

### M.Sc. Program Chairs:

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### Lecturers' team:

Assoc. Prof. P. Dankov, Assoc. Prof. Y. Shopov, Assoc. Prof. Eng. N. Djermanova, Assoc. Prof. J. Kiss'ovski, Assoc. Prof. A. Philipov, Assoc. Prof. I. Buchvarov, Prof. P. Getcov, Assoc. Prof. D. Yordanov, Dr. V. Vassilev, Dr. D. Yankov, Dr. N. Neshev, Dr. Eng. M. Gatchev, Dr. Eng. L. Urshev, Major Dr. N. Tabal'ov, Assist. Prof. S. Kolev, Assist. Prof. N. Zografov, and other

### Essential information for the M.Sc. Program ASE&C:

1. The M.Sc. Program "Aerospace Engineering and Communications" (ASE&C) is a **new education project**, even slightly belated. The aerospace sector in Bulgaria has made a significant progress in the last 2-3 years mainly due to the development of small satellites and UAVs design projects for commercial applications. The companies from the nongovernmental cluster AeroSpace Technology, Research and Applications (CASTRA) and the European aerospace industry are looking to appoint skilled staff; however there is a very limited number of graduated young professionals in this field in Bulgaria and Europe. This fact offers exceptional prospects for professional realization and career of the M.Sc. graduates. The new Bulgarian project for implementation of high-speed high data volume communications with the international expeditions and bases on the Antarctic continent by means of using small satellites will determine an important direction of education in the next 2-3 years. The felicitous combination of high-level practical education in both **aerospace engineering** and state-of-the-art **wireless and satellite communications** offers attractive opportunities for the international students as well.

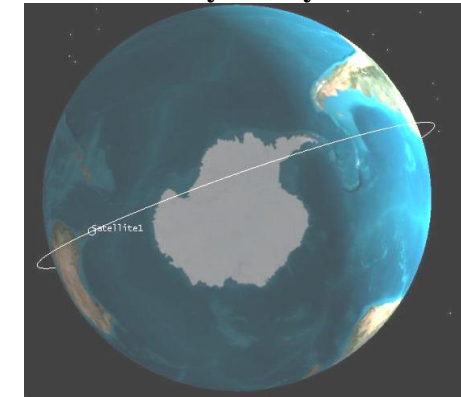
2. The program has regular form of training with duration of **3 semesters** (90 ECTS credits allocated) and **starts in October**. **Foreign students** apply to the program with application forms without any additional entrance exams. They pay the standard fees of the Sofia University.

3. The program consists of **two complimentary modules**: M1 "Aerospace Engineering (small aerospace apparatus)", and M2 "Wireless and Satellite Communications". Each module consists of 7 compulsory and 20 selectable courses. They all cover different areas of aerospace engineering and wireless communications. The courses are grouped in 3 cycles (2-3 courses in a group) with duration of 1-1.5 mounts. A course exam is carried out immediately after the course ends. The students should choose an educational practice in the 3<sup>rd</sup> semester with duration of 4 weeks. It is carried out in suitable scientific laboratories, institutes, companies, high schools, etc. The master training finishes with M.Sc. thesis (15 ECTS credits).

4. The official languages of the M.Sc. program are **English**, **Russian** and **Bulgarian**. The classes can be conducted during each academic year on **two optional languages** (En-Bg; Ru-Bg or En-Ru). The Erasmus students apply for this M.Sc. program at their Universities, which have Erasmus letter of agreement with Sofia University ✂



## Sofia University "St. Kliment Ohridski" Faculty of Physics



### M.Sc. Program:

## *Aerospace Engineering and Communications (ASE&C)*

Professional track:

*Physics*

Educational level:

*Master of Science*

Specialty:

*Engineering Physics*

Training duration:

*3 semesters*

Form of training:

*Regular form*

Professional Qualification:

*Master in Engineering Physics –  
Aerospace Engineering and Communications*

<http://www.phys.uni-sofia.bg/~dankov/Master%20program%20ASE&C/>



**CURRICULUM: MODULE 1: “AEROSPACE ENGINEERING (SMALL AEROSPACE APPARATUS)”**

<i>Courses</i>	<i>Total Hours/ECTS credits</i>	
<b>I<sup>st</sup> semester (winter)</b>		
Space Physics ( <i>introductory compulsory</i> )	75	5
Satellite Systems and Satellite information ( <i>introductory selectable</i> )	60	5
Introductory Course Geophysics ( <i>introductory selectable</i> )	60	5
Microwave and Wireless Technique ( <i>compulsory</i> )	75	5
Computer Practice in Communication Networks and Protocols ( <i>comp.</i> )	60	5
Aerodynamics and Orbital Dynamics ( <i>compulsory</i> )	60	5
Aerospace Control Systems ( <i>compulsory</i> )	60	5

(Note: the students must choose 1 course from the introductory selectable ones) (total 30)

<b>II<sup>nd</sup> semester (summer)</b>		
Practice in Integrated Circuits ( <i>compulsory</i> )	60	5
Navigation and Telemetry of Small Aerospace Apparatus ( <i>compulsory</i> )	60	5
Photovoltaic Systems and Power Sources in Aerospace Apparatus ( <i>comp</i> )	60	5
Cosmic Impact on the Environment ( <i>selectable</i> )	60	5
Analysis, Interpretation and Application of Satellite Images ( <i>select</i> )	60	5
Unmanned Aircrafts ( <i>selectable</i> )	60	5
Modern Materials for Aerospace Applications ( <i>selectable</i> )	60	5
University Micro- and Nano-Satellites and Applications ( <i>selectable</i> )	60	5
Management of Innovations ( <i>selectable</i> )	60	5
One-Term Course in Advanced Topics of Aerospace Engineering ( <i>sel.</i> )	60	5

(Note: the students must choose 3 courses from the selectable ones) (total 30)

<b>III<sup>rd</sup> semester (winter)</b>		
General Meteorology Part 1 (Static and Dynamics) ( <i>selectable</i> )	60	5
Cosmic Rays and their Interaction with the Matter ( <i>selectable</i> )	60	5
Optical Instruments and Optical Technologies ( <i>selectable</i> )	60	5
Plasma and Plasma Propulsion Generators for Satellites ( <i>selectable</i> )	60	5
Instrumental Methods in Material Science ( <i>selectable</i> )	60	5
Management of Aerospace Apparatus and their Applications ( <i>select.</i> )	60	5
One-Term Course in Advanced Topics of Aerospace Engineering ( <i>sel.</i> )	60	5
Educational Practice in Aerospace Engineering ( <i>selectable</i> )	75	7.5
Individual Preparation of the Master thesis ( <i>instead of the practice</i> )	75	7.5
Master thesis ( <i>compulsory</i> )	75	7.5

(Note: the students must choose 3 courses from the selectable ones 15 credits and educational practice, part of the M.Sc. thesis, 15 credits) (total 30)



**CURRICULUM: MODULE 2: “WIRELESS AND SATELLITE COMMUNICATIONS”**

<i>Courses</i>	<i>Total Hours/ECTS credits</i>	
<b>I<sup>st</sup> semester (winter)</b>		
Applied Electrodynamics for M.Sc. Students ( <i>introductory compulsory</i> )	60	5
Introduction to Wireless Communications ( <i>introductory selectable</i> )	60	5
Modern Physics for Engineers ( <i>introductory selectable</i> )	60	5
Microwave and Wireless Technique ( <i>compulsory</i> )	75	5
Computer Practice in Communication Networks and Protocols ( <i>comp.</i> )	60	5
Modulation and Coding in Digital Communications ( <i>compulsory</i> )	75	5
Fixed and Mobile Satellite Communication Systems ( <i>compulsory</i> )	60	5

(Note: the students must choose 1 course from the introductory selectable ones) (total 30)

<b>II<sup>nd</sup> semester (summer)</b>		
Practice in Integrated Circuits ( <i>compulsory</i> )	60	5
Antennas for Wireless Communication Systems ( <i>compulsory</i> )	60	5
Operational Systems and Open-Source Applications in the Communications (Lab. exercises) ( <i>compulsory</i> )	45	5
Radio-Frequency Identification Devices (RFID's) ( <i>selectable</i> )	60	5
Electromagnetic Compatibility ( <i>selectable</i> )	60	5
Security of the Communication Networks and Systems ( <i>selectable</i> )	60	5
Sensor Networks and Sensor Electronics ( <i>selectable</i> )	60	5
Management of Innovations ( <i>selectable</i> )	60	5
One-Term Course in Advanced Topics of Communications ( <i>selectable</i> )	60	5

(Note: the students must choose 3 courses from the selectable ones) (total 30)

<b>III<sup>rd</sup> semester (winter)</b>		
Wireless Networks and Protocols ( <i>selectable</i> )	60	5
Mobile Radio-Channels ( <i>selectable</i> )	60	5
Microwave Measurement in Communications ( <i>selectable</i> )	60	5
Toolbox on MatLab for Communication Applications ( <i>selectable</i> )	60	5
Practical Programming on Visual C++ ( <i>selectable</i> )	60	5
Management of the Communication Networks ( <i>selectable</i> )	60	5
One-Term Course in Advanced Topics of Communications ( <i>selectable</i> )	60	5
Educational Practice in Communications ( <i>selectable</i> )	75	7.5
Individual Preparation of the Master thesis ( <i>instead of the practice</i> )	75	7.5
Master thesis ( <i>compulsory</i> )	75	7.5

(Note: the students must choose 3 courses from the selectable ones 15 credits and educational practice, part of the M.Sc. thesis, 15 credits) (total 30)

