Educational Platform for Space Science and Technology

We Unlocking the Space to Everyone
Educational Platform for Space Science and Technology

Developer and Financier

Financier

www.Egsa.gov.eg
Success Usually Comes To Those Who Are Too Busy To Be Looking For It.

We Unlocking the Space technology to Everyone in to Africa and Middle East Countries
Space and Education

Education is one of the principal Sustainable Development Goals (SDG) because it can have a spillover effect on the other goals. An educated society stands a better chance at reaching the SDGs. Space education, a top priority for most nations, focuses on technical education for employment in space and related sectors. However, space (topics) can also be leveraged to improve general educational outcomes. Space, being universally fascinating, can be a key catalyst in education. Several projects have already used space topics and contexts to teach literacy, numeracy, programming etc. Here the end goal is not to impart an education in space but rather use the excitement of space to better teach a standard curriculum. Space topics are also well suited to instill tolerance and empathy, especially relevant in our highly globalized world with multiple breaking points.

A proposed plan to leverage the potential of space topics is to create an open-source Educational space system connected to the online educational portal repository containing space contextualized examples to teach various subjects. Over time, with more users, evaluations and studies can be carried out in classrooms across the Egyptian University’s in order to uncover the most effective ways of leveraging space topics to improve educational outcomes.

Mohamed El-Koosy
COE Egyptian Space Agency
Space Keys

Space Keys is a Space Science and Technology Platform for Space Educational purposes. The Space Keys Platform design to give to the students a hands-on space education and Outreach with understanding and exploring concepts in electrical design, mechanical design, software design, and systems engineering by using the subsystems and functionality of a spacecraft. Hardware and exercises design to give the students of engineering hands-on experience in satellite testing and operation. Space Keys Platform even provides satellite subsystem boards that allow advanced students to design their own payload and learn about control, operation, and data acquisition. The instructor will find the full space system course curriculum with a lot of exercises that can be applied directly to the kit, some are more advanced than others and the intent is to offer a set of base exercises that illustrate the operation of all the elements of Space Keys Platform.

Mohamed Ibrahim
Space Key Project Manager
The instructor will need to tailor these exercises to the needs of their students. Through the Space Keys Platform organization instructors can exchange ideas and lectures exercises. It is important to point out that Space Keys Platform design such that it can be used in courses that provide high-level overviews of Spacecraft subsystems and their interrelationships, but it can also be used to teach principles of systems engineering, and even detailed design engineering. Space Keys Platform come with the different satellite payload types to simulate the Earth Monitoring, weather monitoring applications, communication application, navigation Application, and space environment effects.
What We Do

WHO WE ARE?
The best of the best specialists of the manpower of the Egyptian Space Agency

BEST SERVICE
Space education, technology transfer, and training of manpower in the space industry

VERY USEFUL
undergraduate and postgraduate students, fresh engineers, and scientist

GOOD VISION
Investment in People (IIP); and building the space workforce with higher-skilled human resources
We offer distinguished educational services including cost-effective reliable educational tools and platform solutions for universities and research institutes. Our educational platform is a comprehensive, multidisciplinary demonstrative tool with state-of-the-art educational systems.

Space Keys Platform
Space Science and Technology Course Portfolio
lectures Platform
Ground Control Station Software
Space Application SW
Space Keys Platform

Core of Space Innovation Lab

Communication Subsystem
- TT&C subsystem operation
- Communication protocols
- Communication security
- Link budget
- Wireless transamination

Command & Data Handling Subsystem
- Satellite Commanding
- Telemetry Gathering
- Satellite Control bus
- CDH Operation
- CDH SW Errors Investigation
- CDH SW modification

Electric Power Subsystem
- EPS operation
- Power Generation
- Power Storage
- Power distribution
- Load protection
- Devices control

ADCS Subsystem
- ADCS Sensors
- ADCS Actuators
- Orbits mechanism
- Satellite Control by Thruster
- Satellite Orientation
- Satellite Control Algorithms

Payload Subsystem
- Earth Monitoring Application
- Satellite Communication App
- Weather Monitoring App
- Image formats & resolution
- Image data handling & storage

Space Science Subsystem
- Space Environment Sensors
- Radiation effect
- Magnetic Field effect
- Thermal effect
Space Science and Technology Course Portfolio

Brain of Space Innovation Lab

- **Space System Engineering lectures**
  - 2 Lec.

- **Satellite**
  - 4 Lec.

- **Electric Power**
  - 4 Lec.

- **ADCS lectures**
  - 4 Lec.

- **Payload lectures**
  - 4 Lec.

- **Space Science**
  - 4 Lec.

- **Communication lectures**
  - 4 Lec.

- **CDH lectures**
  - 4 Lec.

- **Power Management and Control**
  - 4 Lec.

- **Satellite Attitude determination and Control**
  - 4 Lec.

- **Satellite Payload**
  - 4 Lec.

- **Space Environment**
  - 4 Lec.

- **Structure lectures**
  - 2 Lec.
Space Science and Technology lectures Platform

Brain of Space Innovation Lab

- Satellite Electric Power Experiments
- Satellite AOCS Experiments
- Satellite Payload Experiments
- Space Science Experiments
- Satellite Structure Experiments

Magnetic Levitation Experiments Frame

Space System Engineering Experiments
- 2 EXP.

Satellite Communication Experiments
- 5 EXP.

Satellite CDH Experiments
- 6 EXP.

Satellite Electric Power Experiments
- 6 EXP.

Satellite AOCs Experiments
- 6 EXP.

Satellite Payload Experiments
- 4 EXP.

Space Science Experiments
- 5 EXP.

Satellite Structure Experiments
- 3 EXP.

Handout
Lab Exercises
Instructor Manuals
Student Manuals
Quiz & Exam
Ground Control Station and Application Software

Attractive of Space Innovation Lab

Space Keys Platform – SW
- System Eng. SW
- GCS \ SW
- Earth Simulator
- Weather Simulator
Our Objectives

1. Building the space workforce with higher-skilled human resources that are capable of achieving sustainable development goals (SDGs).
2. Providing an experimental way for teaching these technologies will create unique opportunities for students to understand and explore satellite subsystems.
3. Unification of the space knowledge through Egyptian Space Agency educational portal.
4. Supporting the stimulating innovation & entrepreneurship in universities.
5. Unlocking the Space technology to Everyone in to Africa and Middle East Countries
Timeline

We Learn From The Best, Success Seems To Be **Connected With Action**

Finishing design and Building of the first model of Space educational platform, so that it is ideal to be cost-effective multidisciplinary modern educational systems focusing on, low-cost science, and commercial proof-of-concept for educational purposes. **Space keys** platform offers a full mission solution based on our portfolio of subsystems and extensive knowledge, for science and technology dissemination.
Action

To permit about (35 unit) of the Space keys platform to establishment of the Egyptian Space Innovation Lab in the Faculty of Engineering and Faculty of Science across Egyptian University, with capability to join together in online learning distance system through Egyptian Space Agency educational portal to the unification of the space knowledge system.

Action

- Stimulating Innovation, Entrepreneurship in Universities activity
- Pre-Incubation & Incubation Program for Space Technology Startups
Our Long Plan

**Phase 1**
- 32 Space Innovation Lab
- 5 African Countries (Sudan, Nigeria, Uganda, Kenya, Ghana)

**Phase 2**
- 14 Africa and Middle East Countries

**Phase 3**
- Rest of the African Countries

**Phase 4**
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Thanks For Watch