

CENTRE FOR SPACE SCIENCE AND TECHNOLOGY EDUCATION IN ASIA AND THE PACIFIC

(Affiliated to the United Nations)



**Background document for
26th meeting of the Governing Board**

Date: December 22, 2021

Mode: Virtual Meeting

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

**Indian Institute of Remote Sensing Campus
4, Kalidas Road
Dehradun-248001, India**

Agenda – 9

Activities of CSSTEAP and Future Plans by Director, CSSTEAP

Activities of CSSTEAP

The Centre has been conducting Post Graduate and short courses in the four disciplines. Till date the Centre has conducted 61 PG courses 24 in Remote Sensing & Geographic Information System (RS & GIS), 12 in Satellite Communications (SATCOM), 11 in Satellite Meteorology & Global Climate (SATMET), 11 in Space & Atmospheric Science (SAS) and 03 in Global Navigation Satellite Systems. The Centre has also conducted several short courses and workshops in past 26 years. These programmes have benefitted around 2876 participants from a total of 36 countries in the Asia-Pacific region. In addition to this, 48 participants from 23 countries* outside Asia-Pacific regions have also been benefitted. PG Courses have benefitted 1018 participants (Figure 1a) while Short Courses have benefitted 1858 participants (Figure 1b).

Country-wise Output of PG and Short Courses

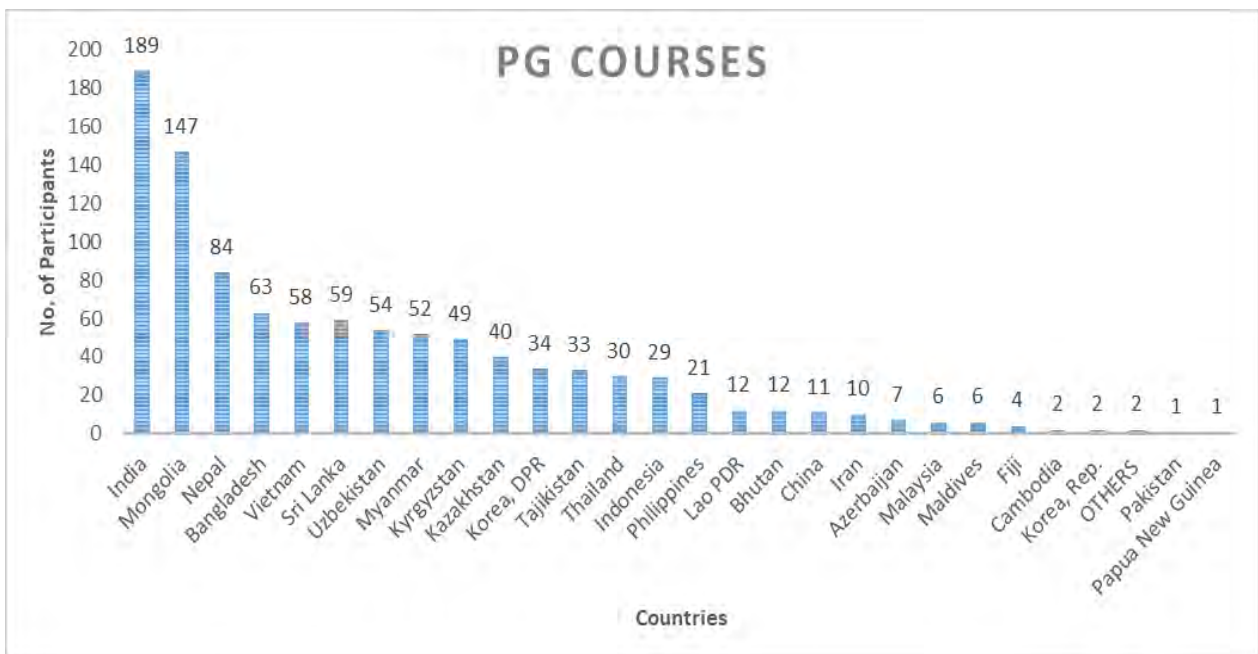


Figure 1a: Country-wise output of CSSTEAP academic programmes of PG



Figure 1b: Country-wise output of CSSTEAP academic programmes of Short/Online Courses

***Others include countries outside Asia-Pacific Region:** Algeria, Bahrain, Bolivia, Botswana, England, Egypt, Ghana, Iraq, Kenya, Madagascar, Mauritius, Mexico, Nigeria, Qatar, Romania, Rwanda, Saudi Arabia, South Africa, Syria, UAE, Yemen, and Zambia.

Academic Activities of Centre

Due to worldwide COVID-19 pandemic, the PG courses planned for year 2020 have been postponed to 2021 so no course was completed during the period.

(i) Completed Courses (2020-21)

During year 2020-21, the center has conducted 12 online short courses, workshops, Special courses, webinar. The details of the courses conducted are mentioned below:

Online Courses

(2020)

- ❖ Online Short Course on Remote Sensing and GIS Technology and Applications at IIRS, Dehradun during November 16-27, 2020. *(68 participants from 16 countries)*
- ❖ Online Short Course on Meteorological Satellites: Physical Principle, Retrieval and Applications” at SAC, Ahmedabad during November 23 - December 05, 2020. *(63 participants from 13 countries)*
- ❖ Online Short Course on Space and Atmospheric Science at PRL, Ahmedabad during December 7-14, 2020. *(65 participants from 11 countries)*

- ❖ Online short Course on Small Satellite Mission at IIRS, Dehradun during December 14-25, 2020. *(27 participants from 11 countries)*
- ❖ A Massive Open Online course (MOOC) on Geospatial Applications for Disaster Risk Management was jointly organised by CSSTEAP and UNOOSA during October 13 – December 31, 2020. A total 11892 participants from 148 countries were benefitted from MOOC conducted during the year 2020.

(2021)

- ❖ Online Short Course on Space Application for Forest Monitoring and Assessment during April 12-16, 2021. *(56 participants from 08 countries)*
- ❖ Online Short Course on Space Technology for Disaster Management during April 19-30, 2021. *(45 participants from 11 countries)*
- ❖ Use of Space Technology for weather and Climate Studies during May 17-31, 2021. *(43 participants from 10 countries)*
- ❖ Online Short Course on Coastal Zone Management in Response to Natural Hazards and Climate Variability during July 26-August 06, 2021. *(43 participants from 07 countries)*
- ❖ Online Short Course on Introduction to Satellite Navigation during September 13-24, 2021. *(45 participants from 13 countries)*

* Country-wise participation of candidates in Online Courses is given in table below:

Table : Country-wise participation of candidates (Online Short Courses)

Countries	Short Courses								
	RS&GIS				SATMET		SAS	GNSS	Small Satellite Mission
	On-line RS&GIS 2020	On-line FMA 2021	On-line DRM 2021	On-line CZM 2021	On-line PPRA 2020	On-line WCS 2021	On-line SAS 2020	On-line SATNAV 2021	Online SSM 2020
Bahrain	3								
Bangladesh	5	13	2	1	3	7	2		1
Bhutan	2				2				1
Ethiopia		1				1	2		
India	7	28	2	22	28	18	33	11	8
Indonesia	3				4	1			3
Iran		2	8			1			

Kazakhstan	7		6	3	5	3		4	4
Kyrgyzstan			2						
Lao PDR	1		1			1	1	4	1
Malaysia	7			2	5			4	1
Maldives	2				2				
Mongolia	3	2	3		3	4	1	4	3
Myanmar	13	1	2		4		2	1	1
Nepal	7	8	2	1	1	3	12	4	3
Nigeria								2	
Philippines	1			12	1				
Rwanda								1	
Sri Lanka	4	1	15	2			1	7	
Tajikistan									
Thailand	1		2		4	4	1	1	
UAE								1	
Uzbekistan	2				1	1	5		1
Vietnam								1	
Yemen							1		
Total	68	56	45	43	63	43	61	45	27

Special Courses

- ❖ Phase II of MOOC on “Geospatial Applications for Disaster Risk Its Management” on June 01, 2021 which continued until November 30, 2021. About 7049 participants from 128 countries have attended the Phase II of MOOC.
- ❖ Online Training Course on Remote Sensing Applications for Crop Mapping and Monitoring. (Jointly with UNOOSA ESA-ISRO-NASA) held on October 5 and October 7, 2021.

Upcoming Course-2021

Online Short Training course on 10th Small Satellite Mission during December 13 - 24, 2021. (*Selected Participants 44 from 9 countries*)

M. Tech. degree awarded/Fellowships

Till date 188 participants from 17 countries have been awarded M. Tech. Degree in the 5 disciplines (85 participants in RS & GIS; 50 in SATCOM; 22 in SATMET; 27 participants in Space Science and 04 in GNSS).

During the year 2020-21, 11 participants (2 in RS&GIS, 2 in SATCOM, 1 in SATMET, 04 in SAS and 02 in GNSS) who had finished their PG diploma were awarded M.Tech. degree.

(a) Host Country Support

The host country is providing all necessary support and facilities to the Centre.

(b) Financial Support from Other Sources

In addition to the financial support from Department of Space, Govt. of India the following support has been received

- During the year 2021, UNOOSA has provided financial support of US\$ 15000 for international travel of RS&GIS Course participants.

(c) Future Programmes for (2022)

PG Courses

- ❖ 26th Post Graduate course in RS & GIS at IIRS, Dehradun from August 01, 2022 – April 31, 2023.
- ❖ 13th Post Graduation Course in Satellite Communications at SAC, Ahmedabad from August 01, 2022 – April 30, 2023.
- ❖ 4th Post Graduate Course in Global Navigation Satellite System at SAC, Ahmedabad from August 01, 2022 – April 30, 2023.

Short/ Online - Proposed Courses

- ❖ Two weeks course “Open Source GIS technology & Geoweb Services”.
- ❖ Two weeks course "Space based innovative solutions to improve water resources management in Asia-Pacific region"
- ❖ Two week course on Application of Geomatics in Disaster Risk Reduction with special emphasis on flood and landslides
- ❖ Three weeks course on "Techniques and Applications of Synthetic Aperture Radar (SAR) Remote Sensing".
- ❖ Two-week short course on Space Weather
- ❖ Three weeks course on "Hyperspectral Remote Sensing Techniques and Applications".
- ❖ Two weeks Special Course on "Advances in Remote Sensing Data Analysis Techniques for Geological Applications with emphasis on Asia-Pacific Region"
- ❖ Two weeks short course on “Weather Forecasting using numerical weather prediction models”.

- ❖ 11th Small Satellite Mission Course 2022.

(d) Ongoing PG Courses (Hybrid Mode):

- ❖ RS&GIS: 25th PG course in Remote Sensing & Geographic Information System at IIRS, Dehradun during October 1, 2021- June 30, 2022.
- ❖ SATMET: 12th Satellite Meteorology & Global Climate at SAC, Ahmedabad during October 1, 2021- June 30, 2022.
- ❖ SAS: 11th Space and Atmospheric Sciences at PRL, Ahmedabad during October 1, 2021- June 30, 2022

Agenda – 10

Ratification of GB decision to Revised Budget of 2021

Formal approval of budget of CSSTEAP for 2021:

The 25th Governing Board meeting of CSSTEAP was held virtually on December 21, 2020, where under one of the agenda items, the Budget Estimates for 2021 were presented to the members for approval. The Budget Estimate for 2021 was discussed and approved for INR 31.796 million subject to the revision by evaluating the expenditure pattern and savings in 2020 budget.

The RE: 2021 is prepared based on the actual expenditure incurred as on 31.10.2021 and the proposed expenditure on activities in the remaining part of the year 2021. Since none of the courses could not be carried out in person due to COVID 19 pandemic the courses have been conducted in online mode The RE: 2021 for RS & GIS, SATCOM, SATMET, SAS, GNSS, short-term courses, Research Program and CSSTEAP Office is arrived at INR 3.870 million, which represents a decrease of INR 27.926 million with respect to BE: 2021.

The GB may formally ratify the Revised Budget for 2021 as indicated in Annexure-3.

Revised Estimates 2021 (January to December)

Activities Planned for 2022

Background of the Centre

In response to the UN General Assembly Resolution (45/72 of 11th December, 1990) endorsing the recommendations of UNISPACE-82, the United Nations Office for Outer Space Affairs (UNOOSA) prepared a project document (A/AC.105/534) envisaging the establishment of Centres for Space Science and Technology Education in the developing countries. The objective of the Centres is to enhance the capabilities of the member states in different areas of space science and technology that can advance their social and economic development. The first of such centres, named as Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP) was established in India on November 1, 1995. Department of Space, Government of India has made available appropriate facilities and expertise to the Centre through the Indian Institute of Remote Sensing (IIRS), Space Applications Centre (SAC), Physical Research Laboratory (PRL) and UR Rao Satellite Centre (URSC). The Centre is an educational and research institution that already demonstrated high attainment in the development and transmission of knowledge in the fields of space science and technology. The initial emphasis of the Centre has been on in-depth education, research and application programmes, continuing education, awareness and appraisal programmes. The Centre offers Post Graduate level courses in the fields of (a) Remote Sensing and Geographic Information System, (b) Satellite Communications, (c) Global Navigation Satellite Systems, (d) Satellite Meteorology and Global Climate and (e) Space and Atmospheric Sciences. The Centre also conducts short-term regular course on Small Satellite Missions and theme-specific courses/workshop in various disciplines and also Navigation and Satellite Positioning System from time to time. A set of standard curricula developed by the Centre and endorsed by the United Nations is followed for the Post Graduate educational programmes. The Centre is affiliated to the United Nations and its long term educational programmes are recognized by Andhra University, India for award of M. Tech degree.

Role of the Centre

The Centre aims to be a nodal organization in the region responsible for comprehensive capacity building. Guiding principles of the Centre are as follows: -

- ☐ Developing indigenous capability at the local level: capacity building in the region through appropriate technology.
- ☐ Provision of technical advisory services in the region;
- ☐ Provision of information in space science and technology;
- ☐ Developing long-term fellowship programmes;
- ☐ Organization of technology transfer programmes;

- Promotion of greater co-operation in space science and technology between developed and amongst developing countries.
- Collaborating with UN and other international agencies in Capacity building in Asia Pacific Region.

Towards this, the Centre engages itself in educational and training programmes, application activities, research, data management, extension activities and awareness programmes.

Conduct of the Programmes and Host Country Contribution

The Department of Space, Government of India has provided comprehensive facilities to the Centre in terms of institutional support, expert teaching staff, buildings, laboratories and financial support. This has made it possible for the Centre to conduct its educational programmes in an efficient and state-of-the art mode. The Centre conducts its activities in one of the host institutions of Department of Space and enjoys access to all its physical and intellectual facilities. All the educational programmes are conducted in English medium requiring the participants to have proficiency in the language. The candidates aspiring to have admission must have a Master's degree in science or Bachelor's degree in engineering with 5 years' experience in relevant discipline. The courses are conducted with the use of modern teaching methods and the participants are taken to various national facilities on study tours.

Post Graduate Courses

Five Post Graduate Courses of 9-month each are organized. RS&GIS course is organized every year, whereas Satellite Communication and Global Navigation Satellite System is organized every odd year and Satellite Meteorology and Global Climate and Space and Atmospheric Sciences are organized every even year. List of programmes and host institutions are given in Table 1.

Table 1: List of PG and Short Courses conducted at host institutes

	Educational Programme	Host Institutional Facility
1.	Post Graduate Programme in Remote Sensing and Geographic Information System (1 st Phase of 9 Months at the Centre followed by 2 nd Phase of 1 Year at the Home Country)	Indian Institute of Remote Sensing (IIRS), Dehradun
2.	Post Graduate Programme in Satellite Communication (1 st Phase of 9 Months at the Centre followed by 2 nd Phase of 1 Year at the Home Country)	Space Applications Centre (SAC), Ahmedabad
3.	Post Graduate Programme in Global Navigation Satellite Systems (1 st Phase of 9 Months at the Centre followed by 2 nd Phase of 1 Year at the Home Country)	Space Applications Centre (SAC), Ahmedabad
4.	Post Graduate Programme in Satellite Meteorology and Global Climate (1 st Phase of 9 Months at the Centre followed by 2 nd Phase of 1 Year at the Home	Space Applications Centre (SAC), Ahmedabad

	Country)	
5.	Post Graduate Programme in Space and Atmospheric Sciences (1 st Phase of 9 Months at the Centre followed by 2 nd Phase of 1 Year at the Home Country)	Physical Research Laboratory (PRL), Ahmedabad
6.	Short course on Application of Remote Sensing and GIS applications in specific themes	Indian Institute of Remote Sensing (IIRS), Dehradun
7.	Short Course on Small Satellite Missions	Indian Institute of Remote Sensing (IIRS), Dehradun and UR Rao Satellite Centre (URSC), Bengaluru
8.	On request Short term courses and workshops in the above disciplines	At above Institutions in collaborative mode

Besides providing infrastructure and manpower support to the programmes of CSSTEAP, the host country has also been providing financial support for educational courses to the tune of around 40 million INR per year.

Short Courses

In addition to PG Courses, CSSTEAP conducts Short term courses & workshops in specific areas of RS & GIS (theme specific), SATCOM, SATMET, SAS, GNSS and Small Satellite Missions. In RS & GIS disciplines every year Short Courses on specific themes are organized. Till date 40 Short Courses in RS & GIS on specific themes of applications in Natural Resources and Environmental Management, Disaster Management, Biodiversity Management Sustainable Agriculture, Urban Studies, Agriculture Meteorology, Flood Risk Management, application to drought, High resolution aerospace Imagery for Environmental Management, Open Source Geo-spatial tools, Microwave Remote Sensing, Disaster Risk Reduction and Rapid Response, Hyperspectral Remote Sensing, Flood Risk mapping, modeling and assessment using space technology and Geo-referenced disaster risk management information systems, Lidar and UAV remote sensing and its application have been conducted. Under SATCOM, 8 Short Courses/ Workshops have been conducted on Distance Education via Satellite, Digital Signal Processing, Satellite Communication for Development, Space Science & Technology for social scientists, Satellite Navigation and Location based Services and Navigation and Satellite Positioning System. In SATMET, 6 Short Courses / Workshops has been conducted on emerging trends in Satellite Meteorology, Meteorological Application on MW Remote Sensing and Weather Forecasting using Numerical Weather Prediction Model. Under Space Science Stream 4 short course / workshop on data processing from Chandra & YMM Newton Space Mission and space weather are conducted. In GNSS 01 short course of NAVSAT was conducted and 9 short courses have been conducted in Small Satellite Missions (SSM).

Source of Funds to CSSTEAP

So far most of the funding for the running of the courses and the Centre has been provided by the Government of India. Besides this, Department of Space/ISRO has made available its facilities for the conduct of the programmes of CSSTEAP. UNOOSA, ESCAPUNDP and UN-SPIDER continue to provide limited funds for international travel support for a few participants of PG and Short Courses. However,

NAM Science & Technology Centre, COSTED, TCS of MEA, ITEC of MEA, SAARC (SDMC), UNESCO, UN-ESCAP, UN-SPIDER, IWMI, WMO, ITTO-JOFCA and ITC-UNU had in the past provided supports towards organizing PG and Short Courses.

Research

The successful completion of the 9-month PG-Phase of the programme leads to the award of a Post Graduate diploma by the Centre. For the students who successfully finish their PG course and are interested in continuing for a Master of Technology (M. Tech.) degree, the Centre offers the opportunity to do so, in collaboration with Andhra University (AU) in Visakhapatnam, India. To this end, the student has to complete a 1-year research project in an application of space science or technology. This project has to be approved by CSSTEAP and AU, and the research is supervised by designated academic staff of CSSTEAP, AU and the institution where the research is carried out. In most cases the 1-year project is carried out at the home institution of the student concerned. Since 2004 onwards every year selected meritorious PG students are being given fellowships to complete their M.Tech. thesis work at CSSTEAP host institutions. Till date 188 participants from 17 countries have been awarded M. Tech. Degree in the 5 disciplines (85 participants in RS&GIS; 50 in SATCOM; 22 in SATMET; 27 participants in Space Science and 04 in GNSS).

Achievements:

So far, 61 PG courses and 69 short/online courses and including one webinar have been conducted. More than 2800 participants have benefitted from the programmes of CSSTEAP. Course-wise out-put of students for PG and Short Courses is given in Table 2.

Table 2: List of CSSTEAP Course participants of various PG & Short Courses participated during the year 1996 to 2021.

Year	No. of Course Participants in PG Courses					No. of Course Participants in Short Courses							Total
	RS& GIS	SAT-COM	GNSS	SAT-MET	SAS	RS& GIS	SAT-COM	SAT-MET	SAS	GNSS	SSM	Sp. Courses	
1996	25	-	-	-	-	-	-	-	-	-	-	-	25
1997	23	13	-	-	-	-	9	-	-	-	-	-	45
1998	21	-	-	17	10	-	-	8	-	-	-	-	56
1999	17	18	-	-	-	45	20	-	-	-	-	-	100
2000	19	-	-	21	9	14	18	-	-	-	-	-	81
2001	20	14	-	-	-	20	13	-	-	-	-	-	67
2002	23	-	-	19	11	12	-	17	-	-	-	-	82
2003	21	15	-	-	-	37	-	-	28	-	-	-	101
2004	20	-	-	15	9	20	-	-	-	-	-	-	64
2005	19	12	-	-	-	17	-	-	-	-	-	-	48
2006	22	-	-	18	13	12	-	-	-	-	-	-	65
2007	18	20	-	-	-	18	-	-	-	-	-	-	56

2008	15	-	-	16	7	16	18	-	-		-	-	72
2009	17	17	-	-	-	-	-	-	-		-	-	34
2010	15	-	-	14	12	32	-	-	-		-	-	73
2011	22	17	-	-	-	64	-	-	-		-	-	103
2012	21	-	-	14	14	58	20	-	-		20	-	147
2013	20	16	-	-	-	54	16	-	-		15	-	121
2014	21	-	-	17	12	57	19	-	-		19	-	145
2015	23	16	9	-	-	38	-	-	-		20	-	106
2016	19	0	0	13	12	67	-	-	13		37	-	161
2017	22	21	12	-	-	42	-	25	-		40	44	206
2018	24	-	-	13	13	36	-	-	-		46	-	132
2019	22	16	14	-	-	202	-	26	27		28	-	335
2020	-	-	-	-	-	68	-	63	61		27		219
2021						144	-	43	-	45			232
Total	489	195	35	177	122	1073	133	182	129	45	252	44	2876

REVISED ESTIMATES 2021 (JANUARY TO DECEMBER)

ACTIVITIES PLANNED FOR 2022

Educational Courses

The nine months PG courses were to be conducted in five different disciplines under the CSSTEAP academic programmes in 2020 were postponed to 2021 due to worldwide COVID-19 pandemic. The Academic courses and short courses which were conducted in 2021 and the courses which has been planned in 2022 are provided in the following table:

1.	25 th RS & GIS PG Course at IIRS, Dehradun	January to June, 2022 (Course started on October 1, 2021 in hybrid mode)
2.	12 th Satellite Metrology PG Course at SAC, Ahmedabad	January to June, 2022 (Course started on October 1, 2021 in hybrid mode)
3.	12 th Space and Atmospheric Science PG Course at PRL, Ahmedabad	January to June, 2022 (Course started on October 1, 2021 in hybrid mode)
4.	26 th RS & GIS PG Course at IIRS, Dehradun	Course will start on August 1, 2022
5.	13 th Satellite Communication PG Course at SAC, Ahmedabad	Course will start on August 1, 2022
6.	4 th Global Navigation Satellite System PG Course at SAC, Ahmedabad	Course will start on August 1, 2022
7.	Application of Space Technology for Disaster Risk Management with Special Emphasis on Floods and Landslides with emphasis on Asia-Pacific Region to be conducted at IIRS Dehradun	The course will be organized during June-July 2022
8.	Short course on Weather Forecasting using numerical weather prediction models to be conducted at SAC Ahmedabad	The course will be organized during August-September 2022
9.	Space based innovative solutions to improve water resources management in Asia-Pacific region to be conducted at IIRS Dehradun	Course will be organized during December 2022
10	Short Course on Space Weather to be conducted at PRL Ahmedabad	The course will be organized during Oct-Nov 2022
11	Online short course on Techniques and Applications of Synthetic Aperture Radar (SAR) Remote Sensing to be conducted by IIRS – 3 weeks	To be decided

12	Online short course on Open Source GIS technology & Geoweb Services to be conducted by IIRS – 2 weeks	To be decided
13	Online short course on Hyperspectral Remote Sensing Techniques and Applications to be conducted by IIRS – 2 weeks	To be decided
14	Online short course on 6. Advances in Remote Sensing Data Analysis Techniques for Geological Applications with emphasis on Asia-Pacific Region to be conducted by IIRS – 2 weeks	To be decided

CSSTEAP Office Activities

As the Headquarters of CSSTEAP is located at Dehradun it is the main hub of activities. All the activities related with Director's office like Coordination with Member countries, Host Institutions, Programme coordination, Budget preparation, publication of Newsletters, various official documents & publications, bringing out CD-ROMs, Correspondence with different organizations in Asia and Pacific region, etc. are carried out here.

Research and Coordination Activities

Director, CSSTEAP in consultation with the host institutes identifies new research areas and facilitates research work at host institutions in India as well as in their home country.