

Summer School Learning Plan

Girls 4 STEM

The University of Malta is organising a Girls4STEM Week between the 12th and 16th September 2022, aimed at female students who have finished Year 7. The girls will participate in teams in activities linked to real life problems in which they apply their knowledge of different STEM areas (science, technology, engineering, mathematics) and learn new concepts in a hands-on, collaborative environment. The Girls4STEM Week will also include meeting and working with women involved in STEM-related careers. They will explore STEM through a variety of topics and applications. It is envisaged that through the various planned activities, students will become more aware of their own potential and increase their interest in studying, being involved and in pursuing careers in STEM, digital disciplines and entrepreneurship especially with regard to leadership positions

Organizational Issues.....	2
Schedule	3
Learning Activities	5
Lecturers and mentors.....	7
GEM Summer School Support Site.....	9

This document bases on the work within the project Empower Girls to Embrace their Digital and Entrepreneurial Potential (GEM). This project is co-funded by the European Union under grant no. LC-01380173. The European Union/European Commission is neither responsible for the content nor liable for any losses or damage resulting of the use of these resources.

Coordination: Prof. Dr. Katja Maaß, UNIVERSITY OF EDUCATION FREIBURG, Germany. Partners: UNIVERSITEIT UTRECHT, Netherlands; UNIVERSITA TA MALTA, Malta; UNIVERZITA KONSTANTINA FILOZOFA V NITRE, Slovakia; UNIVERSIDAD DE JAEN, Spain; ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON, Greece; UNIVERZITA KARLOVA, Czech Republic; SCHOOL OF EDUCATION AND COMMUNICATION, Jonkoping; EDEX – EDUCATIONAL EXCELLENCE CORPORATION LIMITED, Cyprus; VILNIAUS UNIVERSITETAS, Lithuania.



Co-funded by
the European Union

University of Malta GEM Summer School

Target Group:

Students who have finished Year 7, around the age of 12.



Venue:

University of Malta Online and Esplora Interactive Science Centre

Transportation to the venue / digital access to the Summer School:

Participants will use their own transportation to and from the University of Malta, however transport to and from the Esplora Interactive Science Centre will be provided by the organisers. The meeting point is outside the gateway building (Mikiel Anton Vassalli Conference Centre) at the entrance from the Mater Dei Hospital side of the University of Malta. Students will be met by mentors and accompanied to the respective meeting rooms.

Subsistence:

The Girls4STEM Week is free for all participants.

Contact person for girls and their guardians:

Students, working in small groups will be led by a mentor who will accompany them throughout the summer camp. She will be their contact person during the week. For other information girls and their guardians may contact the organisers (josette.farrugia@um.edu.mt, charles.bonello@um.edu.mt and stephen.bezzina@um.edu.mt).



Schedule

Day 1 – Monday 12th September 2022 at the University of Malta

Activity 1 (1 hour 15 mins) – Electromagnetics in medical diagnosis and treatment

Activity 2 (1 hour 15 mins) – Science in the investigation and preservation of Malta’s national cultural heritage

	09:00 – 10:15	10:30 - 11:45	12:15 – 13:30
Group 1	Introduction + Pre-Questionnaire	Activity 1	Activity 2
Group 2	+ Ice-breaker activities in small groups	Activity 2	Activity 1

Day 2 – Tuesday 13th September 2022 at the University of Malta

	09:00 – 10:15	10:30 – 11:45	12:15 – 13:30
Group 1	Investigation: Introduction	Investigation: Planning	Investigation: Gathering Data
Group 2			

Day 3 – Wednesday 14th September 2022 at Esplora Interactive Science Centre

Activity 3 (45 mins) – NASA’s Moon Survival Challenge Activity Centre lev 1 Lab

Activity 4 (45 mins) – Catch them young Activity Centre lev 0 ST

Science show (45 mins) - Take Off! - Act lev 0 ST - both groups, total of 65 students join for the show at the same time.

	09:00 – 10:00	10:15 – 11:00		11.45-12.45
Group 1	Activity 3	Show	Break	Activity 4
Group 2	Activity 3	Show		Activity 4

Day 4 – Thursday 15th September 2022 at the University of Malta

Activity 5 (1 hour 15 mins) – Entrepreneurship

Activity 6 (1 hour 15 mins) – Health

	09:00 – 10:15	10:30 – 11:45	12:15 – 13:30
Group 1	Investigation: Data Analysis	Activity 5	Activity 6
Group 2		Activity 6	Activity 5

Day 5 – Friday 16th September 2022 at the University of Malta

Activity 7 (1 hour 15 mins) – Coding

	09:00 – 10:15	10:30 – 11.45	12:15 – 13:00	13:00 – 13:30
Group 1	Activity 7	Investigation: Prepare Presentation	Investigation: Presentation of Investigations	Conclusion + Post- Questionnaire
Group 2	Investigation: Prepare Presentation	Activity 7		

Learning Activities

Learning Activities	STEM/ICT subject knowledge	Knowledge of inspiring role models and their meaning	Knowledge about the STEM/digital world of work	Entrepreneurial mind-sets	Transversal skills
1	X	X	X		X
2	X	X			X
3	X	X			X
4	X	X			X
5	X	X	X	X	X
6	X	X	X		X
7	X	X	X		

Overall, throughout the Girls4STEM Week, students will work in a small group accompanied by a young female mentor. The activities are planned in a way that they can be held with small groups of students at a time, with short stand-alone activities that may be alternated. The students will



work within the same small group for the whole duration of the summer camp. The activities involving workshops will involve a group of 30-35 students divided in small groups and coordinated by STEM professionals. Girls will work on an investigation of an environment-related issue on the University Campus through inquiry-based learning. They will work in groups to collect data, analyse, discuss and come up with solutions related to the issue.

Activity 1 – Electromagnetics in medical diagnosis and treatment

In this workshop, Dr L. Farrugia will guide the participants in getting a basic understanding of electromagnetic fields through a hands-on activity related to magnets and magnetic fields. The scientist will then talk about her research related to the use of electromagnetic radiation in medical diagnostic and therapeutic treatment.

Activity 2 – Science in the investigation and preservation of Malta’s national cultural heritage

The session will be led by Ms Roslyn DeBattista from the Diagnostic Science laboratories (DSL). The DSL are dedicated to the scientific investigation and preservation of Malta’s national cultural heritage collection. The DSL provide the necessary scientific support to the conservators/restorers and curators by incorporating examinations and analysis on historical materials and their deterioration products. This helps in various aspects such as conservation treatments, profiling the artist’s palette, documentation, authentication and dating. Such investigations are carried out on artefacts in order to enrich knowledge on their historical background as well as preserve and maintain them. The activity will focus on how science helps preservation and restoration of works of art. Students will work on an investigation of a historical work of art in order to establish what information lies out of plain sight which can help in the interpretation and preservation of this artefact.

Activity 3 – NASA’s Moon Survival Challenge

Oh no! Your spacecraft experienced mechanical difficulties and you've been forced to land on the moon. Your only chance of survival is to hike 320km across the moon to the mother ship and you can only carry 15 essential items. Do you have what it takes to survive on the moon? This experiential learning activity is not only a great team-building activity, but a great way of applying STEM knowledge and skills to the problem at hand.

Activity 4 – Catch them young

Are you curious and creative? Do you love solving problems? Are you fascinated with the world around you? Then join us in our quest to inspire the next generation into STEM! But what does



a scientist look like and what does it take to become one? In this workshop, we will be exploring stereotypes in STEM and the skills which STEM professionals need, to carry out their amazing work.

Activity 5 – Entrepreneurship

The main aim of this session, led by Dr Leonie Baldacchino is to inspire students to consider entrepreneurship as a viable career option. It shall include an introduction to entrepreneurship, an interactive discussion about the advantages of being one's own boss, and examples of female business founders. Reference shall also be made to intrapreneurship and to the importance of developing an entrepreneurial mindset, which will enhance students' future prospects not only if they aspire to start up their own business, but also if they wish to build a rewarding career within a successful organisation.

Activity 6 – Health

The session will be led by a young female radiographer. Ms Mangion will talk about her work related to medical imaging and how science helps us learn about medical conditions. Through Activity 6 she will introduce students to Health-related professions. During her workshop students will learn about the human skeleton and work on a number of case studies.

Activity 7 - Coding

Participants will be conducting simple coding activities using a micro:bit aimed at enhancing their computational thinking skills. Participants will work in teams to design and prototype their own flashing designs, through an inquiry-based and exploratory learning approach.

Lecturers and mentors

All lecturers are professionals in their respective fields, working either in academia or industry. On the other hand, mentors are females who either possess a B. Ed. (Hons.)/B. Sc. (Hons.) or equivalent, or are currently following a degree course in a STEM/ICT subject. They also have experience in teaching/leading groups including in the non-formal sector. Mentors prepare educational material and supervise small groups of participants.

The professionals leading the activities are:

Dr Lourdes Farrugia read for her undergraduate degree at the University of Malta and received a B.Sc. (Hons.) in Mathematics and physics in 2008. She followed with an M. Sc in Physics from the



University of Malta in collaboration with Methode Electronics Ltd. Before joining the Department of Physics as a Research Officer, Lourdes gained good laboratory skills whilst working in a pharmaceutical laboratory, first as a quality control analyst and eventually as a trainer within the same environment. She obtained a Ph.D. from the University of Malta in 2016. Her research interests are mainly focused on aspects of instrumentation and measurement of physical quantities, especially sensor design, applied electromagnetics (in particular, dielectric properties of biological tissue), electromagnetic compatibility, and biological effects of electromagnetic radiation. She chairs the networking project MyWAVE, funded by the Cooperation in Science and Technology, COST.

- **Ms Roslyn DeBattista** works as a heritage scientist within the Diagnostic Science Laboratories, Heritage Malta. Her main interests within the cultural heritage domain relate to the analysis and identification of historical textiles and other organic materials such as protective varnish coatings and pigments via advanced microscopic systems and infra-red techniques. In addition, stemming from her academic research, she also has a keen interest in the identification and examination of skeletal archaeological remains.

- **Dr Leonie Baldacchino** is the Director of The Edward de Bono Institute for Creative Thinking and Innovation at the University of Malta. She holds a Ph.D. in Entrepreneurship from Warwick Business School (UK), an M.A. in Creativity and Innovation and a B.Psy.(Hons.) from the University of Malta, and she is a Fellow of the International Society for the Study of Creativity and Innovation. Her research focuses on various aspects of creativity and entrepreneurship and has been published in various outlets, including the Journal of Management Studies, International Journal of Management Reviews, International Journal of Entrepreneurial Behavior & Research, and in edited books by Routledge, Springer and Edward Elgar.

Ms Maria Mangion is a radiographer at Mater Dei Hospital with a passion for science and a special interest in Science Education. In fact she is currently following a part-time Masters in Teaching and Learning course.

Dr Vanessa Camilleri is an academic at the Department of Artificial Intelligence, Faculty of ICT, University of Malta. Her expertise is in the area of Human Computer Interactions, with a specialisation in Virtual Worlds and Serious Games. Her areas of interest include Virtual Reality applications for developing emotional intelligence values. Her previous experience in the area of education and pedagogy, as well as educational technologies and use of games for learning have contributed to her overall academic profile. Her main publications are in the areas of online learning and the use of innovative and emerging technologies for learning. She also has worked on a number of EU funded projects in the areas of game-based learning. More recently she has started working on developing virtual reality experiences for teaching and learning purposes related to various aspects of emotional intelligence.



Mr David Caruana studied mainly sciences and graduated 3 years ago with a BSc in Chemical Technology. He works at Esplora as a science communicator and has been doing this job for the past 5 years; delivering shows and workshops. Before Esplora, he used to work in a water testing lab but he really likes performing arts. Since he likes science too, this is the best job one can have as he can mix the two together.

Ms Talitha Van Colen has worked as a science communicator at Esplora for the last four years, after completing a degree in Biology at the University of Malta. During their degree, Tal focused on plants in wetlands and how they could thrive in these harsh conditions, but they are also fascinated by all kinds of living things. They enjoy learning about new ideas, engaging with different communities, and finding creative ways to explore complex topics in a fun and approachable way.

Mr David Cilia works as a science communicator at Esplora Interactive Science Centre since almost 5 years. From a young age, he developed a strong passion for science, which led him to seek jobs related to his interests. He decided on becoming a biology teacher, where he administered a laboratory and could therefore research his favourite scientific topics, but in an environment with lots of interactions and collaborations with others, especially curious and passionate young persons. This intersection of pedagogy and science eventually led to his current position at Esplora.

The Mentors

Attard Chiara

Is a graduate with Bachelor of Education with specialisation in Physics and a Master in Education. She is a teacher of Physics and girl guide leader. Her Master of Education dissertation focused on out of school activities to engage girls in STEM.

Buttigieg Deborah

Is a graduate with a B.Sc.(Hons) in Applied Biomedical Science and has worked as an analyst with a pharmaceutical company. She is currently a science teacher and following the part-time Master in Teaching and Learning course.

Attard Ritienne

Is a graduate with a B.Sc (Hons) in Biology and currently following the Master in Teaching and Learning course. She has experience of teaching in formal and informal settings.

Deidun Katrina

Has successfully completed a B.Sc (Hons) in Science for Education and Communication specialising in Biology. She has experience of out of school STEM teaching.

Sciberras Amy

Is currently following the B.Sc (Hons) in Science for Education and Communication specialising in Physics. She has experience of teaching.



Salerno Julia

Is currently following the B.Sc (Hons) in Science for Education and Communication specialising in Geosciences. She has experience of teaching in informal settings.

Pace Rachel

Is a graduate with a Bachelor of Education with specialisation in Biology and a Master in Education. She is a teacher of Science and Biology.

Skokanová Katarina

Is from Slovakia and has just finished there her studies in Teaching English language and Ecology. She is interested mainly in botany and her diploma thesis was about the creation of an interactive edu-trail through one botanical garden using a mobile app, in cooperation with high school students. She is in Malta for an internship mainly to improve her English language skills and is also eager to contribute to the scientific and environmental awareness of citizens in Malta via activities within projects that she will participate in.

Baldacchino Katryna

Graduated with a B.Sc. (Hons) in Biology and Chemistry, a Post-Graduate Certificate in Education and a Master in Education. She is a chemistry teacher with a special interest in teaching through inquiry and through real-life contexts.

Gauci Mia

Is currently an electrical engineering student and Secretary General of the university engineering student association executive team. She is passionate about STEM and has participated in many projects and competitions such as the Malta robotics Olympiad and the Malta Junior Science Olympiad among others.

University of Malta GEM Summer School Support Site

You can find more information about the Summer School in the national language by following this link:

LINK: <https://www.um.edu.mt/educ/ourresearch/gem>

