



MINISTÉRIO DA CIÊNCIA E TECNOLOGIA  
INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS



## **ASTROPHYSICS POSTGRADUATE STUDY AT THE NATIONAL INSTITUTE FOR SPACE RESEARCH (INPE) IN BRAZIL**

### **CALL FOR APPLICATIONS FOR MASTERS AND DOCTORAL STUDY IN 2012**

The Astrophysics Postgraduate Course – organized by the National Institute for Space Research (INPE) - is a Master's and Doctoral Programme with emphasis in the development of astronomical instrumentation. Lectures and research programs are conducted at INPE, which is located in the city of São José dos Campos, São Paulo.

Africa is bidding to host the world's largest and most sophisticated radio telescope, the Square Kilometre Array (SKA) Telescope. To support this bid, South Africa is providing an extensive human capital development programme. We are proud to announce that INPE, Commission for Development of Higher Education Studies (CAPES) and South African SKA Project Office (SASPO) will provide the funding for the Astrophysics Postgraduate Course.

The main objectives of the Master's and Doctorate Programme are to increase the number of researches in experimental astrophysics in the country and to promote access to world-class equipment and facilities.

Successful candidates will begin the program in January 2012, with lectures during the first year (three 12-week periods from March to December). The courses are designed for full-time two-year Master's or four-year Doctoral Programmes. The official language of the course is Portuguese.

### **Target Group**

The programme addresses candidates who aim at acquiring a Master's or Doctoral degree in the area of Astrophysics. Preference will be given to Portuguese-speaking candidates from any African country that possesses a BSc, preferably in the areas of Radio Astronomy, Physics, Mathematics,

ComputerScience or Engineering, for entry into the Master's programme and a Master's degree for entry into the Doctoral programme.

## Curriculum

The Astrophysics Programme is an interdisciplinary area, and covers the following main areas of study:

- High-energy astrophysics
- Galactic Astrophysics (the Sun and the Solar system, the Milky Way, stellar evolution, the interstellar medium).
- Extra-solar planets.
- Extragalactic Astrophysics (galaxies, galaxy evolution, galaxy clusters, intra-cluster medium, star formation).
- Active Galactic Nuclei (including accretion theory, relativistic jets, modelling)
- Cosmology (including observational cosmology, galaxy surveys, gravitational lensing, very early universe).
- Optical and infrared astrophysics (photometric, polarimetric, spectroscopic observations near-infrared and visible region of electromagnetic spectrum).
- Physics of the Interplanetary Environment – (understanding solar phenomena (eruptions, “Coronal Mass Ejections” and filaments eruptions).
- Astro-particle Physics.
- Gravitational waves.
- Observational astrophysics from the ground and from space.
- Computational astrophysics (N-body simulations, magneto-hydrodynamic simulations)
- In addition, depending on their chosen area, students will learn to design and construct astronomical instrumentation in the areas of radio astronomy, high-energy astrophysics, gravitational waves studies and optical and infrared astronomy.

### **The facility will offer the following resources (Computers and Workstations):**

- Standard software packages used by the international astronomical community for the reduction and analysis of data;
- Library with technical books and scientific magazines with about 78.000 titles;
- Access to the Portal of Scientific Journals through CAPES Portal : <http://www.periodicos.capes.gov.br/portugues/index.jsp>;
- Laboratories of microwave/radio, optical, X-rays and gravitational waves;
- Students' resources (PROAP);
- All materials, including stationery, required for the course will be provided.

### **Discipline Categories**

The disciplines are offered in three 12-week periods (P1, P2 and P3), according to the academic calendar of the INPE.

#### **First Period (P1)**

AST-200-3 I Stellar Evolution (P1) - mandatory course for Master's programme

AST-204-4 Radioactive ProcessI (P1) - mandatory course for Master's programme

AST-203-4 Technical Observations in Astrophysics (P1) - mandatory course for Master's programme

#### **Second Period (P2)**

AST-202-3 Stellar Evolution II (P2) - mandatory course for Master's programme

#### **Elective courses**

AST-402-4 Introduction to the General Relativity (P2)

AST-308-4 Extragalactic Astrophysics (P2)

Third Period (3<sup>o</sup> Period and beyond)

### Elective courses

AST-300-3 Astrophysics of Gravitational Waves (P3)AST-301-4 Plasma Astrophysics (P3)AST-302-4 Experimental Radio AstronomyAST-403-3 Topics of Cosmology (P3)AST-305-3 Current Problems in Astrophysics (P3)AST-306-3 Radioactive Processes II (P2) AST-307-4 Mechanics Quantum I (P2,P3)AST-404-4 High Energy Astrophysics (P3)AST-405-4 Infrared Astrophysics (P3)AST-406-3 Radiophysics of the Sun (P2)AST-409-3 Physical of the Interstellar Medium (P3)AST-410-4 Interferometry and Aperture Synthesis (P3)AST-411-3 Time Series in AstrophysicsAST-413-4 Fundamentals of CosmologyAST-414-3 Stellar Populations (P3)AST-412-3 Cataclysmic Variables (P3)

### ACADEMIC CALENDAR – 2011

Period Of Adaptation	
Registration for Accommodation	January 24
Beginning of the Course of Adaptation	January 24
Last day for proposal of disciplines for the 1st period	February 04
Final Exams	February 07 - 11
Deadline for lecturers to deliver the final grades to the Graduate Programme Office	19 February
1 <sup>o</sup> Period	
Registration days	March 01 - 02
Beginning of classes March 14	
Last day for cancellation of courses and period	April 08
Last day for submitting courses for the 2nd period	April 29
Last day for applying to Doctorate programme starting in the 2nd period	April 29
Final Exams	May 30 to June 03

Deadline for lecturers to deliver the final grades to the Graduate Programme Office	June 10
<b>2° Period</b>	
Registration days	June 01 - 02
Beginning of classes June 13	
Last day for cancellation of courses and period	July 08
Last day for submitting courses for the 3rd period	July 29
Last day for applying to Doctorate programme starting in the 2nd period	July 29
Final exams	August 29 to September 02
Deadline for lecturers to deliver the final grades to the Graduate Programme Office	September 09
<b>3° Period</b>	
Registration days	September 01 - 02
Beginning of the classes September 19	
Last day for cancellation of courses and period	October 14
Last day for applying to Graduate Studies Programme starting in 2012	October 30
Final Exams	December 06 -10
Deadline for lecturers to deliver the final grades to the Graduate Programme Office	December 16
Final Thesis and dissertation Presentations, Qualifying exams and Thesis/Dissertation validation evaluations	December 23

### Grant Details

The grant funding for the programme is provided jointly by CAPES and the NRF, DST and SASPO. The grant is offered for full-time two-year Master's Programme or three-year doctoral degree studies.

**The INPE will offer:**

- A monthly stipend of approximately R5 400/R8 100 per person per month for 24/48 month MSc/PhD;
- Programme tuition fees – none are applicable at INPE;
- All expenses to conferences and observatories (e.g. travel, accommodations, meals and registration);
- Monitoring the student's progress, advice on any problem that might arise, invitation to various activities such as scholarship holder meetings, workshops, conferences, etc.

**Additional support**

A good graduate student's network exists that will help new students in finding accommodation. The successful candidates may contact the student's representative for help in advance of his/her arrival.

**The NRF will cover:**

- Health Insurance cost;
- Visa and repatriation fee (if applicable)
- Flights to and from Brazil once a year; and

Successful candidates will have to take an admission exam at the Brazilian Embassy in the country of residence.

Students renewing the scholarship are expected to complete an annual progress report. Their application for renewal has to be supported by the supervisor.

Scholarship holders are not allowed to change to any other funding sources during the tenure of the award. Scholarship holders may apply to other funding programmes on completion of their studies (e.g., completion of Master's degree and wanting to apply for doctoral funding).

## **Eligibility Criteria**

The criteria used during the selection process are: academic skills, experience, motivation and language proficiency.

Admission to the Astrophysics Postgraduate Course is open to students of all nationalities who fulfill these minimum requirements:

Hold a BSc Honours degree in Physics, Astronomy, Astrophysics, Mathematics, Engineering or expect to obtain it latest by September 2011 of the starting year of the Masters Course (i.e. by September 2010 for the course starting in March 2012);

Hold a Master's degree in Physics, Astronomy, Astrophysics, or Mathematics or expect to obtain it latest by September 2011 of the starting year of the Doctoral Course (i.e. by September 2011 for the course starting in March 2012);

If not a native speaker, present a language proficiency certificate in Portuguese.

## **Application Documentation**

Together with the complete Application Form, applicants should upload the following documents in English;

- A Scanned copy of valid ID/ Passport;
- Recommendation by supervisor of the previous degree;
- Official and certified university transcripts and degree certificates;
- Two (2) recommendation letters;
- An abstract of the masters dissertation to be submitted if applying to the doctorate programme;
- A description of relevant extracurricular activities that are related to Astronomy/Astrophysics and skills acquired (e.g. computer/programming skills) in the biographic section of the application form.

## **Application Procedure**

1. Applications must be submitted through an NRF online application process.
2. Applicants can apply by accessing the link: <http://phoenweb.nrf.ac.za/FPF2>
3. Register/ Login using your email address and password.
  - Select create new application from the list of existing calls.
  - Select the call for which you are applying to: ASTROPHYSICS POSTGRADUATE STUDY AT THE NATIONAL INSTITUTE FOR SPACE RESEARCH (INPE) IN BRAZIL
  - Select Apply now.
4. Complete all screens and sub-screens online for application summary, project information, research outputs, etc.
5. Check for completeness by clicking the “*submit form*” tab
6. Click on the “submit application” tab.
7. Online applications will be submitted no later than the by 15 Noveber 2011.
8. A list of successful candidates will be posted on the NRF website under the student link.

### **Selection Criteria**

The selection of the candidates will be done by a panel of experts by assessing the documentation presented;

The shortlisted candidates may be required to write two tests and be interviewed in order to qualify for the Master's and the Doctoral Programme.

For more details consult the announcement: <http://www.capes.gov.br/cooperacao-internacional/multinacional/pec-pg>

### **Post Award**

Successful candidates will be notified by the NRF.

The conditions of grant and all other related documents related have to be completed and sent back to the NRF. An Annual Progress Report (APR) that focuses on the research progress have to be submitted to the NRF for the scholarship to be renewed.

**For grant related and technical queries contact:**

Ms Yolanda Davids

Grant Director: Scholarship and Fellowships

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