovative workshop that provides valuable insights into the materials used in spacecraft construction. From lightweight alloys to advanced composites, the workshop will foster an interesting understanding of the materials that drive the success of space exploration missions. Can you test all the materials to identify which would be ideal for spacecraft engineers to build the vessel?

Day 2

Ready, Set, Go! Roller Coaster

Unleash your creativity and use your teamwork skills to create a model of a rollercoaster. With the budget provided, you will need to purchase the materials needed to build a rollercoaster system. Your challenge is to include at least one gravity-defying 360° loop-the-loop. So, use your budget wisely, and pick the right materials. Ready, Set, Go!

Mobile Phones: How do they work?

These days, almost everyone has a mobile phone. But do we know how these actually work? What are the different parts of the mobile phone for? How do mobiles communicate with each other? How does a touch screen really work and why can't it work if I wear gloves? How are pictures taken with the mobile phone camera saved to the phone's memory? This workshop on mobile phones and how they work will explain these concepts using practical examples.

Electrodough workshop

In this workshop, we are going to explore the electrical elements of engineering. We'll take time to experiment with conductors and insulators in very different ways by using two special doughs made from simple kitchen ingredients. We will be replacing our wires with dough and immersing ourselves into the imaginative world of circuit building. Explore different electrical components whilst creating your own creative contraption.



Day 3 & Day 4

**The workshops will be held at the Faculty of Engineering Labs, where participants will be organised into groups. Over the course of two days, these groups will rotate through all six available workshops to get a taste of all the different areas of engineering.

All participants will have the chance to experience the following six workshops:

Alloy Allies: Uniting Materials

Welcome to the amazing world of materials! In our workshop, get ready to guess your way through the fascinating properties of materials in one of our interactive games. Together we'll look at materials which have memory and how material behaviour can be harnessed for different applications. You'll uncover how materials engineering is used in practical engineering applications. Don't forget your magnifying glass – we're taking a closer look at the tiny wonders of the microscopic realm where materials reveal their surprising behaviours.

Aeroplanes - enjoy the view!

One of the first things we all do on an aeroplane is look outside the window. How easy is it to design an aeroplane window? How does an engineer make sure everything is in order? This hands-on demonstration will show you the fundamental mechanics principle behind the design of aeroplane windows, which is the same principle used to design important mechanical components in a huge variety of applications.

Looking out of the window, one can notice the wing of the aircraft. This device is what makes aircraft fly. But how does it work?

Using smoke to visualise the flow of the air around the wing section, one can understand how forces on the wing surface develop to enable the aircraft to fly in mid-air. Other fun mechanical principles will be demonstrated through working models.

Electricity Generation & Electric Bikes

Have you ever imagined harnessing your workout energy to power up the world around you? In the first part of our workshop, we will delve into the fundamental principles of electricity generation. Through interactive presentations and hands-on activities, students will not only grasp the concepts of electrical quantities but also roll up their sleeves to generate electricity themselves. By flexing their muscles to rotate the shaft of a small generator and engaging in a brief cross-trainer session, they will feel the excitement of converting rotational kinetic energy into electrical energy.

Next, we will pedal into the exciting realm of electric bikes, exploring both throttle-based and pedal-assist models. Students will learn the main characteristics of batteries and experience the dynamic capabilities of electric bikes in action. Together, we will uncover the benefits of embracing electrified transportation, from reducing carbon emissions to promoting a healthier lifestyle

Join us this summer for an electrifying journey that promises to enlighten, inspire, and empower young minds to become the change-makers of tomorrow. Let's strive together towards a greener, brighter future.

Meet your new colleague...dive into the world of collaborative robotics!

Have you ever wondered how it feels like to work next to a robot in manufacturing? Do you think that it scary, exciting or fun? Now is your time to find out! Calling all curious minds to join us for an immersive experience with collaborative robots (cobots) through an interactive and engaging workshop. The workshop shall introduce you to the endless possibilities of cobots in industry, their versatility, and how they are designed and programmed to ensure your safety. Get ready for a real-time demo where we'll program a simple task for the cobot, involving a 3D printer that shall print a component and you can tell the cobot to move the part wherever you want! The pick-and-place program you shall create shall be tested first-hand on a UR3e collaborative robot.

Rainwater alarm

The concept behind this session runs on the same lines as the Prowler Alarm, but at an easier level. This activity seeks to present an inexpensive and practical application that students can easily build and use at home. The scope of the alarm is to provide busy mums and dads, who hang up their washing on a cloudy day, with a handy device that will provide an audible warning as soon as the first few drops of rain start to fall.

Big Robots. Small Robots.

Robots that clean, robots that cook, robots that drive - that's what lies ahead in our future. But, how are these robots built? How are they made to obey? In this interactive workshop the students will be shown different programs on our big and small robots. Together, we will then program Lego Mindstorms robots to perform simple tasks - shedding some light on the technologies that will lead to the robots of the future.

