

Summer School Learning Plan

„ Encouraging girls towards STEM fields“

The summer school will be addressed only to girls 13-15 years old, that is girls who attended classes of secondary education during 2021-2022 school year. It will be held online for three days from 9.00 to 15.00 approximately every day. The girls will be divided in three groups according to their class. A mentor will be responsible for each group as regards the educational part of the camp (e.g., activities, structure of sessions, materials, etc.) while another colleague will be responsible for the communication with parents/guardians for all organizational issues. The girls will be involved in STEM labs based on activities addressing at least two STEM fields. The activities will be adapted to diverse levels and profiles including connections to women’s contribution to STEM fields and favouring the girls’ reflections on their own educational and professional path. With these activities, we aim to (a) introduce the girls to featured STEM fields and corresponding professional spaces, (b) inform girls about women’s contribution to scientific domains, and (c) improve girls self-confidence in their abilities related to STEM.

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Co-funded by the European Union

NKUA GEM Summer School

Target Group (age, school type):

13-15 years old, lower secondary education



Venue:

Online platform (zoom or webex).

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

N/A

Subsistence:

N/A







Contact person for girls and their guardians:

Parents and guardians could contact the scientific responsible of the project concerning all issues of organization or a person of the project team appointed with this role. Mentors will also be available to communicate with girls (one for 20 to 25 girls) as regards their participation in the summer school.








Schedule

Tuesday, 21st June 2022





Time	Duration	Activity	
9:00-9:30	30m	Opening of summer school	
09:30-11:00	1h & 30m	Lab 1	
11:00-11:30	30m	Break	
11:30-13:00	1h & 30m	Lab 2	
13:00-14:00	1h	Lunch break	
14:00-15:00	1h	Lecture and free discussion	



Wednesday, 22nd June 2022

Time	Duration	Activity	
09:00-10:30	1h & 30m	Lab 1	
10:30-11:00	30m	Break	
11:00-12:30	1h & 30m	Lab 2	
12:30-13:30	1h	Lunch break	
13:30-15:00	1h & 30m	Discussion panel: "Women in Science and professional arena - Part I"	

Thursday, 23rd June 2022

Time	Duration	Activity	
09:00-10:30	1h & 30m	Lab 1	
10:30-11:00	30m	Break	
11:00-12:30	1h & 30m	Discussion panel: "Women in Science and professional arena - Part II"	
12:30-13:30	1h	Closing of summer school - evaluation	



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
Apocryphography to DNA	Biology	DNA explanation	Biology, Criminology	Biological labs, labs of criminology by investigating a crime scene	Science, investigation skills
Could you reach..the stars?	Physics	Solar system analysis, characteristics of every planet, risk assessment and analysis to survival	Physics, Astronomy, Astrophysics, Using ChoiCo – choosing of consequences	Astronomer, Astrophysicist, risk analyst	Decision making
Let's talk about stairs	Mathematics	Architectural design, engineering plan, Mathematics	Schetching, desing, mathematical reasoning used to engineering	Civil engineer, Architect	Geometry, engineering, architecture
Become a programmer	Programming	Introduction to Scratch, game desing	Basic skills in programing, game designing, game planing	Programmer, PC game specialist, graphic designer	Decision making, graphic design
Escape room	Techology	Knowledge of women in science through playing, riddle solving	PC gaming	Game design, programming	Problem solving, observing details



The program is divided into three learning zones. The first two zones will include three STEM laboratories in which all the teams will be involved.

Most of the activities address at least two STEM fields, where one of these fields is (or might be) more dominant than the others. The activities have different formats, such as problems describing real-life situations, games, programming, professional oriented problems, experiential and interactive activities, etc. For instance, one activity concerns girls' engagement in exploring the construction of stairs emphasizing different aspects such as geometrical (e.g., height, length, slope), architectural (e.g., plan view, safety) and engineering ones (e.g., electrical elevator). Another activity concerns girls' engagement in programming through Scratch and game design while a third one concerns girls' involvement in exploring the DNA helix through manipulatives and digital tools. Additionally, there is an escape room as game that gives the girls the opportunity to discover the clues and get knowledge about women in science and also an activity through which are trying to get to space and discovers the characteristics of the planets. Moreover, all the activities will be followed by reflections on women's role and self-projection of the girls in the related domains (studies, potential professional careers, etc). The STEM labs will be adapted to various levels and profiles (e.g., age, school grade, special needs & interests) of the participating girls. Apart from the labs there is also the last learning zone during which lectures by women scientists, video screenings, discussion panel take place.

The activities are planned in such way in order to be amusing, interactive and participating. Certain necessary material is sent to the participants so as to be able to make simple constructions and be creative while listening also to certain theoretical background of each activity.

We plan to have some lectures, panel discussions and mentoring by women from a variety of disciplines, to provide advice to girls as they plan for their future, to get to know "the woman behind the scientist," and to be inspired by their personal stories.

Through these activities, we anticipate the participants to:

- acquire a significant knowledge about STEM fields and make connections between them,
- explore some possible STEM professions in WoW,
- get involved in competitive projects and to develop team working spirit,
- realise that many women have excelled in STEM domains,
- gain confidence in their abilities and believe that they have their own place in STEM world,
- apply their school knowledge to new contexts related to STEM.



Lecturers and mentors

The summer school is organized by The National and Kapodistrian University of Athens (NKUA). It is a public university with 33 departments, 2.100 academic staff members and about 40.000 undergraduate students. The Department of Mathematics has about 1.200 undergraduate students and 44 academic staff members with a variety of academic expertise (e.g., Statistics, Algebra and Geometry, Analysis or Didactics of Mathematics). The department offers a variety of courses but there are two main directions in the teaching program, pure and applied mathematics, and there are three specializations (Computational mathematics, Statistics and operational research and Mathematics education). Members of the Mathematics Department serve in the board of the Greek Mathematical Society and participate in scientific committees of the Ministry of Education, the body responsible for educational policy, for curriculum and textbook development. Every year the Mathematics Department admits 250-300 undergraduate students. About half of them will follow a teaching career after their studies while other continue their professional careers and further studies in STEM-related areas (e.g., finance, programming, big data analytics). Additionally there is a Master's programme in Mathematics Education that is attended by many in-service and pre-service mathematics teachers. There are several research collaborations with other European universities through e.g. Erasmus+. Consequently, the Mathematics Department has strong relations with various bodies and groups of stakeholders in Greece and abroad and this could support project's dissemination and sustainability.

Department webpage: <https://en.math.uoa.gr/>

The lecturers working labs with the girls are from various fields such as mathematics and physics. More specifically,

- **Maha Farah:** She has studied mathematics at the University of Lebanon, where she has also completed her postgraduate studies in the field of "Modelling and Informatics". Then, she has completed her doctoral studies in applied mathematics in France, where she worked in secondary schools for about 5 years. In recent years, she has been supporting the French school of Athens in Greece as a temporary teacher, teaching mainly mathematics.
- **Elisavet Kalogeria:** Elisavet has studied mathematics and has completed postgraduate and doctoral studies in Mathematics Education. She has been working as a teacher in secondary schools for almost 20 years. Her involvement with STEM starts from her PhD in mathematics education with digital tools but also through training seminars she has attended. Elisavet, when teaching, looks for ways to combine mathematics with other fields of science.
- **Ekaterini Spanou:** Ekaterini is a physicist specializing in environmental physics and with experience in teaching physics to secondary school students. She has completed her postgraduate studies at the University of Athens in Digital Transformation and Educational Practice. In addition, she has attended



seminars on teaching practices in primary and secondary education and a STEM training course for instructors.

- **Polixeni Tsitsa:** Polyxeni is a mathematician and has been working as a secondary school teacher for over 15 years now. She has completed postgraduate studies in Education. Since 2009 she designs and implements, in the high school she teaches, a program on "Mathematics & Literature" with the participation of students and invited speakers related to the subject.
- **Maria Vassilopoulou:** She is a mathematician specializing in the Mathematics Education and a PhD candidate in the same field. She works for approximately 5 years now to Secondary Education but also in programs for primary schools' students. She has extensive experience from STEM teaching and participates as a STEAM educator at MENSA Greece.

We plan to have some lectures, panel discussions and mentoring by women from a variety of disciplines, to provide advice to girls as they plan for their future, to get to know "the woman behind the scientist," and to be inspired by their personal stories. More specifically,

- **Sofia Lambropoulou:** She is Professor of the National Technical University of Athens in Greece at the School of Applied Mathematical and Physical Sciences. Her main research interests are in mathematics (knots theory) but also physics and biology. She had her studies in Greece and UK and in 2002 she was qualified Maître de Conférence by the French Ministry of Education. Most recently, she was honoured with representing Greece in the exhibition "Women of mathematics throughout Europe", which was inaugurated at the 8th European Congress of Mathematics in Portoroz, July 2021 (interviewed & portrayed in Geneva, February 2019).
- **Myrto Denaxa:** She is a PI at the Alexander Fleming Biomedical Sciences Research Center, Greece. Denaxa obtained her bachelor's degree from the University of Patras, Greece, and her master's and PhD from the University of Crete Medical School, Greece. She subsequently joined the group of Vassilis Pachnis at the National Institute for Medical Research, London, as an MRC postdoc fellow. Later, she became a senior research associate at the Francis Crick Institute, London. Her research is focusing on deciphering molecular mechanisms implicated on cortical interneuron development and function.
- **Paraskevi Pitta:** Dr. Paraskevi (Vivi) Pitta is an Associate Researcher focusing on Microbial Ecology at Hellenic Centre Marine Researches, Institute of Oceanography. She assumed her duties in April 1996. She completed her doctoral training at the Institute of Marine Biology of Crete, Greece. Her thesis work focused on the dynamics of the plankton community in sea bream (*Sparus aurata*) larvae



rearing mesocosms. She earned her doctoral and master's degrees in Marine Biology from the University of Crete, Greece. She holds a second master's degree in General Ecology from the Universite de Paris-Sud (Paris XI), France and a bachelor's degree in Biology from the University of Athens, Greece.

- **Marina Sagnou:** She is an Associate Researcher at the National Center for Scientific Research "Demokritos" in Greece for 15 years now. She writes about herself: "My main research focus is in the area of design, synthesis and biological evaluation of novel small organic molecules, natural products or organometallic complexes with potential target-specific pharmacological properties. The areas of potential application of such designed molecules in which my research is currently engaged are: diagnosis of Alzheimer's disease, diagnosis and/or therapy of cancer, function and imaging or p-glycoprotein and multi-drug resistance in CNS pathology and cancer, natural products in rewarding and addiction, and small molecules in stem cell proliferation. I have also been actively involved and participate in the foundation and development of the NCSR spin-off company "STEP@biomaterials" in the production and development of novel human bone allograft products, bovine xenografts, synthetic allografts and other related biomaterials for dental and orthopedic application. Finally, it is a great interest and concern of mine how to get younger kids inspired about science. So, getting them to know "Demokritos", laboratory experience, hands-on experiments, outreach events are of high priority of mine".
- **Ekaterini Orfanogiannaki:** She is mathematician specialized in είναι μαθηματικός με ειδίκευση στη Statistical Seismicity. She has been involved for the last 20 years in numerous national and international research activities, collaborations and programs of the Institute of Geodynamics of the National Observatory of Athens and the Athens University of Economics and Business related to natural disasters from earthquakes, tsunamis and landslides. Ekaterini Orfanogiannaki has participated upon invitation, as an expert in Statistical Seismicity, in the creation and subsequent development of the electronic platform for statistical analysis of seismicity (Community Online Resource for Statistical Seismicity Analysis – CORSSA, <http://www.corssa.org/en/home/>). She has extensive experience in organizing workshops and conferences, as she has been a member of the organizing committee in international conferences on natural disasters from earthquakes and tsunamis. In addition, she has been a guest researcher at Universities and Research Institutes in New Zealand (2008), Switzerland (2010) and Japan (2013, 2019). She has been awarded by the Hellenic Statistical Institute and the American Geophysical Association for the preparation of papers presented in the framework of respective conferences and has secured funding for the elaboration of doctoral and postdoctoral research, as well as self-reliant research as coordinator in the form of scholarships. He is the scientific responsibility of the project "Tracing the mysteries of earthquakes through an innovative educational journey" which has received funding from the Hellenic Foundation for Research and Innovation and is implemented in cooperation with primary and secondary schools.



NKUA GEM Summer School Support Site

You can find more information about the Summer School in the national language by following this link: <http://scholar.uoa.gr/gpsych/GEMSummerCamp2021>

Learning plan in the national language: [GEM summer school timeplan 2022](#)

Pictures: [Media library](#)

