MASTA 2019

Master Program on Space Technology Applications

Overview

Space technology and its applications, the most fascinating technical achievement of the human race in the last six decades, has undoubtedly advanced with great stride. The various practical benefits of space technology play a central role in international development efforts.

Master of Space Technology Applications (MASTA) is regular program of APSCO since 2006. This Program is an elaborately designed and intensive Master Program for students who are interested in space technology and its application. It focuses on both knowledge acquisition and operational training, and is an application-oriented program. It provides a powerful platform for scholars and professionals to obtain more opportunities for communicating and experiencing the space technology practice. This program is jointly sponsored and organized by APSCO, China Scholarship Council (CSC) and Beihang University. All Member States actively participated in these programs. This program has enrolled totally 260 postgraduate students from 20 countries, among which 159 students have graduated and obtained the Master's Degree on Space Technology Applications.

MASTA is designed to give participants a competitive edge by:

- ✧ Broadening their knowledge on space-related issues and activities and encouraging participants to use acquired knowledge and skills through practical, hands-on experience;
- ✧ Providing a variety practice opportunities (include watching satellite launching on site, attending international conferences/workshops, etc.);
- ✧ Internationally qualified professors and experts from a diversity of academic backgrounds;

✧ Modularized curricula design and flexible study modes;

✧ Developing the cross-cultural communication skills with an internationalized atmosphere.

The main educational fields of MASTA Program include Remote Sensing and Geographic Information Systems (RS&GIS), Satellite Communications, Global Navigation Satellite System (GNSS), Micro-satellite Technology, Space Law and Policy, etc.

This program is carried out according to the regulations and requirements of Beihang University. Referring to the Education Curricula of UN-PSA, the study period is divided into two phases:

(a) 9-month Course Study

(b) 6-12 months Thesis Research (at Beihang University or in applicant's homeland)

The training procedures are as follows.

<table>
<tr><td colspan="4">Phase Ⅰ
Course Study in China: 9 months (at Beihang University)
(Leading to Course completion Certificate)</td></tr>
<tr><td></td><td>Module Ⅰ</td><td>Module Ⅱ</td><td>Module Ⅲ</td></tr>
<tr><td>Formulation of an Individual Training Plan</td><td>Common Platform Courses</td><td>● Major courses
● Academic Lectures
● Professional Visits</td><td>● Pilot Project or Practical Courses</td></tr>
<tr><td colspan="4">Phase Ⅱ
Thesis Research: 12 months (in China or home country)
(Leading to Master's Degree in Engineering)</td></tr>
<tr><td>Literature Survey and Thesis Proposal</td><td>Midterm Assessment</td><td>Academic Activities</td><td>Thesis Research</td></tr>
</table>

Lectures are conducted in English. The thesis for project practice is required to be written in English. Courses are organized into three modules as given above.

Participants will be awarded with the Graduation Certificate of Beihang University and Master's Degree Certificate of the People's Republic of China when fulfilling the required credits and passing the thesis defense.

The faculty for this program consist of professors, experts and senior engineers from Beihang University and some other institutes or academies of China and abroad. The core faculty members have long and varied experience in the field of space science and technology. In addition, they have accumulated considerable teaching experience over the years and are skilled in teaching and advising international students.

Introduction to Beihang University

Beihang University, founded on October 25, 1952, is the first university in China focusing on aeronautical and astronautical education and research. About 26km away from the main campus, the suburban Shahe campus provides quiet study milieu and is also home to the National Laboratory of Aeronautics and Astronautics(NLAA).

Since its founding, Beihang has excelled as one of the first 16 key universities in China, given priority for development. In 2017, Beihang was chosen to participate in the Double First-Class plan, which includes major support from the Chinese Ministry of Education and other government departments to build a world-class university with world-class disciplines. Over the past 65 years, Beihang has fostered more than 180,000 professionals in various sectors for the world. The main designers and chief engineers of China’s first manned space flight, Shengzhou-5 Spacecraft, are Beihang alumni. The university and its alumni have contributed the most to the country’s aeronautical, astronautical and other relative industries, etc.

Beihang has now a total enrollment of over 30,000 full-time students, including about 1,300 international students. Beihang is deeply committed to an education that fosters innovation and intercultural awareness. It is a campus tradition that Beihang students participate in innovation contests and figure out the most creative solutions in teams every year. It is also a booming trend for many students to spend weeks, months or even years studying abroad at our partner universities.

Beihang has evolved into an open, comprehensive, research-oriented university with focuses on aeronautics, astronautics and informatics. Looking to the future, Beihang aspires to become a world-class research university rooted in China with distinctive advantages in science and technology

Application Qualifications

- ✧ The applicant should be under the age of 35;

- The applicant should have some professional experiences of working in space technology industry or research institutes;
- The applicant should have Bachelor Degree of relevant discipline or the diploma equivalent to Bachelor Degree;
- The applicant is expected to have good command of English and the ability to take courses in English;
- The applicant is supposed to have research background in relevant areas.

Note: Please notice as a special requirement that selected applicants should come to study at Beihang University with their Private Passports only (not official/service/other types of passport).

Applicants of this program are mostly recommended by organizations. Students who are interested to do self-sponsor, please visit website (http://admission.buaa.edu.cn/) for further information.

Fees

- Tuition Fee: 35000 Yuan (RMB) per year;
- Insurance: 800 Yuan (RMB) per year;
- Accommodation: Double room, 750 Yuan (RMB) per month (not including costs like water, electricity, etc.).

Scholarship and Financial Support

1. The applicants are welcomed to apply for the Chinese Government Scholarship (CSC Scholarship) at Beihang University.

   The Full CSC scholarship will cover the following items:

   - Tuition fee for 2 years;
   - Free accommodation during study at the University (not including costs like water and electricity, etc.);
   - Living allowance during stay at the University (3000 RMB per month or according to the standard of CSC);
   - Medical Insurance only for accidents and hospitalization treatments, according to the standard of CSC.
2. The applicants who fail to get the CSC Scholarship will have chance to get Beijing Municipal/Beihang Scholarship. **Beijing Municipal/Beihang Scholarship will only cover tuition fee.**

Application Procedures and Required Documents

Step 1: Apply online

Make the online application for Chinese Government Scholarship on the website of CSC ***http://studyinchina.csc.edu.cn)***: fill up the Application Form, submit the completed Application Form and supporting documents online, and print the Application Form according to the requirements. Please note that the specialty should be chosen as "Space Technology Applications" and the language of instructions should be chosen as "English". Please also note that the "**Program Category**" should be "**Type B**" and the "**Agency Number**" of Beihang University is **10006**.

Step 2: Prepare documents

1. Application Form for Chinese Government Scholarship;
2. Highest Education Diploma (notarized photocopy or original one) or Certificate of Expected Graduation Date from the university studying currently;
3. Notarized Transcripts or Original Ones;
4. Study or Research Plan (no less than 500 words);
5. Two Recommendation Letters from Professors or Academic Experts;
6. The Results of TOEFL, IELTS or English Proficiency Certificates;
7. Photocopy of Physical Examination Form and the Report on Blood Examination;

   Attachment 1-FOREIGNER PHYSICAL EXAMINATION FORM.pdf
8. Photocopy of First Page of Passport (the information page);
9. The List of Application Documents and Post Address confirmed.

   Attachment 2-List of Application Documents.doc

Note: *All the documents should be in duplicate. And the language of documents should be in English or Chinese or attached with translations in English or Chinese.*

Step 3: Submit documents

Mail all required documents to the following address before February 25, 2019.

Ms. Jessica Zhuang

Address: ASIA-PACIFIC SPACE COOPERATION ORGNIZATION (APSCO) Building 13&14, Section 3, No.188, South Street Fourth Ring, Fengtai District, Beijing, China, Post Code: 100070

Tel: +86-(0)10-6370 2677 Ex. 405 Fax: +86-(0)10-6370 2286

Note: *In order to speed up your application process, scanned copies can be emailed to the Contact Person: Jessica@apsco.int so that we can get your information in advance. And* ***mail all the required documents to the Contact Person at APSCO*** *by the already set deadline* ***(February 25, 2019)****. APSCO and Beihang University will acknowledge the receipt of your application after evaluation. No application documents will be returned after submission.*

Contact Information

- Ms. Jessica Zhuang
- **Address**: ASIA-PACIFIC SPACE COOPERATION ORGNIZATION (APSCO)
- Building 13&14, Section 3, No.188, South Street Fourth Ring, Fengtai District, Beijing, China, Post Code: 100070
- **Telephone**: +86-(0)10-6370 2677 Ex. 405
- **E-mail**: Jessica@apsco.int
- **Website of APSCO**: http://www.apsco.int
- **Website of International School, Beihang University**: http//is.buaa.edu.cn
- **Website of Beihang University**: http://ev.buaa.edu.cn/
- **Website of China Scholarship Council**: http://studyinchina.csc.edu.cn

In 2019, MASTA Program provides three educational fields: Satellite Communications and Global Navigation Satellite Systems (SC&GNSS), Remote Sensing and Geo-information System (RS&GIS), Micro-satellite Technology. The followings are detailed information of each field.

***Note: In 2020, MASTA Program will provide three educational fields: Satellite Communications and Global Navigation Satellite Systems (SC&GNSS), Remote Sensing and Geo-information System (RS&GIS), Micro-satellite Technology. One more direction: Space Science and Meteorology, Space Law and Policy are planned to be involved.**

Satellite Communications and Global Navigation Satellite Systems (SC&GNSS)

Satellite Communications are space microwave communications between radio stations on Earth (including land, water and the lower atmosphere), using Artificial Earth satellite as relay stations to transmit radio waves. Global Navigation Satellite System (GNSS) provides positioning, navigation and timing services for the whole world. Communications and navigation satellites are the most important national spatial information infrastructure in the social life and military affairs in modern times. They would serve people in many areas together with Remote Sensing, Geographical Information System such as global personal communications, disaster management, emergency response, land, aviation and maritime transportation, etc.

The objective of the program is to enable the students to master the principles, technologies and systems of satellite communications, as well as the special problems and technologies of Internet services and broadband integrated services in satellite communication systems. In addition, the GNSS principles, receiver design, data processing and application cases are introduced. The program also provides opportunities for students to touch the frontier technologies on Satellite Communications and GNSS.

Professionals/Experts (partial)

Yang Yuanxi

Academician, Chinese Academy of Sciences

Renato Filjar

Professor, University of Jica, Croatia

Shen Jun

Chief Scientist, Beijing UniStrong Science & Technology Co., Ltd.

Yang Dongkai

Professor, School of Electronics and Information Engineering, Beihang University

Jing Guifei

Professor, Beidou Belt&Road School, Beihang University

Partners

The partners of this program include:

National Remote Sensing Center of China

9-month Course List

No.	Item	Class Hrs	Credits	Remark
Module Ⅰ Platform Courses				
PC1-1	Probability and Statistics in Engineering	48	3	Select at least 3 compulsory credits
PC1-2	Theory of Matrix	48	3	
PC1-3	Numerical Analysis	48	3	
PC2-1	Matlab Programming	32	2	Compulsory/ Optional
PC3-1	Space Environment, Orbit and Spacecraft Systems	48	3	Compulsory
PC3-2	Introduction to Space Technology Applications	18	1	Compulsory
PC3-3	International Cooperation in the Peaceful Uses of Outer Space	16	1	Compulsory/ Optional
PC3-4	Introduction on Space Life Science and Astrobiology	18	1	Compulsory/ Optional
PC4-1	Introduction to China and Chinese Language	54	3	Compulsory
Module Ⅱ Major Basic Courses & Major Courses				
MC3-1	Principles of Communications	32	2	Select at least 2 compulsory credits
MC3-2	Principles of GNSS	32	2	
MC3-3	Wireless communications	32	2	Compulsory
MC3-4	Telemetry and Telecommand	16	1	Compulsory
MC3-5	Satellite Communications and Satellite Networks	32	2	Select at least

No.	Item	Class Hrs	Credits	Remark
MC3-6	Satellite Laser Communications	32	2	4 compulsory credits
MC3-7	GNSS Receiver Principles and Design	32	2	
MC3-8	GNSS/INS Integration Navigation	32	2	
MC3-9	Satcom/GNSS Applications	16	1	Compulsory
MC3-10	Satcom/GNSS Experiments	16	1	Compulsory
MC3-11	Satcom/GNSS New Technologies	16	1	Compulsory
Module Ⅲ Team Pilot Projects				
PPC	Team Pilot Project	12 Weeks	8	Compulsory

Remote Sensing and Geo-information System (RS&GIS)

Remote sensing is the art and science of making measurements of the earth using sensors on airplanes or satellites. These sensors collect data in the form of images and provide specialized capabilities for manipulating, analyzing, and visualizing those images. A geographic information system (GIS) is a computer-based tool for mapping and analyzing feature events on earth. Remote sensed imagery is integrated within a GIS. The potential of remote sensing (RS) techniques, coupled with geographical information systems (GIS), are widely recognized as supporting tools for the planning, monitoring, and management of the appropriate utilization of resources at the country, regional and global levels.

MASTA Students specializing in Remote sensing & Geo-Information System will get training in both the underlying theory and the application of remote sensing, spatial analytical methods, digital cartography, and geographic information systems. Students will be provided with many professional visits to learn how remote sensing and GIS technologies are currently applied in various fields such as natural resource management, environmental monitoring, disaster assessments, and other related fields. Some leading national and international geoinformatics practitioners will be invited to lead training or seminars to highlight industrial, commercial and governmental applications.

Professionals/Experts (partial)

He Linshu

Professor, Beihang University

Liu Qinhuo

Professor, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences

Liu Yalan

Professor, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences

Tan Yumin

Associate Professor, Beihang University

Xu Liping

General Manger, Beijing Space View Technology Co.,Ltd.

Partners

The partners of this program include:

ChinaRS Geoinformatics Co., Ltd.

Beijing Aerospace TITAN Technology Co., Ltd.

Twenty First Century Aerospace Technology Co., Ltd.

National Satellite Meteorological Center

Institute of Remote Sensing and Digital Earth

National Astronomical Observatories Chinese Academy of Sciences

National Time Service Center

International Alliance of Satellite Application Service

National Remote Sensing Center of China

9-month Course List

No.	Item	Class Hrs	Credits	Remark
Module Ⅰ Platform Courses				
PC1-1	Probability and Statistics in Engineering	48	3	Select at least 3 compulsory credits
PC1-2	Theory of Matrix	48	3	
PC1-3	Numerical Analysis	48	3	
PC2-1	Matlab Programming	32	2	Compulsory/ Optional
PC3-1	Space Environment, Orbit and Spacecraft Systems	48	3	Compulsory
PC3-2	Introduction to Space Technology Applications	18	1	Compulsory
PC3-3	International Cooperation in the Peaceful Uses of Outer Space	16	1	Compulsory/ Optional
PC3-4	Introduction on Space Life Science and Astrobiology	18	1	Compulsory/ Optional

No.	Item	Class Hrs	Credits	Remark
PC4-1	Introduction to China and Chinese Language	54	3	Compulsory
Module Ⅱ Major Basic Courses & Major Courses				
MC1-1	Principle of Remote Sensing	48	3	Compulsory
MC1-2	Physical Principles of Microwave Remote Sensing	26	1	Compulsory
MC1-3	Geographic Information System: Principle, Design and Practice	32	2	Compulsory
MC1-4	Remote Sensing Image Processing and Software Application	48	1	Compulsory
MC1-5	Geographic Information System: Design and Practice	32	3	Compulsory
MC1-6	Natural Disaster Remote Sensing	18	1	Compulsory
MC1-7	Case Studies in the Applications of RS & GIS	18	1	Compulsory
Module Ⅲ Team Pilot Projects				
PPC	Team Pilot Project	12 Weeks	8	Compulsory

Micro-satellite Technology

During the past decades, the micro-satellites have been applied widely to perform space experiments, demonstrate new technology and operational missions. Micro-satellite has become one of the key fields in the future space exploration. Because of their simple functions, small sizes, light weight as well as low cost, micro-satellite technology is extremely suitable to be developed in universities. On the other hand, although small or micro-satellites seem function and system sample, such kinds of satellites still consist of subsystems that almost cover all the technology in design and manufacture for normal satellites, therefore it is an efficient way for students to study and develop space technology through special micro-satellite projects. Many universities in the world are now endeavoring in various micro-satellites, Surrey University in British and Delft University of Technology are examples.

In order to enhance student innovation and engineering abilities in spacecraft design, a student micro-Satellite (BUAA-SAT) program is sponsored by Beihang University. The Micro-satellite Technology program of the Centre is the one branch of BUAA-SAT as the English-taught program for international students. After years of work, BUAA-SAT has completed its preliminary design phase. All subsystems have been prototyped and demonstrated. Now the flight model and qualified tests of space environments are conducted. Meanwhile a training platform for microsatellite has been formed at Beihang University, which contains document materials for design, simulation as well as devices and facilities for test.

Professionals/Experts (partial)

Gustavo Alonso Rodrigo

Professor, Technical University of Madrid

Leonardo M. Reyneri

Professor, Politecnico di Torino

Zhang Xiaomin

Vice President, DFH Satellite Co., Ltd.

Huang Hai

Professor, School of Astronautics, Beihang University

Niu Jianwei

Professor, School of Computer Science, Beihang University

Chu Zhongyi

Professor, School of Instrument Science and Opto-Electronics, Beihang University

Partners

The partners of this program include:

9-month Course List

No.	Item	Class Hrs	Credits	Remark
Module Ⅰ Platform Courses				
PC1-1	Probability and Statistics in Engineering	48	3	Select at least 3 credits of them
PC1-2	Theory of Matrix	48	3	
PC1-3	Numerical Analysis	48	3	
PC2-1	Matlab Programming	32	2	Compulsory/ Optional
PC3-1	Space Environment, Orbit and Spacecraft Systems	48	3	Compulsory
PC3-2	Introduction to Space Technology Applications	18	1	Compulsory
PC3-3	International Cooperation in the Peaceful Uses of Outer Space	16	1	Compulsory/ Optional
PC3-4	Introduction on Space Life Science and Astrobiology	18	1	Compulsory/ Optional
PC4-1	Introduction to China and Chinese Language	54	3	Compulsory
Module Ⅱ Major Basic Courses & Major Courses				
MC4-1	Orbital Mechanics	48	3	Compulsory
MC4-2	Spacecraft Structure and Mechanism Design	32	2	Compulsory
MC4-3	Practics of MSC Patran/Nastran	16	1	Compulsory
MC4-4	Satellite OBDH System Design and Test	32	2	Compulsory
MC4-5	Thermal Control Technology of Spacecraft	32	2	Compulsory
Module Ⅲ Team Pilot Projects				
PPC	Team Pilot Project	12 Weeks	8	Compulsory