



CSSTEAP Post Graduate Course on GNSS

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CSSTEAP

- United Nations Office of Outer Space Affairs (UN-OOSA) identified host country for establishment of Centre for Space Science and Education in Asia and the Pacific (CSSTEAP).
- The Centre was established in India on November 1, 1995 under a signed initially by 10 member countries of the region.
- The Centre is hosted by the Government of India with Department of Space (DOS), as the nodal agency.
- DOS has made available appropriate facility and expertise to the Centre through the Indian Institute of Remote Sensing (IIRS), at Dehradun, Space Applications Centre (SAC), at Ahmedabad and Physical Research Laboratory, Ahmedabad.
- The commitment of the host country is symbolized and embodied in an Indian sloka:

“ ज्ञानं दानात् वृध्यते ”.

By giving to others knowledge increases.

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Member Countries in Governing Board

- | | |
|-------------------------------------|--|
| ☐ India | ☐ Myanmar |
| ☐ Bangladesh | ☐ Nauru |
| ☐ DPR Korea | ☐ Nepal |
| ☐ Indonesia | ☐ Phillipines |
| ☐ Iran | ☐ Republic of Korea |
| ☐ kazakhstan | ☐ Sri Lanka |
| ☐ Kyrgyzstan | ☐ Thailand |
| ☐ Malaysia | ☐ Uzbekistan |
| ☐ Mongolia | ☐ Netherlands |



CSSTEAP Objectives

- To develop the skills and knowledge of university educators, research scientists and project personnel in the design, development and application of space science and technology for subsequent national and regional development and environment management.
- To assist educators to develop environmental and atmospheric sciences that they can use to advance the knowledge of their students in their Institutions / Countries.
- To develop skills for satellite communications including those associated with development, long distance education, delivery of health services, disaster mitigation, air and maritime navigation, and network / linkage of professionals and scientists.
- To assist research and application scientists for preparing information for presentation to the policy and decision makers for national and regional development programmes.
- To enhance regional and international cooperation in space science and applications programmes as envisaged in the strategy and action plan.



CSSTEAP Courses

- CSSTEAP Organizes Several Nine Month Diploma Course Leading to Award of M.Tech Degree and Short Courses.
- Mainly these course are conducted at
 - Space Applications Centre (SAC), Ahmedabad
 - Physical Research Laboratory (PRL), Ahmedabad
 - Indian Institute of Remote Sensing (IIRS), Dehradun
 - ISRO Satellite Centre (ISAC), Bengaluru
- A set of standard curricula developed by the United Nations is adapted for the educational programmes.
- The Centre is affiliated to the United Nations and its educational programmes are recognized by Andhra University, India.



CSSTEAP Courses

Name of Course	Frequency	Center
Remote Sensing and Geographic Information System (RS & GIS)	Every year starting in July	Indian Institute of Remote Sensing, Dehradun
Satellite Communications (SATCOM)	Every alternate year starting in August	Space Applications Centre, Ahmedabad.
Satellite Meteorology and Global Climate (SATMET)	Every alternate year starting in August	Space Applications Centre, Ahmedabad.
Space and Atmospheric Sciences	Every alternate year starting in August	Physical Research Laboratory, Ahmedabad
Global Navigation Satellite Systems	Every alternate year starting in August	Space Applications Centre, Ahmedabad.
Short Term Courses / Workshops in the above disciplines		Above institutions



Details of Global Navigation Satellite Systems (GNSS) Course

- The first GNSS course was started in 2015.
- This PG courses is of 9-month duration and was organized by CSSTEAP and conducted by Space Applications Centre (SAC), ISRO, Ahmedabad.
- The **1st** GNSS (2015-2016) with 9 participants from 4 countries was organized
- The **2nd** GNSS (2017-2018) with 12 participants from 5 countries was organized



Eligibility

- Eligibility Criterion to Admission to GNSS Course
 - Bachelor's Degree in Electronics/Telecommunications/ Electrical/Geomatics/Software/Computer Engineering
 - Master's degree in Science (Physics, Electronics) or equivalent with at least 5 years of experience
- Nomination and/or sponsorship by the organization in which the candidate is employed
- The candidate should have working knowledge of English, as the medium of instruction is English
- The Candidate should be comfortable with English pronunciation amicable to India as the majority faculty drawn from India.
 - If not, they should take some Indian English course in their country and come prepared before joining



GNSS Course Structure

The GNSS course of CSSTEAP was organized in two phases:

Phase I

(Duration Nine Months divided into 2 Semesters)

- Lectures/ Practical/ Seminars/ Visits/Tutorials
- Pilot Project
- Participants awarded Post Graduate Diploma



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GNSS Course Structure

- Phase II (Duration One Year)
 - Project work in their own respective countries

Eligible for getting Post Graduate Degree in Satellite Communications is subject to fulfilling the criterion set and acceptance of the thesis by Andhra University





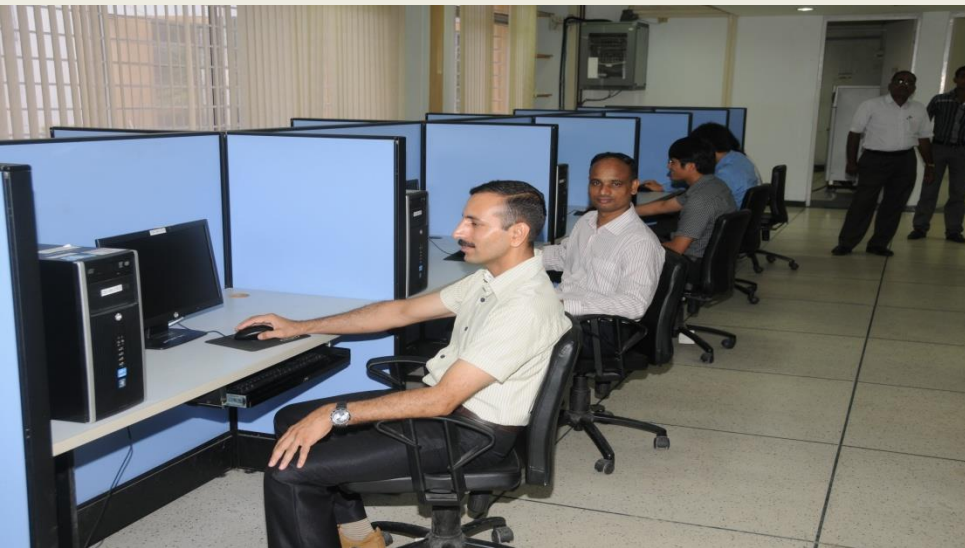
Course Curriculum

- Curriculum is based on the guide lines provided by the UN expert working group held in Frascati Italy in 2001.
- Board of Studies constituted by Director CSSTEAP from time to time review the contents of the syllabus and suggest the modifications based on the feed back received from the students, faculty and advancement of technology with in the frame work of initial recommendation of the UN expert committee.



Course Curriculum

- The last Board of Studies was held in December 2014 and the recommendation of BOS were implemented in GNSS-1 & 2 courses.





GNSS Course Curriculum

(All Topics Except Orientation Course will Have Two Papers
- One Theory and one Practical)

Semester I		
S.No	Paper Name	No.of Weeks
1	Orientation Course	1
2	GNSS Fundamentals	3
3	Position Determination Techniques	3
4	Technologies for Augmented Systems	3
5	Elements of Space and Ground Segments	4



GNSS Course Curriculum

(All Topics Except Pilot Project will have Two Papers - One Theory and one Practical)

Semester II		
S.N	Paper Name	No.of Weeks
0		
6	GNSS Receivers	4
7	GNSS/INS Integrated Navigation	2
8	GNSS Applications	2
9	Space Weather and GNSS	2
10	Pilot projects	11

Total Weeks = 35

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GNSS Credit System



SEMESTER-I		Credits
GSAT.I.01	Orientation course	2
GSAT.I.02	GNSS Fundamentals	4
GSAT.I.03	GNSS Fundamentals Lab	2
GSAT.I.04	Position Determination Techniques	4
GSAT.I.05	Position Determination Techniques Lab	2
GSAT.I.06	Technologies for Augmented Systems	4
GSAT.I.07	Technologies for Augmented Systems Lab	2
GSAT.I.08	Elements of Space and Ground Segments	4
GSAT.I.09	Elements of Space and Ground Segments Lab	2
GSAT.I.10	Seminar	2
Semester-I Total Credits		28



GNSS Credit System



SEMESTER-II		
GSAT.II.01	GNSS Receivers	4
GSAT.II.02	GNSS Receivers Lab	2
GSAT.II.03	GNSS/INS Integrated Navigation	4
GSAT.II.04	GNSS/INS Integrated Navigation Lab	2
GSAT.II.05	GNSS Applications	4
GSAT.II.06	GNSS Applications Lab	2
GSAT.II.07	Space Weather and GNSS	4
GSAT.II.08	Space Weather and GNSS Lab.	2
GSAT.II.09	Pilot Project	11
Semester-II Total Credits		35



Grading System

Range of Marks	$\geq 90\%$	80%-89%	70%-79%	60%-69%	55%-59	50%-54%	$< 50\%$
GRADE	O	A	B	C	D	E	F
POINTS	10	9	8	7	6	5	0



Participants -Students

- 1st GNSS (2015-2016)

Bangladesh (2)
India (4)
Kazakhstan (1)
Mongolia (2)

2nd GNSS (2017-2018)

Bangladesh (2)
India (5)
Mongolia (3)
Sri Lanka (1)
Tajikistan (1)



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Feedback from the Participants

- The overall response of the participants regarding the course content, subjects offered are good and felt that the course is very useful to their work
- The participants expressed that the faculty explained them the minutest details and are approachable for their difficulties. Particularly, the tutorial sessions and Lab sessions are very much beneficial to them
- A few participants felt that course syllabus was very intensive and they have to work hard to cope up with the syllabus



Educational Environment and Facilities

- The academic program of the course is organized through class room lectures, tutorials, practical, multi-media self-learning packages, field excursion, seminars etc.
- The facilities like private network to access all course materials present and past, class room lectures recording both in audio and video provided
- Other elements are Computer Lab with one computer per participant and software tools like MATLAB, STK, and bench test set up for all elements in satellite communications systems are also being provided.



Educational Environment and Facilities

- A state of art Earth Station operating on C and Ku band established in the same campus is also made available to the students for carrying out experiments related to SATCOM Technology & Applications and hands on training on operational aspects on Satellite Communications
- Additionally as a part of study, the students are taken to various ISRO Centres and other organization working in the field of Satellite Communication
- From SATCOM-7 onwards credit point system as per Andhra University guidelines are adopted for evaluating the performance of the students.



Earth Station Indoor Unit @ Bopal Campus



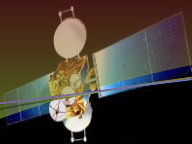


Faculty and Manpower support

- The major components of course syllabus is covered by the faculty of SAC, Ex. SAC/ISRO, other DOS Centres like PRL, Ahmedabad, ISRO-HQ, MCF and from various Indian Organizations / Institutions / Universities such as Nirma University, IIT Kharagpur, IISc Bangalore, Gujarat University Ahmedabad, MS University Vadodara, Prasar Bharati Training Centre New Delhi, Andhra University, Visakhapatnam etc.



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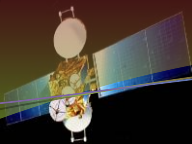


CONCLUDING REMARKS

- GNSS Course
 - Serving the main aim of CSSTEAP
- Refinement of GNSS Course is Underway
 - New Board of Studies Formed
 - Course under revision by BOS

ACKNOWLEDGEMENTS

- ISRO Delegation & Other Colleagues
- Working Group-C Co-Chairs
- ICG-13 Organisers : CHINA, ICG Secretariat-Vienna
- All ICG-13 Working Group-C Participants



THANK YOU