САМАРСКИЙ УНИВЕРСИТЕТ
SAMARA UNIVERSITY

Educational trainings for specialists from emerging countries for space technologies and their applications

Dr. Avariaskin D.P.

Samara 2017

- Foreign partners from emerging countries
- Short-term educational trainings for emerging countries
- Specialized trainings in the field of nanosatellite design

2016 UNOOSA meeting

Cooperation of Samara University with emerging countries

The Arthur C Clarke Institute for Modern Technologies (ACCIMT), Sri Lanka

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The Regional Centre for Space Science and Technology Education for Latin America and the Caribbean, Mexico (CRECTEALC)

The National Commission on Space Activities of Argentina (CONAE)

The African Regional Centre for Space Science and Technology Education in English, Nigeria (ARCSSTE-E)

AGENCIA ESPACIAL DEL PERU CONIDA

The National Commission on Space Activities of Peru (CONIDA)

Types of short-term educational programs:

1. At a inviting organization
duration 1- 2 weeks

2. At Samara University
duration from 2 weeks to 2 month

3. Distant courses
duration about 20 hours

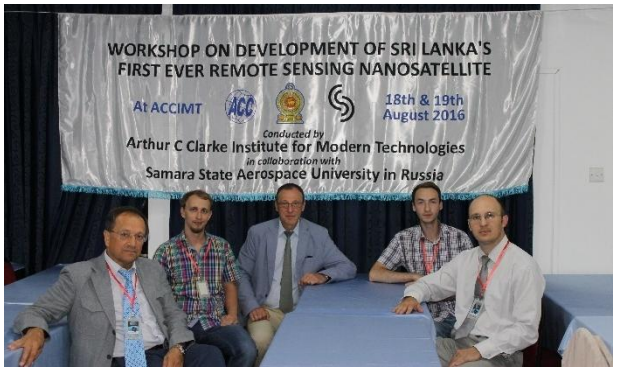
The main topics of lectures and practical classes:

- design of space technologies;
- space mission analysis;
- basics of space navigation and control;
- software for design;
- basics of microcontroller programming.
- basics of space microelectronics and radio engineering;
- basics of microcontroller programming.

Trainings are illustrated with examples of Samara University nanosatellite projects

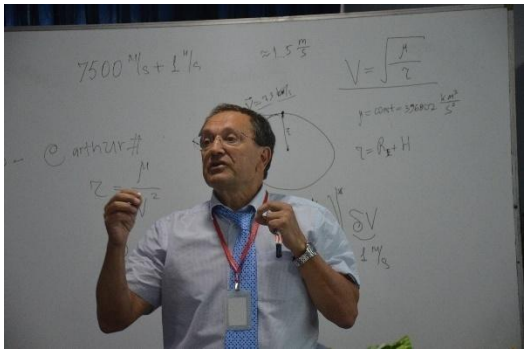
18 and 19 August 2016

***workshop** on development of the first Sri Lanka remote sensing nanosatellite at Arthur C Clarke Institute for Modern Technologies (Sri Lanka)*



from 20 till 23 August 2016

*at Arthur C Clarke Institute for Modern Technologies (Sri Lanka) was **short-term training** «Introduction to nanosatellite design»*

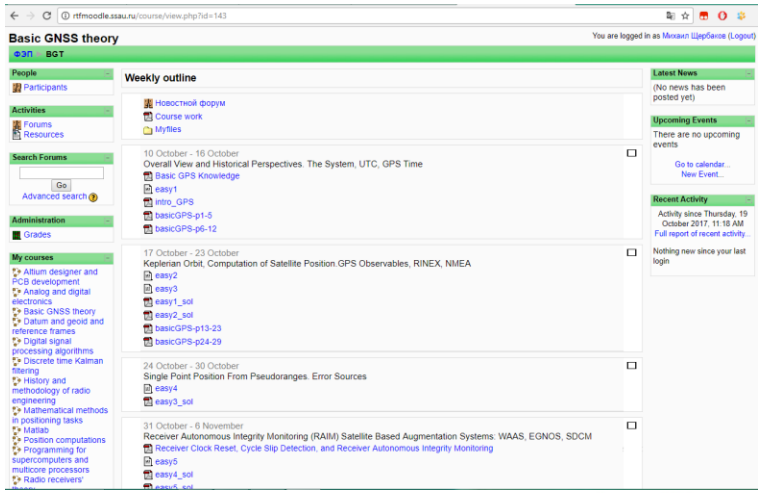


The distance training course
«Basics of Nanosatellites Technologies»
(duration 20 hours)
20 – 31 March 2017

Training is carried out in the Moodle system through a system of personal accounts for each Trainee.

The list of topics studied in the course:

- Space Flight Mechanics
- Basics of space flight mechanics: nanosatellites orbits
- Features of nanosatellite flight dynamics
- C/C++ basics
- Microcontrollers architecture basics
- IAR systems environment



Training «Basics of nanosatellite design»
(duration 120 hours)
03 –28 April 2017

Training was at Space Research Department of Samara University.

<u>The training included topics</u>:

- Introduction to space technologies and low-orbital nanosatellite missions,
- Nanosatellite design,
- Basics of software for design,
- Basics of space navigation;
- System analysis of space missions;
- Excursions to the aerospace museums of Samara.

Training at Monterrey Institute of Technology and Higher Education (Mexico)
«Basics of nanosatellite design» (duration 30 hours)
November-December 2017

The training includes introductions to the next topics:

- nanosatellite design;
- space flight mechanics and navigation;
- space radio engineering;
- attitude control;
- software for nanosatellite design.

Development of cooperation with Sri Lanka

It is discussing cooperation in area of consultation and assistance in the design of the first nanosatellite of ACCIMT (Sri Lanka).

Program of a week training
«Introduction to nanosatellite technologies»
(duration 30 hours)

Program of lectures and practical classes

Topic	Hours
Introduction to space technologies and nanosatellite missions	2
Basics of space flight mechanics and navigation	6
Introduction to nanosatellite design	10
Introduction to space radio engineering	8
Introduction to software for nanosatellite design	4

Program of a two weeks training
«Basics of nanosatellite technologies»
(duration 60 hours)

Program of lectures and practical classes

Topic	Hours
Introduction to space technologies and nanosatellite missions	4
Basics of space flight mechanics and navigation	10
Basics of nanosatellite design	12
Basics of space radio engineering	10
Basic principles of work with software for nanosatellite design	6
Basics of attitude determination and control	**8**
Basics of microcontroller programming	**10**

Program of a month training **«Advanced nanosatellite technologies»**
(duration 120 hours)

Program of lectures and practical classes

Topic	Hours
Advanced space technologies and nanosatellite missions	6
Space flight mechanics and navigation	14
Nanosatellite design	12
Basics of space radio engineering	16
Work with software for nanosatellite design	24
Basics of attitude determination and control	8
Basics of microcontroller programming	22
Nanosatellite deployers	**2**
Basics of nanosatellite relative motion	**8**
Ground station and other facilities	**4**
Testing of nanosatellites	**4**

Conclusion

- It is planned to expand cooperation of Samara University with emerging countries in the field of nanosatellite technologies
- It is planned to create nanosatellite projects jointly with aerospace organizations and universities of emerging countries of the world
- It is proposed to implement new educational trainings in Samara at the Samara University and in emerging countries

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THANK YOU

Space Research Department,
Denis Avariaskin,
avaryaskind@gmail.com

34, Moskovskoye shosse, Samara, 443086, Russia
Tel.: +7 (846) 335-18-26, fax: +7 (846) 335-18-36
www.ssau.ru, e-mail: ssau@ssau.ru