



**CSSTEAP SHORT COURSE  
ON  
"SPACE WEATHER"**

**Organized By**

**Conducted By**



**Centre for Space Science and Technology Education in  
Asia and the Pacific (CSSTEAP)  
(Affiliated to the United Nations)  
IIRS Campus, 4, Kalidas Road, Dehradun, India  
[www.cssteap.org](http://www.cssteap.org)**

**Physical Research Laboratory (PRL)  
(A Unit of Dept. of Space, Govt. of India)  
Navrangpura, Ahmedabad, India  
[www.prl.res.in](http://www.prl.res.in)**

**Duration: December 1 – 15, 2022  
Venue: Physical Research Laboratory**





## Introduction

Space weather is a branch of Physics and Aeronomy. It includes time-varying conditions on the Sun (e.g., solar flares, filament eruptions and coronal mass ejections) due to which massive energy and mass flow through the interplanetary medium and affect the entire Solar System. This effect is more profound on the inner planets and can cause large-scale changes in the space surrounding the planet. In the case of Earth, spatio-temporal variations occur in the magnetosphere, ionosphere and thermosphere due to the adverse effects of space weather. Today there are space vehicles and space missions stationed and/or passing through both low-earth orbits and interplanetary space. Some of these may be manned. The solar wind and radiation not only affect human health in space but also can cause disruption of electronics on space-based and ground-based communications systems. Global Positioning System signals are affected by the plasma irregularities in the ionosphere generated due to space weather thereby degrading service during such events. Thus, space weather plays a very important role in life on Earth and affects almost all aspects of modern society. A clear understanding of space weather has become a necessity for modern civilization. With this view in mind, the Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP) announces organizing a short course on "Space Weather" to be held at Physical Research Laboratory, Ahmedabad for the participants from the Asia-Pacific region.

## Objective of the course

The proposed short course on "Space Weather" will describe the solar sources of space weather disturbances (i.e., solar flares, coronal mass ejections, solar energetic particles), and their effect on Near-Earth environment with possible disruptions to satellites, communication systems, and human life, etc.

This course will benefit professionals who have been working in areas of atmospheric science, space physics, satellite systems, satellite communication and navigation, high-flying airliners, pipeline transportation of petroleum products, and national power grids. These are a few of the high-tech systems affected by space weather phenomena.

## Course Contents

The following topics will be covered in 25 one-hour lectures:

1. Overview of Space Weather (2 hours)
2. Solar sources of space weather: Structure of the Sun, processes on the Sun and its atmosphere, sunspots, solar activity, the origin of energetic events, solar flares, coronal mass ejections, short and long timescale change in solar outputs. (9 hours)
3. Propagation of the electromagnetic and charged particles through the heliosphere (2 hours)
4. The response of Earth's magnetosphere, ionosphere and thermosphere to Space Weather: Interaction with solar radiation and particles, and consequences on civilization. (9 hours)
5. Solar influence on middle atmospheric processes (1 hour)
6. Effect of Space Weather on electronic and communications systems (2 hours)

## Projects

In addition to the theory sessions, the course would be having projects in the form of practical sessions on the following topics:

1. Measurement of the speed of coronal mass ejection
2. Measurements of sunspots; number, area and rotation
3. Measurement of the geomagnetic field
4. Radio sounding of the ionosphere
5. Measurements of TEC and scintillation using GPS
6. Study of optical signatures of space weather events

## Course Implementation

There would be a session on the modelling of space weather events. This will also cover various data archives of space weather and related topics. During the course, the participants will visit Udaipur Solar Observatory (USO), Optical Aeronomy Laboratory at Mt Abu, and various labs of PRL. The students will use some of the high-end instruments and their data for practical work. The course will be conducted in an interactive mode in which the participants will play an active role in seminars, group discussions and assignments. The course is intended to be useful for teachers, science administrators, and policymakers.

## Eligibility

The prospective participants should possess a Master's degree in Physics/Astronomy/Astro-Physics/Solar Physics or other equivalent qualification relevant to Space and Atmospheric Sciences, OR Bachelor's degree in Engineering, (B.E./ B. Tech.) in Electronics and allied fields / Environmental Science/Engineering. Candidates having teaching or research experience would be preferred. Candidates possessing higher qualifications viz. a Ph. D. would also be eligible for admission.

**Course Duration:** December 1-15, 2022

## Language

The medium of instruction is English. Proficiency in written and spoken English is essential. Candidates who are not proficient in English are advised not to apply. Applicants who have done their higher studies in a medium (language) other than English are required to submit a TOEFL score or a diploma/certificate of English Language issued by an accredited language institution or by the local UNDP for satisfactory proof of the applicant's competence in spoken and written English language. Preference will be given to those who secure a high score in the TOEFL examination. Nominating agencies are requested to ensure this.

## Expected benefits to the participants

After attending the course, the participants will gain a broad overview of the effect of solar radiation on the interplanetary medium and Near-Earth environment. They will get an awareness of how adverse space weather conditions affect radio communication and satellite systems and possible methods of prediction of such space weather conditions. The participants will also be involved with hands-on experiments to get an appreciation for the ways and means of studying space weather. The knowledge gained from this course will help the participants to address space weather issues in their home countries.

## Fellowships to the participants

Preference in selection will be given to those candidates whose expenses are borne by the candidate or his/her organization/nominating agency. A few fellowships covering to and fro international air travel, domestic air travel in India and living expenses (Rs. 8,000 for two weeks) in India are available from the Government of India (GOI). However, preferences will be given to fully sponsored/self-sponsored candidates bearing international to and fro travel.

## Health Insurance

Medical, life and disability insurance should be undertaken before reaching India, by the participants themselves or on their behalf, by their sponsoring institute/organization. No medical expenses will be borne by CSSTEAP. However, participants who receive the Fellowship of the GOI will be paid medical expenses for minor ailments on an actual basis (as outpatients only) as and when such expenses are incurred. CSSTEAP will have only limited liabilities as far as medical expenses are concerned. Candidates in sound physical and mental health only need to apply.

## Application Procedure

The application form is attached at the end of this document. It can also be downloaded from [www.cssteap.org](http://www.cssteap.org) or [www.prl.res.in](http://www.prl.res.in). The duly filled and signed application form should be endorsed by the applicant's organization or recommending agency and sent to us at the contact details given below. For applicants from outside India, the duly filled, signed and endorsed application form should be forwarded to us through the Governing Board member of the applicant's country (contact details are given in the link [www.cssteap.org/governing-board](http://www.cssteap.org/governing-board)), or through the Indian Embassy/High Commission in the applicant's country, or the Embassy/High Commission of the applicant's country in India. For faster processing, an advance copy can be sent to us directly either by email (preferable) or by post.

## Important Dates

**Announcement of course : August 1, 2022**

**Last date for receipt of application : October 1, 2022.**

## About CSSTEAP and PRL

The CSSTEAP was established in India in November 1995 with its headquarters in Dehradun and is considered the Centre of Excellence by UNOOSA. The 1st campus of the Centre was established in Dehradun, India and is hosted by the Indian Institute of Remote Sensing (IIRS), a constituent unit of Indian Space Research Organisation (ISRO). The CSSTEAP has been imparting training and educational programmes related to RS & GIS, Satellite Communication, Satellite Meteorology, Space Science, Global Navigation Satellite Systems, and Small Satellite Mission, helping participants in developing research skills through its Master's Degree, Post Graduate and Certificate programmes.

Known as the cradle of Space Sciences in India, the Physical Research Laboratory (PRL) was founded in 1947 by Dr. Vikram Sarabhai. As a unit of the Department of Space, Government of India, PRL carries out fundamental research in selected areas of Physics, Space & Atmospheric Sciences, Astronomy & Astrophysics, Solar Physics, Planetary and Geosciences.

## Contact Detail

**For any course-related query, the applicants may contact**

**Dr. Jay Banerji**

**Course Director**

**Physical Research Laboratory**

**Navrangpura, Ahmedabad 380 009, India**

**Email: [uncsc@prl.res.in](mailto:uncsc@prl.res.in)**

**Ph: +91-8141026595**



**Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP)**  
(Affiliated to the United Nations)

**APPLICATION FORM FOR SHORT COURSE ON SPACE WEATHER**

**Duration: December 1-15, 2022**  
**Venue: Physical Research Laboratory, Ahmedabad, India**  
**Last date for receipt of application: October 1, 2022**

**AFFIX  
PASSPORT SIZE  
PHOTOGRAPH  
HERE**

(For office use only)

Application No.....

Date Received.....

**Important:**

All the correspondence from CSSTEAP (issue of admission letter, e-tickets for travel, enquiries, etc.) with the applicants will be by E-mail and sometimes by phone (Home/ Office). Therefore, kindly ensure that email-id, phone, fax, etc., are correctly and clearly mentioned.

(PLEASE TYPE OR USE **BLOCK CAPITALS**)

**1. Name (As mentioned in the passport):**

Dr./Mr./Ms./-----

First

Middle

Last

**2. Father's Name:** -----

**3. Name of mother/husband/wife:** -----

**4. Date of Birth (DD/MM/YYYY):** -----

**5. Place of Birth:** -----

**6. Gender (Male/Female):** -----

**7. Nationality:** -----

**8. Contact Information:**

Present official Address (Valid until date-----)

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Contact number (Please give complete Phone no. with country and city codes)

Office (Tel): -----

Office (Fax): -----

Mobile: -----

E-mail: -----

**Important**

1. Interested persons may detach last 4 pages from this brochure and use them as Application Form.
2. It is essential that full passport details are mentioned in the Application Form. Application Forms without passport details may not be considered.
3. Providing alternate email-id, and the phone number would ensure timely communication with applicants, especially during urgency/emergency.
4. For faster communication with the applicants, CSSTEAP Secretariat will be using your email-id for all purposes (e.g. Admission letter, air tickets and logistic arrangements).

**9. Your permanent home address (in your country):** -----  
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➤ Contact number (Please give complete phone no. with country, city codes)

Home (Tel): ----- Home (Fax): -----

Email (alternate preferably Gmail or Yahoo): -----

**10. Nearest International airport (Specify the place/city):** -----

**11. Academic Qualifications (mandatory):**

Degrees (Bachelor /Master) /Diploma	Duration of Course(mention from which year to year)	University/ Institution	Year of passing	Grade/ percentage	Major Subjects/ specialization

\*(Enclose copies of Degree/Diploma/Certificates/marks/grades obtained etc. and their certified transcription in English)

➤ Major Subjects in the Last Examination:----- ➤ Area of Specialization:-----

➤ Medium of instruction/language: ----- ➤ TOEFL Score (Proficiency in English): -----

Proficiency in English (please tick the option)

Reading: Fair/Good/Very Good

Writing: Fair/Good/Very Good

Spoken: Fair/Good/Very Good

Enclose certified copies of marks/grades of degree, diploma, TOEFL (validity period), etc. certificates and their certified translations in English).

**12. Details of Experience and Employment:**

➤ Present Position/ Designation: ----- ➤ Present Responsibilities: -----

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➤ Organization and complete Address: -----

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➤ Date of Joining this Organization (dd/mm/yyyy): -----

\* If necessary, attach additional sheets giving details of your technical activity during last one year.

➤ Research or working Experience:

Name of Organization (s)	Position(s)/ Post (s) held	Nature of work done	Duration

13. (a) Activities & Projects in which your present organization is engaged (mandatory) and nature of work done or will be done:

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13. (b) Main technical/scientific facilities available in your organization \*(including approximate number and type of computers, type of software available etc.):

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14. Have you done any other course from CSSTEAP (If yes, please give details including theme and year):

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15. How this Course will help you in your work/organization? Please describe below.

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16. Details of Passport: Please provide valid passport details below and if not holding a valid passport, please forward a copy of the passport whenever available.

Passport Number	Place of Issue (City and Country)	Date of issue	Passport valid up to	Issuing Authority	Whether previously visited India if so place and date of the last visit

17. Physical Fitness:

(a) Have you ever been infected by Covid-19 virus? If yes, when? \_\_\_\_\_

(b) Are you vaccinated against Covid-19 virus? \_\_\_\_\_

(c) Are you suffering from any recurring/chronic/serious communicable disease which may affect your study program in India?  
\_\_\_\_\_

(d) If yes, please specify nature of the illness (Candidates are advised to attach medical fitness certificate from a government hospital or government recognized hospital on hospital letterhead)

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18. How do you propose to meet international travel & stay expenses in India? (Preference will be given to those who will make their own travel arrangement)

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19. Declaration by the candidate:

I have read the Announcement brochure and will abide by the rules and regulations of the Centre. I have made/am making/have not made travel arrangements for attending the Course, and for local expenses for the period of stay in India.

Date:

Place:

Signature of the candidate

## 20. Sponsoring/ Nominating Agency Certificate:

Dr./Mr./Ms. \_\_\_\_\_ is sponsored/nominated by \_\_\_\_\_ to attend the Short Course on Space Weather, to be held at Physical Research Laboratory, Ahmedabad, India during December 1-15, 2022. We envisage utilizing his/her experience in specific tasks of our organization/agency.

- (a) He/She will be / will not be provided international travel support.  Mandatory:  
(b) He/She will be/will not be provided financial assistance for the period of stay in India.  Please tick the  
(c) He/She possesses adequate knowledge of English Language required by the course  appropriate  
option.

Date: \_\_\_\_\_

Signature:

Place: \_\_\_\_\_

Name in Capital Letters:

Designation:

Phone /Fax No:

E-mail:

(Official seal of the sponsoring/nominating authority including CSSTEAP GB member)

Note: Application without the official seal of sponsoring or nominating authority and their details will not be considered.

## (21) (*Not applicable to Indian citizens*) Forwarding note either by the respective Indian Embassy/High Commission in your country or your Embassy/High Commission in India:

This is to forward the application of Dr./Mr./Ms. \_\_\_\_\_ of \_\_\_\_\_ (specify the country name here) for the Short Course on Space Weather, to be held at Physical Research Laboratory, Ahmedabad, India during December 1-15, 2022.

Date: \_\_\_\_\_

Signature:

Place: \_\_\_\_\_

Name:

Designation:

Phone/Fax No:

E-mail:

(Official Seal of the Embassy/High Commission of India)

**N.B. Please send an advance copy of the application form duly signed by the sponsoring/nominating agency to Prof. J. Banerji, Course Director, Space and Atmospheric Science, Room # 762, Physical Research Laboratory, Navrangpura, Ahmedabad 380 009, India by post, or fax (+91-79-2631-4900) or via email ([jaybanerji1@gmail.com](mailto:jaybanerji1@gmail.com)) for quick processing. Original copy to be sent through Indian Embassy/High Commission of your country after being duly signed by the sponsoring/nominating authority.**

### IMPORTANT

- The Application which is not complete in all respects is likely to be rejected.
- Candidates must attach copies of certificates of:
  - ✓ Medical fitness to attend the course including Chest X-ray (PA), Blood Test (including Random Blood Sugar, HIV, HBs, Ag), Urine complete (in case any medical information requiring attention is hidden and if found during the course, the centre will be compelled to send the candidate back home.
  - ✓ Highest degree obtained (Degree certificate and marks sheet/grade card)
  - ✓ Proof of Proficiency in English or certificate by the nominating agency needs to be provided.
  - ✓ All Degree Certificates, if not in English, may please be translated in English and attested by the Head of the organization or transcript in English can also be submitted.
- Expectant mothers are advised to take a judicious decision before applying for the course.
- Smoking and consuming alcoholic drinks in classroom and office campus is prohibited.
- Submission of Covid-19 negative report by country's authorized medical agency is a must at the beginning of the course.
- The participants are required to strictly follow all necessary Covid-19 guidelines recommended by the Government of India.