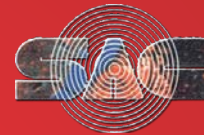


Centre for Space Science and Technology
Education in Asia and the Pacific

ANNOUNCES

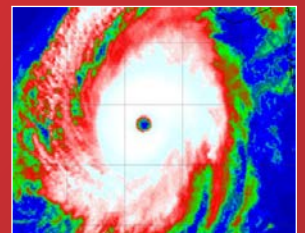
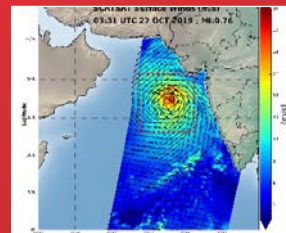
TWELFTH POST GRADUATE COURSE IN SATELLITE METEOROLOGY AND GLOBAL CLIMATE

Conducted at



Space Applications Centre (SAC)
Indian Space Research Organisation (ISRO)
Ahmedabad, India
www.sac.gov.in

ACADEMIC YEAR 2020 - 2021



Centre for Space Science and Technology Education
in Asia and the Pacific (CSSTEAP)
(Affiliated to the United Nations)
www.cssteap.org



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INTRODUCTION

The benefits of space technology, both direct and indirect, have introduced new dimensions into the study and understanding of Earth's processes and in improving the quality of life of the people living on it. United Nations has emphasised that all countries should have access to space technology and major space firing nations should share the benefits of space technology to other countries. An essential pre-requisite to partaking in these opportunities is the building of various indigenous capacities for the development and utilisation of space science and

technology. In recognition of such a pre-requisite, a consensus has emerged within the international community; that if effective assimilation and appropriate application of space technology are to succeed in the developing countries, devoted efforts must be made for capacity building at the local level, for the development of necessary high-level knowledge and expertise in space technology areas. Towards this end, the United Nations General Assembly had called for the establishment of Regional Centres of Space Science and Technology Education in the developing countries.

Under the auspices of the United Nations, through its Office for Outer Space Affairs (UN-OOSA), some regional Centers are established on the basis of regions, that correspond to the United Nations Economic Commissions: Asia and the Pacific (India, China), Latin America and the Caribbean (Brazil & Mexico), Africa (Morocco and Nigeria) and Western Asia (Jordan). All these Centres are affiliated to the United Nations through UN-OOSA. These Centres use existing facilities and expertise available in education and other research institutions in their respective regions.

ABOUT REGIONAL CENTRE FOR ASIA AND THE PACIFIC REGIONS IN INDIA

The Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP), affiliated to UN, was established in India in November, 1995. The Centre's head quarter is established in Dehradun, India around the infrastructure available at the Indian Institution of Remote Sensing (IIRS), Dehradun, Indian Space Research Organisation (ISRO), Government of India. For fulfilling its programmes, the Centre has arrangements with ISRO which has its campuses at Space Applications Centre, Ahmedabad playing as host institution for programmes related to Satellite Communications and Satellite Meteorology and Global Climate and at Physical Research Laboratory in Ahmedabad for Space and Atmospheric Sciences and at Indian Institute of Remote Sensing (IIRS), Dehradun for Remote Sensing and GIS.





GOALS OF THE CENTRE

The Centre is an education and research institution, capable of high attainments in the development and transmission of knowledge in the fields of space science and technology. The Centre offers best possible education, research and application experience to its participants in all its programmes. The principal goal of the Centre is development of skills and knowledge of university educators, researchers and application scientists, through rigorous theory, research, applications, field exercises and pilot-projects in those aspects of space science

and technology that can enhance social and economic development in each country. The programmes aim at development of indigenous capability of participating countries, in designing and implementing space-based research and applications programmes. The Centre will also foster continuing education programmes for its graduates and awareness programmes for policy and decision-makers and the general public.

It should be emphasised that the overall mission of the centres is to assist participating countries in developing and enhancing the knowledge and skills of their citizens in relevant aspects of space science and technology in order that such individuals can effectively contribute to national development programmes.

AFFILIATION TO THE UNITED NATIONS

The Centre has entered into a cooperative agreement with the United Nations which states that the United Nations will cooperate with the Centre by providing expert advice, educational curricula, technical support, necessary documentation and other appropriate support.

EDUCATIONAL PROGRAMME AND COURSES

The educational programme of the Centre is oriented towards the dissemination of knowledge in relevant aspects of space science and technology. The emphasis of the Centre is to deliberate on education and research of natural resources management along with linkages to the global programmes/databases, pilot studies, continuing education and awareness and appraisal programmes. The curriculum has been developed under the auspices of the UN Office for Outer Space Affairs (UN-OOSA) and the guidelines emerged from the meetings held for Education Curriculum Development for the Centre at Granada, Spain in February/March 1995. These curricula are reviewed periodically by an International Advisory Committee. The activities of the Centre are guided by a Governing Board and Board of Studies.



ACADEMIC ACTIVITIES

The academic activity is divided into two phases. Phase-I is of 9 months duration and executed at the Centre in India. After successful completion of the Phase-I, the participants are encouraged to take up Phase-II research project of one year duration in their home country. Phase-II allows participants to take up research project relevant to their home country or organisation and apply the technologies.

If desired by the candidate, the candidate can submit one year research project (i.e. Phase-II) to Andhra University, Visakhapatnam, India for Master of Technology Degree (M. Tech. Degree). The eligibility criteria of the university will apply. Some time centre offers one year fellowships to meritorious students which include to and fro one time travel and subsistence allowance, book allowances, etc. The participant needs to come to India to carry out research. The centre encourages participants to work on the subject pertinent to their country.



(I) Post Graduate Programme: The Centre offers Post Graduate level courses in different fields. P.G. Courses of nine months duration are organised in the following disciplines:

- ❖ Remote Sensing and Geographic Information System (RS and GIS) (at IIRS, Dehradun)
- ❖ Satellite Communications (SATCOM) (at SAC, Ahmedabad)
- ❖ Global Navigation Satellite System (GNSS) (at SAC, Ahmedabad)
- ❖ Satellite Meteorology and Global Climate (SATMET) (at SAC, Ahmedabad)
- ❖ Space and Atmospheric Sciences (SAS) (at PRL, Ahmedabad)



Core Modules (Semester I and II) emphasis on the development and enrichment of the basic knowledge and skills of the participants in the technology. This is followed by pilot study, which provides an opportunity to fine-tune the skills for executing theme-based study.

(ii) Master's Programme: This programme gives an opportunity and continuity in developing higher research skills for those who have completed successfully the nine months P.G. Course. The enrolment to this programme is subject to qualifying for admission requirements of Andhra University, India. In this programme, the candidate has to take up a research project and has to be executed in their respective countries with a view to transfer the technology in their respective organisation. It will also be a test of the methodology and knowledge assimilated during phase-I at the centre.

(iii) Short Courses: Besides P.G. level courses; the centre also conducts short term courses of two to four

weeks duration in specific themes of above subjects regularly. For further details you may please visit our website (www.cssteap.org)

COURSE RECOGNITION BY ANDHRA UNIVERSITY

CSSTEAP has arrangement with Andhra University (Estd. 1926) Vishakhapatnam, India for awarding M. Tech. Degree, subject to the eligibility criteria of the Andhra University. After successfully completing the CSSTEAP 9 months P.G. Diploma course candidate should complete one year research project work successfully for award of Master of Technology Degree (M.Tech. Degree). The terms and conditions of this arrangement are subject to review from time-to-time.



PROGRAMMES CONDUCTED

The Centre has so far conducted 23 Post Graduate Courses in Remote Sensing & Geographic Information System (RS & GIS), 11 each in satellite Communications (SATCOM), Satellite Meteorology & Global Climate (SATMET), Space & Atmospheric Science (SAS) and 02 in Global Navigation Satellite Systems. The Centre has also conducted various short courses and workshops in past 24 years. These programmes have benefitted more than 2300 participants from 36 countries from Asia-pacific region and 19 countries from outside Asia-Pacific

region. 24th RS&GIS PG Course at IIRS Dehradun, 12th Satellite Communications (SATCOM) and 3rd Global Navigation Satellite Systems PG Course at SAC, Ahmedabad are in progress.

ANNOUNCEMENT OF 12th POST GRADUATE COURSE IN SATELLITE METEOROLOGY AND GLOBAL CLIMATE

Duration : 9 Months: August 01, 2020 – April 30, 2021

Venue : Space Applications Centre
Indian Space Research Organisation (ISRO)
Department of Space, Govt. of India,
Opp. Delhi Public School,
Bopal Campus (Tech)., Bopal,
Ahmedabad - 380058,
Gujarat, India

No. of Participants : 20 (Twenty)

Last date for receipt of applications : March 02, 2020



WHO CAN APPLY?

The course is designed for the professionals and specialists working at the meteorological centers, educational institutes and involved in active research in weather forecasting & climate. It is strongly expected that the participating scholars will be able to:

- Serve as catalysts for furthering the skills and knowledge of other professionals in their countries.
- Contribute to policy making, planning, development and management of Satellite Meteorology and its applications in their countries.
- Enhance the self-reliance of their countries so as to reduce the dependence on external experts.

HOW TO APPLY?

Applications are invited from candidates in countries of Asia and the Pacific Region for the 12th post graduate course in Satellite Meteorology and Global Climate. All the candidates need to be nominated/sponsored (i.e. endorsed) by recognised institutions (e.g. ministries or universities in their respective countries). Nominating/sponsoring institutions/authority should ensure that on return, the scholar will be given opportunity to work in a development oriented activity in the area of newly acquired knowledge and skills. It is expected that the sponsoring authority allow them to execute one year research project work in their respective country. However, the Centre will provide long distance internet based scientific guidance.

All the participants from member countries are required to submit the duly filled application form forwarded through the CSSTEAP Governing Board member of respective country to the Indian Embassy/High Commission of that country. (For list of the members please see inside of the front cover page and centres website www.cssteap.org for contact details). However, the applicants from non-Governing Board Member countries need to submit completed application forms to the Centre through the Indian Embassy/High Commission in the respective country. **The application should be completed in all respects and accompanied by attested and/or certified copies of all the certificates (starting from School leaving, Bachelor's and Master's, TOEFL, English Proficiency etc.). Wherever these certificates are issued in a language other than English, the same should be translated in English and certified by the Head of the Organisation or provide English transcription of all such documents.** Completed application forms should be forwarded through the Indian Embassy/High Commission present in the respective country to:

Course Director, CSSTEAP SATMET - 12

Atmospheric and Oceanic Sciences Group (AOSG),

Space Applications Centre (ISRO),

Department of Space, Govt. of India, Opp. Delhi Public School, Bopal Campus (Tech). Bopal, Ahmedabad - 380 058. Gujarat, India.

Phone : +91 79 2691 6108 / 6068

Fax : +91 79 2691 6078

Email : cssteapsatmet@sac.isro.gov.in

Website : www.cssteap.org



However, advance copies of the application form signed by Head of the nominating/sponsoring agency, may be sent by email for taking necessary advance action Preference in selection will be given to those candidates whose expenses are fully or partially borne by themselves or sponsoring agency.

To download application form or to know more about CSSTEAP, its past and future programmes, list of participants and countries who have been benefited from these courses and the Pilot Projects carried out through these programmes, please visit us at www.cssteap.org

ELIGIBILITY FOR ADMISSION

Master's degree or equivalent in Physics, Meteorology, Mathematics, Applied Mathematics, Oceanography, Geophysics or allied subjects with at least 5 years of experience in teaching/research or professional experience in the field or Meteorology and/or related disciplines. (For candidates with higher qualifications, the minimum experience may be relaxed). Graduate level knowledge in Physics and Mathematics is essential besides the Master's degree requirements.



Important and Mandatory

The selected applicants will be required to bring original documents for verification at the time of reporting in India.

SELECTION PROCEDURE

The Centre will select the candidates through a well laid procedure, which includes satisfying academic eligibility, proficiency in English language, funding/forwarding by nominating/sponsoring authority/organisation, country representation etc. Only selected candidates will be intimated by April

30, 2020 and list of selected candidates will also appear at Centre's web-site (www.cssteap.org). Preference in selection will be given to those candidates whose expenses are borne by the candidate and/or sponsoring agency. Once a candidate has been selected and informed about their selection, the nominating/sponsoring authority/organisation or candidate need to confirm their participation or withdrawal of their candidature within 15 days of receipt of email for selection. If the sponsoring authority wishes to call back its candidate after joining the Centre or in the middle of the course or the candidate wants to leave the course and go back to his/her country, the travel cost needs to be borne by either sponsoring authority or by the candidate.

ABOUT HOST INSTITUTE

Space Applications Centre (SAC), one of the major centres of the Indian Space Research Organisation (ISRO), is responsible for most of the satellite data applications programmes of ISRO. It extensively interfaces with the actual users of satellite systems. SAC is active in research and development in the fields of Satellite Meteorology & Oceanography, Remote Sensing and Satellite Communications.

SAC ISRO has been conducting different satellite data applications programmes related to Meteorology and Oceanography. Starting with INSAT-1 series satellites and the indigenously developed INSAT-2A, 2B, 2E, 3A,

3D and 3DR geostationary satellites had operational Very High Resolution Radiometers (VHRR), which are designed and developed at SAC. These sensors are providing satellite images and different geophysical parameters (i.e. winds, rain, sea surface temperature, temperature, humidity profile etc.), for cyclone tracking and other weather events. Currently INSAT-3D and INSAT-3DR with additional sounding capability are in operational use and satellite data from these sensors are being received at SAC. Microwave radiometers for atmospheric and oceanic observations were flown on Bhaskara I and II satellites more than 20 years ago.

IRS-P4 (Oceansat-1) launched in 1999 had a Multi-channel Scanning Microwave Radiometer (MSMR) besides an Ocean Color Monitor (OCM). Megha Tropiques, a joint collaborative project with CNES, France, launched in October 2011 carries microwave radiometer, sounder and radiation budget instruments. ISRO has also launched Saral Altika, Oceansat – II and SCATSAT-1 for sea surface winds, ocean color and ocean





circulation studies. These instruments provide inputs to the meteorological and oceanographic observations particularly over the Indian and the Pacific Ocean regions for studying rainfall, El Niño and related phenomena, besides many regional problems like tropical cyclone/hurricane, summer, winter monsoons, etc.

Data from the Indian INSAT and IRS satellites and from non-Indian meteorological / oceanographic satellites like NOAA, ERS, SSM/I, TRMM, TERRA, AQUA, CALIPSO, CLOUDSAT, GPM etc. are being utilised by the scientists at SAC. Information on Sea Surface

Temperature (SST), winds, temperature-humidity profiles etc. is being retrieved. The centre is also running various research programme using these data for atmospheric and oceanographic applications related in monsoons, tropical cyclones, salinity, sea mounts, bathymetry, ocean circulation and other important weather phenomena of the region. Various numerical models viz. atmospheric and oceanic general circulation models, meso-scale models in various time scales are being used for assimilating these satellite data for carrying out impact and prediction experiments. Climate research using numerical models and satellite data is one of the thrust areas.

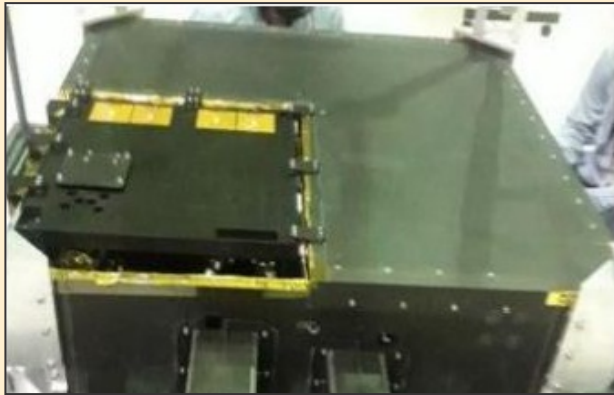
For land based remote sensing, SAC has designed and developed payloads for operational Indian Remote Sensing (IRS) satellites starting from 1st operational satellite IRS 1A (1988), Resourcesat-2 / 2A, CARTOSAT-2E, a follow on mission for the Resourcesat-1, payloads LISS-4, AWIFS A & B and LISS-3 cameras were developed & qualified at SAC and are configured to provide continuity of data with enhanced performance. These include Linear Imaging Scanning Sensors (multi-spectral and higher resolution panchromatic cameras) and Wide Field sensors. Various applications programme related to earth resources (land and marine) data for studies related to agriculture, forestry, geology, water resources of various types, fisheries, offshore oil exploration, environment, soils/land covers, urban/rural/district level planning, coastal zone management, terrain mapping, etc. have been designed and implemented by SAC.

SAC has also established and operationalised a Meteorological and Oceanographic Data Archival Centre (MOSDAC) at its Bopal Campus with a view to disseminating quality data products from ISRO satellite missions on near real time basis and to promote synergy of different sources of satellite data into practical and usable data sets for R&D in atmospheric and oceanic studies.

In the field of satellite communications, payloads for APPLE, INSAT-2 & INSAT-3 transponders etc., have been designed and developed at SAC. Payload development activity at SAC started with the India's first experimental communication satellite APPLE. Since then, SAC is involved in the conceptualisation, design & development of advanced communication



systems. Many transponders are added to the INSAT fleet. GSAT-14, Navigation payloads IRNSS Series were developed and launched. GSAT-14 communications satellite has the domestic communications



capacity at Extended C and Ku-Bands. It carries two Ka Band beacons for propagation studies. IRNSS series will provide time and position signals across the Indian subcontinent and ocean region, enabling these services on a completely indigenous footing. Assembly, Integration and delivery of payloads for GSAT-17, GSAT-19 have been delivered. New technologies like ETM Rubidium Atomic clock, Optical terminal for 1 GPS Link, Establishment of SAC-Bopal Free Space Optical link and System engineering for advanced communication payloads were developed. Bopal Earth Station (BES) facility at Bopal SAC Campus caters to EUMETCAST and VHRR data reception from INSAT series of Satellites. Ahmedabad Earth Station (AES) is mainly involved in SATCOM based operations and experiments including special events at SAC main campus and Bopal campus through BES. It supports space-net based video conferencing facility, VHRR data reception, SATCOM course under CSSTEAP. In ground segment, SAC has been engaged in the design, development, installation and commissioning of a number of earth stations for different SATCOM experiments and applications. Presently SAC is engaged in a number of projects involving design and

development of VSAT, S-band Digital Audio Broadcasting Receiver, S-band Mobile Satellite System-reporting terminal, Satellite-based interactive Direct Reception TV System for development, education, training etc. A number of indigenous technologies developed by SAC for INSAT ground systems like Radio Networking Terminal, Disaster Warning System (DWS), Meteorological Data Collection Platform, Meteorological Data and News Dissemination System, etc. are manufactured and marketed by Indian industries. Data Reception and Processing System for INSAT and NOAA, processor for Local User Terminal of INSAT Search and Rescue System, Satellite News Gathering Terminals, etc., developed by SAC are fully operational.

ISRO is embarked on the space exploration with Chandrayaan-1, Mars Orbiter Mission (MOM) and recently conducted Chandrayaan-2 missions. SAC has significantly contributed in realising payloads of both Chandrayaan-1 and Chandrayaan-2 and analysing the data from different payloads of chandrayaan-1/2 missions. SAC has played key role in developing the payloads for MOM.

Sensors for future generation of Remote Sensing satellites, including the high resolution SAR,



Scatterometer and transponders for future generation of INSAT-4 series of communication satellite are also being developed at SAC. The campus of SAC is situated in the western outskirts of the city of Ahmedabad, (latitude 22.8 deg. N and longitude 72.5 deg E) in Gujarat State of Western India. A new SAC campus was established in the western suburb of Ahmedabad and houses the training facilities and the residential complex for the participants of CSSTEAP. A new Bopal Campus is developed for payload integration and checkout.

FACULTY

The faculty for the course constitutes of scientists in different fields, drawn from Space Applications Centre, India Meteorological Department, other Centres of Indian Space Research Organisation (ISRO) and various other agencies / universities from India. These experts have long and varied experience in the retrieval, analysis of various satellite data and their applications. An active modeling group involved in experimenting with various weather and climate models also exists at the Centre. The core faculty has a strong scientific background with a number of publications, experience of participating in



international scientific programmes, organising a number of courses etc. to their credit. A few visiting international experts are also invited to deliver lectures on advance and specialised topics. In the past, experts from Bureau of Meteorology (Australian Government), European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), Japan Meteorological Agency (JMA), National Oceanic and Atmospheric Administration (NOAA), different United States Universities and Malaysian Meteorological Department (MMD) etc. have delivered lectures.

MEDIUM OF INSTRUCTION

The medium of the instruction/teaching is English. **Proficiency in written and spoken English is essential. Candidates who are not proficient in English should not apply.** Applicants who have done their higher studies in a medium (language) other than English, are required to submit TOEFL score or a diploma/certificate of English language issued by an accredited language institution or by the local UNDP for satisfactory establishment of the applicant's competence in spoken and written English language. Preference will be given to those who secure high score in TOEFL examination. Supporting document regarding the accreditation of the institute should be enclosed along with application.



TEACHING METHODS AND FACILITIES



Modern facilities exist at the Centre for class-room teaching and practical instructions/demonstrations. Printed as well as digital course materials of the lectures are supplied. Earth stations located in Bopal and SAC campus receive and process INSAT, Megha Tropiques, Saral-Atlika, Oceansat-II, Scatsat satellite data. There is a strong computer support with work-stations, a large number of PCs, standard peripherals, etc. and all are interconnected through network. The computing facility is updated for climate model simulation. Facilities also include state-of-the-art

general circulation models (GCM), mesoscale models (WRF), ocean circulation model, ocean wave model, image processing, graphic and visualisation softwares, 4-D GIS etc. The centre has access to global data from different satellites through EUMETCAST. A Meteorological satellite data archival center exists at SAC. One of the major strengths of the institute is its library with latest subject literature, text books, e-books, online-journals, etc.

PERFORMANCE EVALUATION

The performance of the participants is assessed through written, interactive-sessions and/or computer-assisted practical exercises. Independent assessments of theory exams are conducted by external and internal faculty. The participants need to pass each examination paper. Participants, who fail to qualify in the examinations in the nine months course, may be considered for award of only a "Certificate of Attendance" by the Centre.



AWARD OF DIPLOMA / DEGREE

On successful completion of the Phase-I i.e. nine-months course, the participants will be awarded Post Graduate Diploma. Certificate of Attendance will be given to the candidates who fail to qualify. If the participant is able to complete Phase-II i.e. one year of research project work at home country satisfactorily within four years thereafter the work can be submitted to the Andhra University (India) for award of M. Tech. Degree.



COURSE EXPENSES

The overall expenses of the course are given below. This does not include international travel (to and from the city of the course participant to course venue):

- ❖ Course Fee : US \$ 6000 per participant
- ❖ Local tours : US \$ 750 per participant (Approx.)
- ❖ Living expenses : US \$ 2000 per participant (Approx.)

The participants are expected to find suitable sponsorships or funding for meeting the expenses while attending the course in India. Preference will be given to such candidates.

FINANCIAL ASSISTANCE

To encourage the participants from the Asia-Pacific region, selected participants will be waived-off the course fee and local tours. Furthermore, financial assistance will be provided to a few of the selected candidates as below

- ❖ Living expenses in India : INR 16,000 per month for the duration of 9 months.
- ❖ Book allowance : INR 2,000 (one time)
- ❖ Project allowance : INR 1,500 (one time)
- ❖ Local tours : INR 50,000 (as per actuals)

The Centre receives some financial assistance for international travel for a limited number of participants of the Asia-Pacific region through agencies like UN Office for Outer Space Affairs (UN-OOSA) and UN Economic and Social Commission for Asia and the Pacific (UN-ESCAP).

HEALTH AND LIFE INSURANCE

Medical, life and disability insurance should be undertaken before reaching India, by the participants themselves or on their behalf by their sponsoring institute/organisation for covering entire health and disability risks. No medical expenses will be borne by the Centre. However, participants who receive the fellowship of the GOI will be paid medical expenses for minor ailments on actual basis (as out patients only) as and when such expenses are incurred. The centre will have only limited liabilities as far as medical expenses are concerned in such cases. **Candidates must clearly specify if they are suffering from any health disorders which may affect their study programmes. Candidates in sound physical and mental health only should apply.** Participants, who are not covered by appropriate medical insurance while in India, would be required to take a medical insurance policy in India by themselves.



Candidates must clearly specify if they are suffering from any health disorders which may affect their study programmes. Candidates in sound physical and mental health only should apply. Participants, who are not covered by appropriate medical insurance while in India, would be required to take a medical insurance policy in India by themselves.

In case if any medical information requiring attention is hidden and found during the course, the centre will be compelled to send the candidate back home and all expenses towards the same will be borne by the candidate/sponsoring organisation.

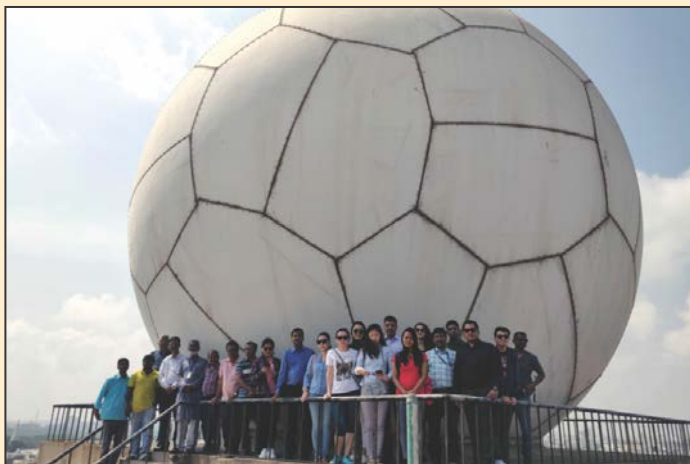
ACCOMMODATION

Accommodation for the participants will be arranged in Hostel. Kitchenette facility will be made available to all the participants. A sum of Rs. 1500/- per month has to be paid by each participant towards accommodation charges. Boarding and other expenses such as cooking gas are to be borne by the participants. No other person will be allowed to stay along with the candidate in the hostel during the entire tenure of the course. Staying in hostel is compulsory for all the participants and staying outside is strictly not allowed.



EDUCATIONAL TOURS

As part of the course, the participants will have the opportunity to visit different centres of ISRO/Dept. of Space, Govt. of India and other organisations concerned with satellite meteorology related research.



SATMET COURSE AT A GLANCE

The Satellite Meteorology and Global Climate Course is of nine months duration have two semesters spread in three modules. The first module covers basic concepts in Satellite Meteorology and Remote Sensing, besides image interpretation aspects. The second module will focus on parameter retrieval and specific application areas using mainly digital information. Problems specific to the region and modeling aspects will also be covered here. In the third module, each scholar will formulate and execute a Pilot Project under the guidance of the faculty. These three modules are described below:

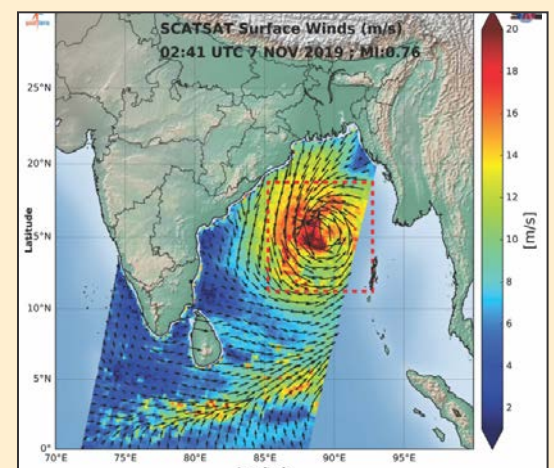
Module-1: Fundamentals of Meteorology, Climatology and Remote Sensing (Three Months)

Theory

- **Concepts in Meteorology and Climatology:**
 - ✓ Basic concepts of Meteorology, Climatology and Oceanography
 - ✓ Mathematical and Computational Techniques for Satellite Meteorology
- **Concepts in Satellite Meteorology:**
 - ✓ Principles of Meteorological Remote Sensing
 - ✓ Overview of Meteorological Satellites / Orbits
- **Image Processing & Interpretation and GIS:**
 - ✓ Image Processing Techniques and Geographic Information System (GIS)
 - ✓ Image Interpretation in Meteorology and Weather Forecasting

Possible laboratory exercises

- ❖ Computer Orientation
- ❖ INSAT-VHRR cloud characteristics, feature extractions and applications
- ❖ NOAA-AVHRR Data Processing – feature extractions and applications
- ❖ Estimation of Rainfall using INSAT-VHRR data
- ❖ Meteorological data processing
- ❖ Atmospheric Motion Vector retrieval and applications
- ❖ Image Processing for Meteorological applications
- ❖ Visualisation and analysis of meteorological data, demo of applications of satellite data in tropical cyclone



Module - 2 : Advance Concepts and Techniques in Satellite Meteorology and Global Climate (Three Months)

Theory

- **Geophysical Parameter Retrieval**
 - ✓ Radiative transfer Theory, Atmospheric Parameters
 - ✓ Land and Oceanic Parameters



➤ **Applications of Satellite Derived Parameters**

- ✓ Applications in Meteorology and Weather Forecasting
- ✓ Satellite Data Assimilation in Numerical Models

➤ **Global Climate and Environment**

- ✓ Short Term Climate Variability
- ✓ Long Term Climate Change
- ✓ Environment Issues and Societal Impacts

Possible laboratory exercises

- ❖ Temperature and Moisture profiles from NOAA-ATOVS/AIRS/INSAT-3D/IASI and validation
- ❖ Geophysical Parameter Retrievals from MW Radiometer data / Megha Tropiques (MT)
- ❖ Humidity Profiles from AMSU-B/SAPHIR-MT
- ❖ Fog Monitoring, Climate simulation Demo
- ❖ SST from MODIS/NOAA-AVHRR/INSAT-3D data and study of Ocean Thermal features
- ❖ Assimilation of Satellite Data in Numerical Weather Prediction (NWP) Models
- ❖ Agromet Applications
- ❖ Cloud radiative forcing (CRF) using Satellite data [SCRab/ERBS/CIRRUS]

Module – 3: Pilot Projects (Three Months)

The topics of the projects are of relevance to participant's region involving extensive use of satellite data and applications.

PHASE II: ONE YEAR PROJECT

Each participant after completing Phase-I of the course, will have to carry out an approved project in his/her home country for a period of one year. This is to be formulated jointly by the scholar and his/her advisor at the Centre during Module 3 of Phase I in an area relevant to the interest of the sponsoring institution/country. The sponsoring institution/country is obliged to guarantee on the return the scholar would remain in a suitable position with commensurate and progressive remuneration and other entitlements for a minimum period of 3 years and will be provided all facilities to carry out the work. This course programme will be considered complete on acceptance/approval of the submitted project report.

ABOUT ANDHRA UNIVERSITY

Andhra University was established in 1926. It is a premier institute of higher learning and it became a trendsetter in higher education and university administration. It is accredited with 'A' Grade by National Assessment and Accreditation Council of India and is the first composite university in India to get ISO 9001 – 2008 certificate. Andhra University is a multi-disciplinary university and has 6 constituent colleges within the university campus.

The University is strong in all faculties and was headed by the greatest personalities like Dr. C.R. Reddy, and Dr. Sarvepalli Radhakrishnan and others as Vice-Chancellors.

Andhra University is considered to be one among the 14 best Universities in India in terms of Research by the Department of Science and Technology, Govt. of India. Andhra University also offers Ph.D. programmes in a various specialisation of contemporary interests by all the Departments.



ABOUT AHMEDABAD CITY

Ahmedabad is an important business centre in western India. A large number of textile mills and other industries are located in and around Ahmedabad. Well-known educational and research institutions like Indian Institute of Management, Physical Research Laboratory, Ahmedabad Textile Industries Research Association, National Institute of Design, Space Applications Centre, Institute of Plasma Research etc. are located here in addition to many Universities including Gujarat University and Gujarat Vidyapeeth. The famous Sabarmati Ashram from where Mahatma Gandhi organised the non-violent movement during India's freedom struggle, is also situated here.



Ahmedabad also experiences the three main seasons, like most of the cities in India. In summers, which last during the months of March and June, the weather is very hot and dry. The average temperature ranges between the 23°C to 43°C. The highest recorded temperature is 47°C. During the winter months, i.e. from November to February, the climate is quite pleasant. During this time, the temperature ranges from 15°C to 35°C and the city experiences extremely dry climatic conditions. One can feel a slight chill during the month of January, mainly because of the cold northerly winds flowing in the region. The lowest temperature ever recorded in Ahmedabad is 5°C. Not to forget, the monsoon sweeps the city during mid-June and mid-September. The south west monsoon is responsible for the humid weather at this time. The annual average rainfall in the city is 93.2 cm.

Ahmedabad is well connected to all important cities of India by air, rail and road. International airports of Delhi and Mumbai are about an hour's flight time from Ahmedabad. A few international flights also land and originate at Ahmedabad.

The nine-day dance festival of Garba (during October-November) followed 20 days later by the light and sound festival of Deepawali, the kite festival of Makarsankranti (on January 14) and the colour festival of Holi (during March) are occasions to enjoy in Ahmedabad.









**CENTRE FOR SPACE SCIENCE AND TECHNOLOGY EDUCATION
IN ASIA AND THE PACIFIC**
(AFFILIATED TO THE UNITED NATIONS)

**APPLICATION FORM FOR TWELFTH POST GRADUATE COURSE IN
“SATELLITE METEOROLOGY AND GLOBAL CLIMATE”**

August 01, 2020 to April 30, 2021

at

Space Applications Centre, Ahmedabad, India
Last date for receipt of application: March 02, 2020

SATMET-12

(for office use only)

Application No.:

Date Received :

(Please type or use **CAPITAL LETTERS**)

Affix Recent
Passport size
Photograph

Important:

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

1. Name (Dr/Mr/Mrs/Miss):
(As mentioned in the Passport)

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 what date):
.....
.....

Contact number: (Please give complete Phone No. with country, city codes)

Home : Office :

Mobile :

Fax : E-mail :

Important:

- a) Interested persons may detach last 4 pages from this brochure and use them as Application form.
- b) It is essential that full passport details are mentioned in the Application Form or provided to the Centre at the earliest.
- c) Application Forms without passport details may not be considered.
- d) Providing alternate email-id would ensure timely communication with applicants.
- e) Please note, 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 arrangement)

9. Permanent home Address (in your country):

.....

Contact number: (Please give complete Phone No. with country, city codes)

Telephone:.....

Fax:

E-Mail (alternate, preferably G-mail or Yahoo):.....

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

11. ACADEMIC QUALIFICATIONS:

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

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

Major subjects in last examination:

Area of Specialization:

Medium of Instruction/Language:..... TOEFL Score:

Proficiency in English – tick (✓) in appropriate item below:

Reading : Fair Good Very Good Excellent

Writing : Fair Good Very Good Excellent

Spoken : Fair Good Very Good Excellent

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

12. DETAILS OF EXPERIENCE:

(a) Present Position:

Present Responsibilities *:.....

Organisation and Complete Address.....

.....

Date of joining this Organisation (dd/mm/yyyy):

* Attach additional sheets giving details of your technical activity during last one year (2018-2019)

(b) Experience during past 15 years:

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

13. (a) Activities & Projects in which your present organisation is engaged (mandatory) and nature of your duties *

.....

(b) Main Scientific/Technical facilities available in your organization *
 (Including approximate number and type of computers, type of software available etc.)

.....

*If required attach separate sheet.

14. Have you done any other course from CSSTEAP (If 'yes'; please give details including the month & year)

.....

15. How do you foresee, the proposed PG Diploma Course in SATMET will help you

.....

16. **DETAILS OF PASSPORT** : Please provide valid passport details below and if not holding a valid passport, please forward 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 last visit

17. **PHYSICAL FITNESS:**

- a) Are you suffering from any recurring/chronic/serious communicable disease which may affect your study program in India?
- b) If yes, please specify nature of illness (Candidates are advised to attach medical fitness certificate from a government hospital or government recognized hospital on hospital letter head)

18. How do you propose to meet the international travel & stay expenses in India? (preference will be given to those who will make their own travel or both travel and stay arrangement himself/herself)

.....

19. **DECLARATION BY THE CANDIDATE:**

I have read the announcement brochure and will abide by the rules and regulations of the Centre and maintain discipline harmony and will not indulge in unlawful activities in campus hostel or during educational and field visits. I have made/ am making/ have not made travel arrangements for attending the course and local expenses for the period of stay in India.

Date:

Place:

Signature of the candidate

Cut Here

20. SPONSORING / NOMINATING / ENDORSING AGENCY CERTIFICATE:

Dr/Mr./ Ms.....is sponsored/ endorsed by..... to attend the **Twelfth Post Graduate Course in “Satellite Meteorology and Global Climate”** to be held at Space Applications Centre, Ahmedabad, India during August 01, 2020 – April 30, 2021. We envisage to utilise his/her experience in specific tasks of our organisation / agency. The candidate will be allowed to report back to the organisation and carryout the project work for a period of one year after his/ her return to this country and will be provided with all the facilities required for the same. Following statements are mandatory for certification by the sponsor.

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

Date:.....	Signature:
Place:.....	Name in Capital Letters:
	Designation:
	Phone No:
	Fax No:
	E-mail:
(Official seal of the nominating/ sponsoring authority)	
Note : Application without official seal of sponsoring or nomination authority and their details will not be considered	

21. FORWARDING NOTE BY THE RESPECTIVE INDIAN EMBASSY/HIGH COMMISSION IN YOUR COUNTRY OR YOUR EMBASSY/HIGH COMMISSION IN INDIA, NEW DELHI

This is to forward the application of Dr/Mr. / Ms.of (Specify the Country Name here) for the 9 months Post Graduate Course in SATMET - 12 of CSSTEAP to be held at Space Applications Centre, Ahmedabad, India during August 01, 2020 – April 30, 2021.

Date :	Signature :
Place :	Name :
	Designation:
	Phone No:
	Fax No :

(Official Seal of the Embassy/High Commission)

Note : **Application without official seal** of the Embassy or High Commission will not be considered

N.B. Please send an advance copy of the application form duly signed by the sponsoring agency to the Course Director, CSSTEAP SATMET-12, Space Applications Centre (ISRO), Opp. Delhi Public School, Bopal Campus (Tech)., Bopal, Ahmedabad - 380058, Gujarat, India by fax (+91-79-2691-6078/6075) or Email to cssteapatmet@sac.isro.gov.in for quick processing. Original copy to be sent through Indian Embassy/High Commission of your country after duly signed the sponsor or through your Embassy/High Commission in New Delhi, India.

IMPORTANT

- The Application which is not complete in all respects is likely to be rejected.
- Candidates must attach copies of certificates of:
 - a. 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 at the cost of nominating agency or candidate).
 - b. Attach copy of Highest degree obtained (Degree certificate and marks sheet/grade card)
 - c. Proof of Proficiency in English needs to be provided or certificate provided by the nominating agency.
 - d. Attach copy of 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.
- Expecting mothers are advised to take a judicious decision before applying and joining the course.
- Smoking and consuming alcoholic drinks in class room and office campus is prohibited.

IMPORTANT DATES FOR SATMET – 12 COURSE

Last date for Receipt of Applications	March 02, 2020
Information of Selection	April 30, 2020
Commencement of Course	August 1, 2020
Completion of Phase-I (in India)	April 30, 2021

Mail the application form on the address given below through Governing Board member (list on inside of the front cover page of this brochure) to Indian Embassy/High Commission in your country.



To,

Course Director, CSSTEAP SATMET - 12
Space Applications Centre (ISRO),
Department of Space, Govt. of India,
Opp. Delhi Public School,
Bopal Campus (Tech).
Bopal, Ahmedabad - 380 058. Gujarat, India.

Phone : +91 79 2691 6108 / 6068
Fax : +91 79 2691 6078
Email : cssteapsatmet@sac.isro.gov.in
Website : www.cssteap.org

Note: Also mail an advance copy of the application form signed by the sponsors to the same address for taking necessary advance action.



Headquarters

IIRS Campus

4, Kalidas Road,
Dehradun- 248 001 (INDIA)
Tel: +91-135-2740737 & 2740787
Fax: +91-135- 2740785
Email: cssteap@iirs.gov.in
Website: www.cssteap.org

IIRS Campus

Indian Institute of Remote Sensing

No. 4, Kalidas Road
Dehradun - 248 001 (INDIA)
Tel: +91-135-2744 583
Fax: +91-135-2741 987

SAC Campus

Space Applications Centre

Ambawadi Vistar P.O.
Jodhpur Tekra
Ahmedabad- 380 015 (INDIA)
Tel: +91-79-2691 3344
Fax: +91-79-2691 5843

PRL Campus

Physical Research Laboratory

Navrangpura
Ahmedabad- 380 009 (INDIA)
Tel: +91-79-26314759
Fax: +91-79-2630 2275

URSC Campus

U R Rao Satellite Centre

Vimanpura Post
Bengaluru- 560017 (INDIA)
Tel: +91-80-2520 5252
Fax: +91-80-2520 5251

Delhi Office

Department of Space

Lok Nayak Bhawan
3rd floor, Khan Market
New Delhi-110 003 (INDIA)
Tel: +91-11-2469 4745
Fax: +91-11-2469 3871

Chandrayaan-2 on board GSLV Mk III -M1

