

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

ANNOUNCES

THIRTEEN
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 2023 - 2024



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 DOS/ISRO which has its campuses at Space Applications Centre, Ahmedabad playing as host institution for programmes related to Satellite Communications, Global Navigation Satellite Systems 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

institution for programmes related to Satellite Communications, Global Navigation Satellite Systems 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

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. 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 25 Post Graduate Courses in Remote Sensing & Geographic Information System (RS & GIS), 12 each in satellite Communications (SATCOM), Satellite Meteorology & Global Climate (SATMET), Space & Atmospheric Science (SAS) and 03 in Global Navigation Satellite Systems. The Centre has also conducted various short courses and workshops in past 27 years. These programmes have benefitted more than 3200 participants from 38 countries from Asia-Pacific region

and 24 countries from outside Asia-Pacific region. 26th RS&GIS PG Course at IIRS Dehradun, 13th Satellite Communications(SATCOM) and 4th Global Navigation Satellite Systems PG Course at SAC, Ahmedabad are in progress.



ANNOUNCEMENT OF 13th POST GRADUATE COURSE IN SATELLITE METEOROLOGY AND GLOBAL CLIMATE

Duration: 9 Months :– August 01, 2023 - April 30, 2024

Venue : Space Applications Centre
Indian Space Research Organisation
(ISRO)
Department of Space, Govt. of India,
Opp. Delhi Public School,
Bopal Campus (Tech)., Bopal,
Ahmedabad - 380 058, Gujarat, India

No. of Participants: 20 (Twenty)

Last date for receipt of applications: April 30, 2023



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 13th P.G. Course in Satellite Meteorology and Global Climate (www.cssteap.org). All the candidates need to be either nominated or sponsored (i.e. endorsed) by recognized institutions (e.g. departments, ministries or universities in their respective countries). Nominating or Sponsoring institutions/ authority should ensure that on return, the scholar will be given an opportunity to work in a development oriented activity in the area of newly acquired knowledge and skills. The execution of a one-year project work in their respective countries is the beginning of this process and it is assumed that sponsoring authority will facilitate one-year research project in the home country. However, the Centre will provide long distance technical guidance. A limited number of short (4-6 months) and one year duration fellowships may be made available to meritorious participants to complete Phase-II Research Project work in India.

Please fill up the **ONLINE APPLICATION FORM** available at CSSTEAP website (www.cssteap.org)

Offline applications will not be considered.

Note: Candidate is required to upload sponsoring/nominating agency certificate with official seal, and or forwarded by Governing Board member of CSSTEAP in your country (for list of Governing Board member please refer www.cssteap.org) to the Indian Mission/High Commission in your respective country or through your country's Embassy/High Commission in New Delhi, India for further processing.

The application should be completed in all respects and accompanied by attested and/or certified copies of all the certificates (School, Bachelor and Master, TOEFL, English Proficiency, etc.). Wherever, if these certificates are issued in a language other than English, then the same must be translated in English and certified by the Head of the organization Department or provide English transcription of all such documents.

Since the medium of instruction is English, therefore, the writing/ reading/speaking knowledge of English is mandatory. **Nominating/ sponsoring agency may kindly note and ensure above condition before forwarding the application.** On arrival in India if the candidate is unable to communicate in English, the candidate will be sent back to his/her country either at the cost of nominating agency or the candidate himself/ herself.

To know more about CSSTEAP, its past and future programmes, list of participants and countries who have benefitted from these 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 May 31, 2023 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

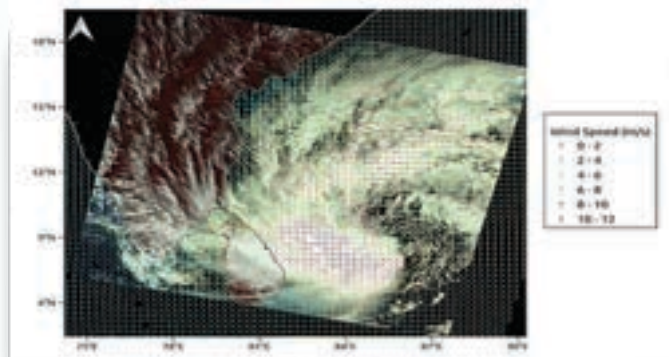
Space Applications Centre (SAC), one of the major centres of the Indian Space Research Organization (ISRO), is responsible for most of the satellite data applications programme of ISRO. It extensively interfaces with the actual users of satellite systems. SAC is active in research and development in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



SAC ISRO has been conducting different satellite data applications programme 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 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 – 2, SCATSAT-1, Oceansat-3 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 Nino 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 utilized 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.

Recently SAC has developed payloads for Oceansat-3 satellite, which carry a 13 band multispectral Ocean Colour Monitor-3 (OCM-3), Scatterometer and a dual TIR channel Sea Surface Temperature Monitor-1 (SSTM-1) to provide the essential data continuity services to the Oceansat-2 data users with improved accuracy and in more number of bands. GISAT-2 has a multi-spectral, multi-resolution imaging instrument capable of imaging full or part of the earth disk with High resolution multi-spectral VNIR (HRMX-VNIR), Hyper spectral VNIR (HyS-VNIR), Hyper spectral SWIR (HyS-SWIR) and High resolution Multi-spectral LWIR (HRMX-LWIR) from an agile geostationary platform. All the payloads are under advanced stage of realization.

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 is significantly contributing to the development of microwave sensors/radars, which are capable of operating in all weather conditions. India's first indigenously developed Synthetic Aperture Radar (SAR) satellite RISAT-1 was designed and developed at SAC. NISAR (S-band SAR) is a joint collaboration between ISRO and NASA for dual-frequency L & S-Band SAR for Earth Observation. S-Band SAR payload has been flagged-off from SAC to Jet Propulsion Laboratory (JPL), NASA after successful T&E. S-SAR & L-SAR joint radiative test was completed successfully at JPL. RISAT-1A is a follow on of RISAT-1 mission with almost similar configuration and improved technologies. 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 datasets 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 conceptualization, 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.

To Enhance the satellite communication capacity of the Nation SAC has developed high power Communication Payloads like GSAT-18, GSAT-31, which needs vast variety of technology domain expertise. SAC has delivered GSAT-24 payload, which will enhance the DTH capacity of the Nation. The high speed internet and other communication services to the end user are extremely important in the age of advanced Information technology. In this regard SAC has developed HTS Satellites GSAT-19, & GSAT-11. Ka band high throughput satellite GSAT-20 is being developed. India's own Navigation system, NavIC (Navigation using Indian Constellation) and GPS Aided Geo Augmented Navigation (GAGAN) are the major navigation systems of our country. The payloads for this system are being designed & developed by SAC. NavIC provides accurate position, navigation & timing information services to users in India as well as the region extending up to 1500 Km from its boundary.

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 realizing payloads of both Chandrayaan-1 and Chandrayaan-2 and analyzing the data from different payloads of Chandrayaan-1/2 missions. SAC has played key role in developing the payloads for MOM.

Building excellence in quantum frontiers are essential for National security. Towards this mission, SAC has made an important breakthrough demonstration of free-space Quantum Key Distribution (QKD) over 300m, which happens to be India's first-ever end-to-end free space Quantum communication link experiment. This activity has been further enhanced with the use of entangled photon source, which will improve the security feature.

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-2, Scatsat, Oceansat-3 satellite data. There is a strong computer support with workstations, 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 31,000 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 very minor ailments on actual basis (as out patients only) as and when such expenses are incurred. The centre will not bear expenses related to major health issues, (for example, hospitalization and any Laboratory / Pathological testing expenses etc.) 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.



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. 6000/- (Approximately) 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 as follows:

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)

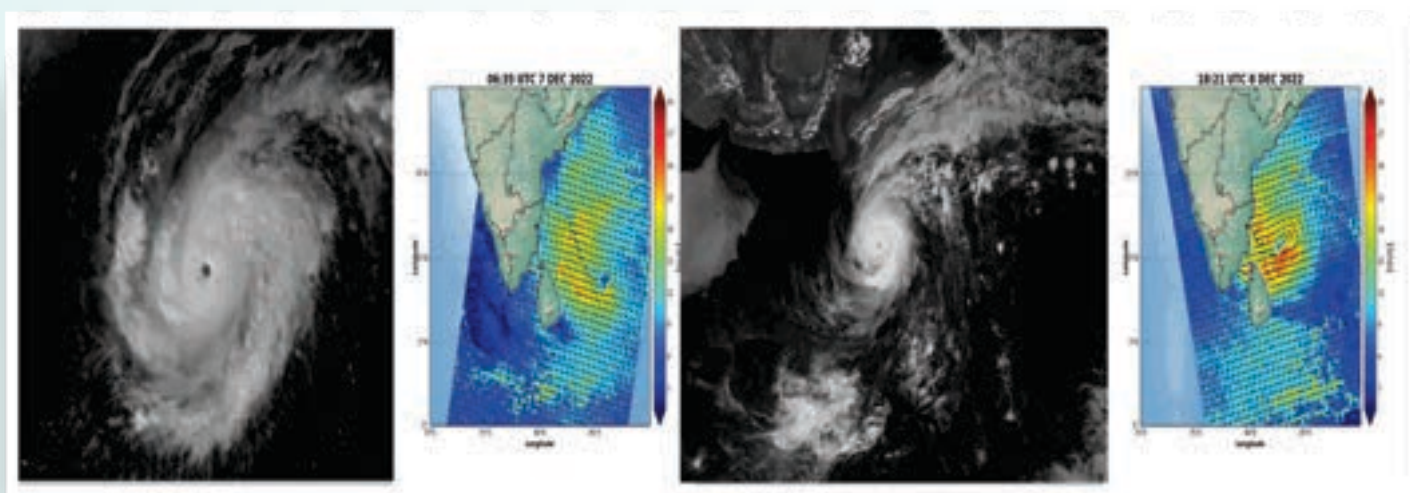
Theory

- **Geophysical Parameter Retrieval**
 - ✓ Radiative Transfer, 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.







How to apply online

Instructions to the Applicants for filling online application form:

- ❑ The Website is best viewed in Firefox ver.70.x, Chrome ver.84.x, and Edge latest version.
- ❑ Please register with valid e-mail, after successful registration e-mail will be triggered at given e-mail address to activate the account.
- ❑ To activate your registration login with credentials with the activation link that sent on your already registered e-mail.

Note: In case the e-mail is not delivered on inbox, Please check the spam folder.

- ❑ Before submitting the online application form, the applicants are requested to go through the course brochure carefully (eligibility and documents required etc.)
- ❑ Submit online application form well in advance along-with legible and scanned copies of all required documents. If the documents are in a language other than English, then translation certificate should be uploaded.
- ❑ The documents should be uploaded in valid scanned .pdf format (with file size limit between 25KB to 500KB).
- ❑ Recent scanned copies of passport-size photograph and Signature should be uploaded in jpeg, .jpg or .png format (with file size limit between 10KB to 100KB).
- ❑ The applicants are advised to fill in all their particulars carefully in the online application form.

Important Note: Applicant is required to upload sponsoring/nominating agency certificate with official seal, and or forwarded by the Governing Board Member (GB) of CSSTEAP (please refer to the list at www.cssteap.org if any GB Member of your country is in the list). Indian applicants need not to send through GB member.

- ❑ The completed form alongwith all the attachments is to be sent either to the Indian Mission/High Commission in your respective country or through your country's Embassy/High Commission in New Delhi, India for further processing. The Embassy/HC will forward your application to the Course Director of the applied course. (refer to the email id of course director for the applied course in the brochure). Indian applicants need not to send through Missions.
- ❑ Applicants are advised to retain the printout of the finally submitted online application form.
- ❑ Please be noted that the online application form is not editable after final submission.
- ❑ In case of any difficulties while submitting online application form please e-mail at websupport@iirs.gov.in
- ❑ The last date of submitting online application form is April 30, 2023 @ 05:00 PM IST.

IMPORTANT DATES FOR SATMET – 13 COURSE

Last date for Receipt of Applications	April 30, 2023
Information of Selection	May 31, 2023
Commencement of Course	August 1, 2023
Completion of Phase-I (in India)	April 30, 2024

Address:

Course Director, CSSTEAP SATMET - 13
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OCM-3, SSTM,
SCAT-2 on
board PSLV-C54
rocket ready for
launch at
Sriharikota



OCM-3 payload

SSTM payload

