MASTA 2018

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. In total 153 MASTA students have been involved in this program until 2017.

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 a internationalized atmosphere;

The main education and training 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 (BUAA) was founded in 1952 with the merger of the aeronautical departments from eight top Chinese universities. Today it is one of the nation's foremost research universities supported by China's Project 211, Project 985 and Project 2011.

Beihang has an enrollment of more than 29,951 students, attending 28 schools in two campuses in Beijing and many going on exchange in partner universities across Europe, Asia, the Americas and Oceania. Among the first Chinese universities to offer postgraduate programs in English for international students, Beihang annually attracts over 1,700 foreign students from 90 countries.

The faculty totals over 2,300 members whose research and teaching encompasses sciences, engineering, economics, management, humanities, law, philosophy, education, medicine and art. A strong body of 20 accomplished professors has been inducted as members of the Chinese Academy of Sciences and the Chinese Academy of Engineering.

Beihang offers 189 academic programs, including 61 undergraduate programs and 128 postgraduate programs. The University has been reputed for its competitive edge in such disciplines as aeronautics and astronautics, instrument science and technology, computer science and technology, management science and engineering, etc.

As a powerhouse of research and innovation, Beihang has earned 1,264 awards for achievements at national or ministerial level, including three First Prizes of National Science & Technology Progress Awards and six First Prizes of National Technological Innovation Awards. Beihang also has strong links with the industrial sector, which contributes to more than 50 percent of the University's research projects.

The center of Beihang is its Xueyuan Road campus in the heart of "China's Silicon Valley" – Zhongguancun Science Park. The Park is one of the technology centres in the world and is growing fast into a high and new-tech industrial cluster. In addition to its Xueyuan Road Campus, the University is also located in northwest Beijing's Changping District with a newly developed campus and has comprehensive research facilities, notably the National Laboratory of Aeronautics and Astronautics (NLAA).

Beihang has also grown to be a university of global outreach, with a recently inaugurated Europe Office in Brussels and visibility in several global consortia, including Top Industrial Managers for Europe (T.I.M.E). The University maintains partnerships with 185 universities, research institutions and companies in over 30 countries. The cooperation covers faculty and student exchanges, joint workshops and publications, joint research endeavors and international

educational projects. The Sino-French Engineer School (or, Ecole Centrale de Pekin), established by Beihang and the Groupe des Ecoles Centrales in 2005, has won international recognition for its excellence in international engineering education. Beihang is also the host institution of the U.N. Regional Centre for Space Science and Technology Education in Asia and the Pacific (China) established in November 2014.

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 welcome 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 standard by 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 15th March, 2018.

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 (****March 15, 2018)****. APSCO and Beihang University will acknowledge the receipt of your application after evaluation. No application documents will be returned after submission.*

Important Dates

- Applicants should mail the required applications documents **to the Contact Person at APSCO** by **March 1, 2018.**
- The results of admission will be notified by stages **from May 20 to early August, 2018**.
- The Admission Notice and related documents will be mailed to the successful applicants before **August 15, 2018.**
- The program will start in **early September 2018.**

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 2018, MASTA Program provides four educational fields: Global Navigation Satellite Systems (GNSS), Remote Sensing and Geo-information System (RS & GIS), Micro-satellite Technology, and Space Law & Policy. The followings are detailed information of each field.

Global Navigation Satellite Systems (GNSS)

Global Navigation Satellite System (GNSS) provides positioning, navigation and timing services for the whole world. It is the most important spatial infrastructure in the social life and military affairs in modern times. The GNSS would serve people in many areas together with Remote Sensing, Geographical Information System such as disaster management, emergency response, land, aviation and maritime transportation, etc.

The objective of the program is to enable the students to master the GNSS space segment including the satellite constellation, orbit, payload, clock, signal structure and attitude control, the GNSS ground segment including the satellite communication, maintenance, telemetry, ephemeris and almanac, and the GNSS user segment including receiver and navigation applications. The program also provides opportunities for students to touch the frontier technologies on 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:

Beijing UniStrong Co., Ltd.

Beijing BDStar Navigation Co., Ltd.

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	GNSS Reference System	18	1	Compulsory
MC3-2	Principle of GNSS	32	2	Compulsory
MC3-3	GNSS Receiver Principles and Design	32	2	Compulsory
MC3-4	GNSS/INS Integration Navigation	32	2	Compulsory
MC3-5	GNSS Applications	18	1	Compulsory
MC3-6	Satellite Navigation Data Processing	32	2	Compulsory
MC3-7	GNSS Experiment	18	1	Compulsory
MC3-8	GNSS New Technologies	18	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.

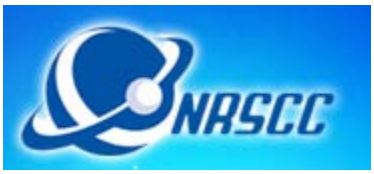
National Satellite Meteorological Center

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

No.	Item	Class Hrs	Credits	Remark
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				
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 of 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 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

Space Law & Policy

Space law plays a critical role in law governing space-related activities. Space law addresses a variety of issues, including the preservation of the space and Earth environment, liability for damages caused by space objects, the settlement of disputes, the rescue of astronauts, the information sharing of potential dangers in outer space, the use of space-related technologies, and international cooperation, a number of fundamental principles, including the notion of space as the province of all humankind, the freedom of exploration and the use of outer space by all countries without discrimination, and the principle of non-appropriation of outer space, and a series of legal systems, including liability system, registration system, etc. In order to build up sound regulation of national space activities, some countries have promulgated domestic space laws, which is also their first step to participate the international space affairs. In order to build up sound regulation of national space activities, some countries have promulgated domestic space laws, which is also their first step to participate the international space affairs. Capacity-building, training and education in the field of space law help to promote international development and cooperation in space activities, and provide methodologies for a deeper understanding of the interdependent roles of science, technology and law in this area.

Currently, the Centre is the first one to set up space law degree program and short training programs among all 6 Regional Centres. In September, 2015, the Centre organized the 1st International Training on Space Law and Policy, and received high praise from participants. With the success of the short training program, the Centre opened a new education field ”Space Law and Policy” in MASTA Program since 2016, with an enrollment of 10 students from 7 countries, so as to promote the educational and training activities of space law at the regional and global level.

Professionals/Experts (partial)

Sergio Camacho

Former Director of UNOOSA

Joanne Gabrynowicz

Professor Emerita, University of Mississippi, USA

Zhao Yun

Professor, Hongkong University

Li Bin

Associate Professor, University of Newcastle, Australia

Li Juqian

Professor, China University of Political Science and Law

Xia Chunli

Associate Professor, Beihang University

Partners

The partners of this program include:

9-month Course List

No.	Item	Class Hrs	Credits	Remark
Module Ⅰ Platform Courses				
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
PC3-4	Introduction on Space Life Science and Astrobiology	18	1	Compulsory/ Optional
PC3-5	International law	18	1	Compulsory
PC4-1	Introduction to China and Chinese Language	54	3	Compulsory
Module Ⅱ Major Basic Courses & Major Courses				
MC2-1	Basic concepts of international law and space law	32	2	Compulsory
MC2-2	Organization and supervision of national space activities	16	1	Compulsory
MC2-3	National Space Legislation and policy	32	2	Compulsory
MC2-4	Legal Issues related to RS&GIS	16	1	Compulsory
MC2-5	Legal Issues related to Satellite Communication	16	1	Compulsory
MC2-6	Legal Issues related to space environment protection	16	1	Compulsory
MC2-7	Space commercialization and the development of Space Law	16	1	Compulsory
AL2-1	Space governance and Peaceful Use of Outer Space	4	1	Compulsory
AL2-2	Long-term sustainability for outer space activities	4		
AL2-3	Hot Topics on Space Law I	4		
AL2-4	Hot Topics on Space Law II	4		
Module Ⅲ Team Pilot Projects				
PP	Legal practice	4 Weeks	8	