आज़ादी का अमृत महोत्सव

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

ANNOUNCES

FOURTH POST GRADUATE COURSE
ON
GLOBAL NAVIGATION SATELLITE SYSTEMS

ACADEMIC YEAR 2022 - 2023

Conducted at

Space Applications Centre
Indian Space Research Organisation
Department of Space, Govt. of India
Ambawadi Vistar P.O.
Ahmedabad-380015 India
www.sac.gov.in

Centre for Space Science and Technology
Education in Asia and the Pacific
(Affiliated to the United Nations)
IIRS Campus, 4, Kalidas Road,
Dehradun 248 001 India
www.cssteap.org

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India

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INTRODUCTION

From the last few decades, the use of space technology for welfare of mankind and overall development of the humanity is growing exponentially. Use of Satellite based Navigation is one of the newest addition to this. Within this very short time, Satellite Navigations has now become an integral part in every walk of human life. From providing navigation to vehicles to synchronizing networks, from global Search & Rescue to warfare, the Global Satellite Navigation system (GNSS) has its own extensive presence over a very wide range of applications. Not only this, the technology is evolving and changing lives of the humankind at a fast rate. Keeping this in view, the Centre for Space Science and Technology Education in Asia & the Pacific (CSSTEAP) is offering a 9-month post-graduate course in GNSS with integrated M.Tech. degree.

All countries should have access to space technology and must share the benefits. An essential pre-requisite to partaking in these opportunities is the building of various indigenous capacities for the development and utilization 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 fields. Towards this end, the United Nations General Assembly had called for the establishment of Centres of Space Science and Technology Education at the regional level in the developing countries.

Under the auspices of the United Nations, through its Office for Outer Space Affairs (UNOOSA), six regional Centres 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, Nigeria) and Western Asia (Jordan). All of these Six Centres are affiliated to the United Nations through UNOOSA. These Centres use existing facilities and expertise already available in education and other research institutions in their respective regions.

ABOUT REGIONAL CENTRE FOR ASIA AND THE PACIFIC IN INDIA

The Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP), affiliated to the United Nations was established in India in November, 1995. The Centre's headquarter is established in Dehradun, India around the infrastructure available at the Indian Institute of Remote Sensing (IIRS), Indian Space Research Organisation (ISRO), Government of India, Dehradun. For conducting its programs, CSSTEAP has arrangements with Department of Space (DoS) at its campuses at:

- Space Applications Centre at Ahmedabad, for programs related to Satellite Communications, Global Navigation Satellite System and Satellite Meteorology and Global Climate;
- Physical Research Laboratory, Ahmedabad, for program related to Space and Atmospheric Sciences; and
- IIRS, Dehradun, for program related to Remote Sensing and GIS.

GOALS OF CSSTEAP

CSSTEAP 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 programs. The principal goal of the Centre is development of skills and knowledge of university educators and researchers, engineers, application scientists and government officials 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 programs aim at development of indigenous capability of participating countries, in designing and implementing space-based research and applications programs. The Centre will also foster continuing education programs for its graduates and awareness programs for policy and decision makers and the general public.

It should be emphasized 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 programs.

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 PROGRAMS AND COURSES

The educational programs of the Centre are oriented towards the dissemination of knowledge in relevant aspects of space science and technology. The initial emphasis of the Centre is to concentrate on in-depth education, research & applications programmes, and linkages to the global programs/databases, execution of pilot projects, continuing education and awareness and appraisal programs. Scholars and professionals, who contribute to the educational programs are renowned experts in their respective fields from both

within and outside the region.

The activities of the Centre are guided by an International Governing Board, Intl. Academic Advisory Committee and Board of Studies. These curricula are being regularly reviewed by an international Advisory Committee of CSSTEAP from time to time and ratified by the UN Office for Outer Space Affairs (UNOOSA).

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 knowledge and technologies. Centre also offers fellowships to the selected meritorious candidates to do research during Phase II in India.

The Centre offers Post Graduate level courses in the fields of:

- Global Navigation Satellite Systems (GNSS), organised every alternate year
- Remote Sensing and Geographic Information System (RS and GIS), organised every year
- Satellite Communications (SATCOM), organised every alternate year
- Satellite Meteorology and Global Climate (SATMET), organised every alternate year
- Space and Atmospheric Sciences (SAS), organised every alternate year

Besides post graduate level courses, the Centre also conducts short courses /workshops on the above subjects on specific themes of space science and technology.

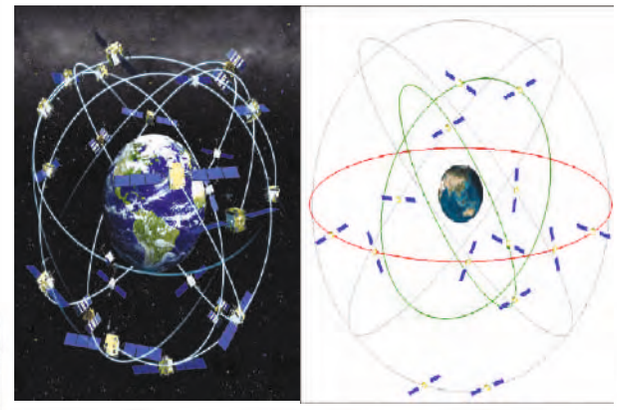
The Post Graduate courses are organised in two phases:

Phase-I (9 Months, in India)

- **Core Modules**, where the emphasis is on the development and enhancement of the knowledge and skills of course participants viz. University educators, researchers, engineers, application scientists and government officials.
- **Pilot-Project**, which is oriented towards planning and execution of project which provides an opportunity to fine-tune the skills for executing theme-based study.

Phase-II (1 Year, in home country)

- **Research Project** for scholars to conduct and execute in their respective country with a view to transfer the technology in his/her organization. It will also be a test of the methodology and knowledge assimilated during Phase-I at the



centre.

- A selected few meritorious students of PG course are also considered for the award of additional fellowship of 6 months to one year to complete part of their research work at centre's host institutions in India which may lead to a M. Tech. degree conferred by Andhra University.

COURSE RECOGNITION BY ANDHRA UNIVERSITY

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

PROGRAMMES ORGANISED

The Centre has so far conducted 24 Post Graduate Courses in Remote Sensing and Geographic Information System. 12 Post Graduate courses in Satellite Communication, 11 Post Graduate courses in Satellite Meteorology and Global Climate, and 11 Post Graduate courses in Space and Atmospherics Sciences and 3 Global Navigation Satellite Systems courses. The centre also conducts various short Courses/Workshops since its inception. These educational programmes have benefited more than 2000 scholars from 36 countries in the region. 25th RS & GIS PG course at IIRS Dehradun, 12th SATMET PG Course at SAC, Ahmedabad and 12th Space and Atmospherics Sciences (SAS) PG course at PRL, Ahmedabad are currently in progress.

ANNOUNCEMENT OF FOURTH POST GRADUATE COURSE IN GLOBAL NAVIGATION SATELLITE SYSTEM

Duration: **9 Months – from August 1, 2022 to April 30, 2023.**

Venue: Space Applications Centre
Indian Space Research Organisation
Department of Space, Govt. of India
Ahmedabad-380 015, India.

No. of Participants: 15 (Fifteen)

IMPORTANT DATES FOR GNSS-04 COURSE

Last date for Receipt of Applications	**May 01, 2022**
Information of Selection	**May 31, 2022**
Commencement of Course	**August 1, 2022**
Completion of Phase-I (in India)	**April 30, 2023**

Mode of Course Conduction:
The course will be conducted in offline mode with in person presence of the participants. However, it may be switched to online/hybrid mode based on the prevailing Covid situation.

INVITATION OF NOMINATION AND SPONSORSHIP

Nominations are invited from candidates in countries in Asia and the Pacific Region for the educational programme of the Centre. Nominations of candidates will have to be endorsed/sponsored by recognized institutions (e.g. ministries, Universities, org. etc.) in their respective countries. Endorsing / sponsoring institutions should ensure that the returning scholar will contribute in development oriented activity in their respective countries 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 for which the nominating institution should ensure that essential facilities and support would be provided to the participant. During this one-year period, the Centre will also provide internet based scientific guidance.

SUBMISSION OF APPLICATIONS

All the participants from member countries are required to forward their application through respective Governing Board (GB) members to the Indian Embassy/High Commission in respective country, who will then forward application to the course director. The participants from non-GB countries need to submit duly filled application to the centre through Indian Embassy/High Commission in their country.

Completed application forms should be sent through the Embassy/High Commission of the respective country to:

Course Director, GNSS-04
CSSTEAP
Building No: 24A, Room No: 20,
Space Applications Centre, ISRO
Ambavadi Vistar,
Ahmedabad - 380 015, INDIA
Tel. No.: +91-79-2691 2420 / 2468
Fax: +91-79-2691 5807,
Email: cssteapgnss@sac.isro.gov.in

The last date for receipt of completed applications is May 01, 2022. The application forms received from countries of Asia and the Pacific Region will be scrutinized by the Centre and the selected candidates will be informed by May 31, 2022. Preference in selection is generally given to those candidates, whose expenses are borne by themselves / sponsoring agency.

IMPORTANT INFORMATION (Please read carefully and note):

1. Interested candidates may download this brochure from **cssteap.org** web site and use the application form available there in.

2. It is essential that full passport details are provided in the Application Form. Application Forms without passport details may not be considered.

3. The medium of instruction of the courses is English. Proficiency both in written and spoken English is MUST. Candidates not proficient in English should not apply.

4. Submission of Covid-19 negative report issued by authorized medical agencies of the respective country is must at the beginning of the course. Candidate must also provide their Medical fitness & mention medical history for pre-existing diseases like HIV, TB, Hepatitis B, Cancer, etc. or any communicable diseases requiring medical attention. If any wrong information is found during the course, the Centre will be compelled to take punitive actions which may include sending the candidate back home at his own cost.

5. Applicant should attach copies of certificate of

   a. Medical Fitness Certificate from an authorized government medical officer covering status of eye, chest (Tuberculosis), vaccinations, heart, lungs, liver, spleen, hydrocele, skin & V.D.,Covid-19, Hepatitis, HIV, Yellow fever and other contagious diseases be enclosed with the application form.

   b. Highest degree obtained (Degree certificate and mark sheet/grade card)

   c. TOEFL score are required for applicants, who have done their higher studies in a medium (language) other than English or a diploma/certificate of English language issued by an accredited language institution in the country or by the local UNDP.

   d. All the degree certificates, if not in English may please be translated in English and attested by the Head of the organisation or notary or transcript in English can also be submitted with seal.

6. Kindly mail the completed application form through Indian Embassy/High Commission in your country.

7. Please also directly email a scan-copy of the filled application form, duly signed by the nominating or sponsoring agency to **cssteapgnss@sac.isro.gov.in** for advance processing.

8. Candidates have to strictly abide by the conduct rules and regulations of the institute and give an undertaking in this regard at the time of registration. In case of the violations of the rules,

disciplinary action may be taken by the authorities as deemed appropriate. The decision will be conveyed to your sponsoring organisation .

ELIGIBILITY

Bachelor's Degree in Electronics / Electrical / Telecommunications Engineering or Master's degree in Science (Physics, Electronics) or equivalent with at least 5 years of experience in teaching / research or professional experience in the field of Communication Engineering and/or related field. The candidates should be nominated and / or sponsored by the organisation for the disciplines they are working in. For the candidates with higher qualifications, the criteria of minimum experience may be relaxed.

TARGET PARTICIPANTS

The course is directed towards the following categories of professionals.

- University educators and researchers
- Professionals and specialists
- Telecom system managers, engineers and planners
- Government officials

It is expected that at the end of the program, 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 communications and its applications in their countries.
- Enhance the self-reliance of their countries so as to lessen dependence on external experts.

SELECTION OF CANDIDATES

Based on the completed application forms received, the Centre will select the candidates as per selection criteria set by a Selection Committee. Selection criteria may include satisfying eligibility requirement, country representation, proficiency in English language, sponsorship etc. Preference will be given to the sponsored candidates, whose nominating organisation provides fully or partly international air travel (both ways) and/or fellowship.

The list of selected candidates be declared by May 31, 2022. The list will be put at CSSTEAP website (**www.cssteap.org**) and the individual candidate will be informed by email.

ABOUT SPACE APPLICATIONS CENTRE

(Host Institute)

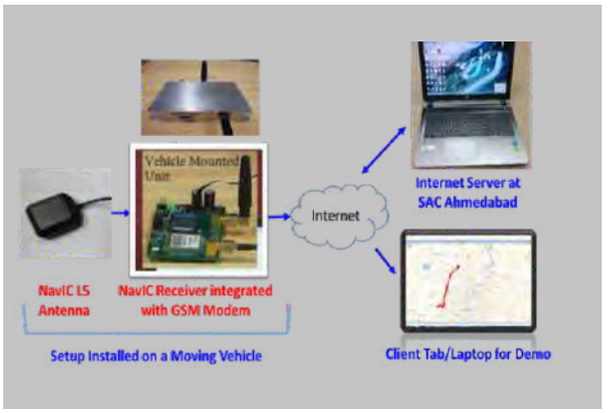
Established in 1972, Space Applications Centre (SAC), one of the lead Centres of the Indian Space Research Organisation (ISRO), is carrying out a wide range of scientific and technical activities, with emphasis on utility of space technology for societal applications.

SAC main campus is situated in the western outskirts of the city of Ahmedabad in Gujarat State, Western India. Two new SAC campus have been established 8 km away from the main campus, which also houses training facilities and housing complex for CSSTEAP participants.

SAC New Bopal Campus

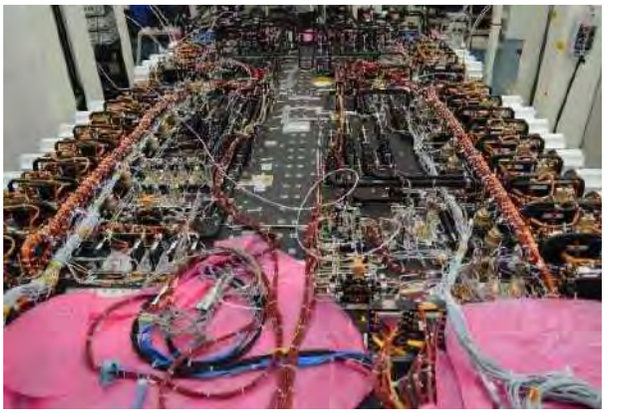
With a strong foundation of research & development, SAC develops advanced space borne payloads for Spacecraft along with a range of associated applications for the benefit of society. The applications primarily address communication, navigation and remote sensing needs of the country. SAC has also been instrumental in realizing scientific and planetary missions of ISRO including Mars and Moon missions.

Navigation: SAC has developed the payloads for the IRNSS/NavIC satellites (Navigation with Indian Constellation) and GPS Aided Geo Augmented Navigation (GAGAN). The NAVIC and GAGAN services are regional services & cater to the Indian sub-continent for navigation applications.



Vehicle Tracking with NavIC Receiver

Communication: The communication transponders developed at SAC for INSAT and GSAT series of satellites are used by government and private sector agencies for VSAT, TV broadcasting, DTH, DSNG, internet, telephony, mobile satellite services, search and rescue, data relay services, radio networking, tele-medicine, tele-education etc. The recent high

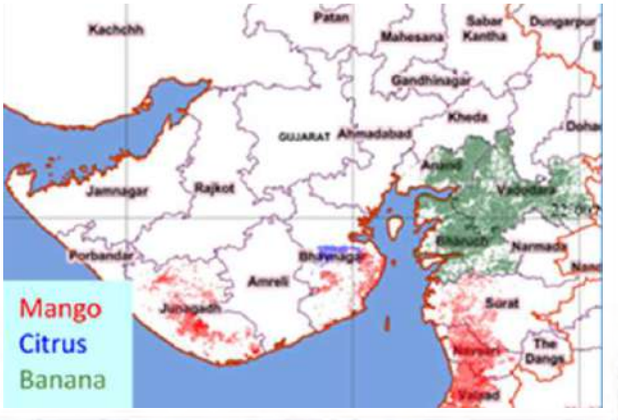


GSAT-11 Panel

throughput satellites in Ka/Ku band launched by ISRO will bring high-speed internet and FSS services at the doorsteps of people, govt. and industry. The development of Q/V band payloads and optical communication link between space and ground station are some of the new initiatives for future Satcom activities.

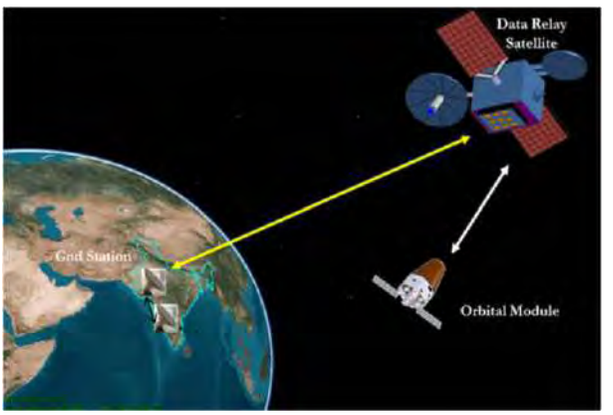
CARTOSAT-2S Image of an Airport

Remote Sensing: SAC is involved in design and development of airborne and space-borne multi-spectral & infrared optical and microwave sensors. SAC also develops signal and image processing software, GIS software and many applications for Earth Observation program in diverse areas of agriculture, forestry, coastal zone management, fisheries, urban planning, watershed development, ground water prospecting, snow & glacier studies, oceanography and atmospheric studies, early warning and disaster management support etc. SAC has developed web based real time data archival portals including Visualisation of Earth Observation Data and Archival System (VEDAS) as well as Meteorological and Oceanographic Data Archival Centre (MOSDAC).

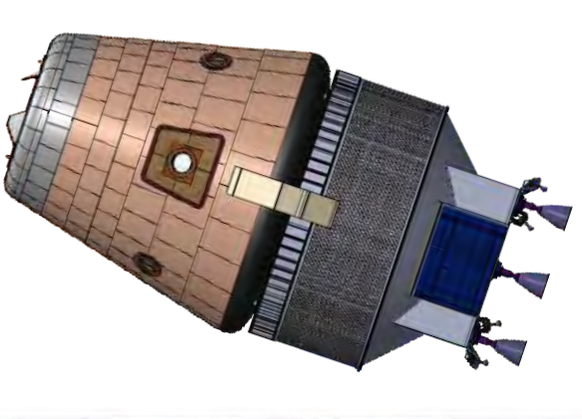


Agriculture forecast

Space Exploration: ISRO has embarked on the space exploration with moon mission (Chandrayaan-1) and Mars Orbiter Mission (MOM). A second moon mission with orbiter, lander and rover was launched in the year 2019. Chandrayaan-3, Human space flight and quantum communication experiments are few upcoming technology initiative projects under progress. Payloads for these space science missions and analysis of data are under progress at SAC.



Space Exploration



Gaganyaan Crew Model

Infrastructure: SAC has a strong in-house infrastructure to support design, fabrication and testing of payload electronics and mechanical hardware while ensuring reliability and quality over mission's operational life. Some of the major facilities are: Microelectronic Fabrication Facilities for Microwave Integrated Circuits (MIC), Monolithic MIC (MMIC), Surface Acoustic Wave (SAW) devices & Low-Temperature Co-fired Ceramic (LTCC) packaging, Payload Fabrication facility, Environmental Test Facility, Thermovac chambers, vibration and shock test facility, Precision mechanical fabrication facility with computer controlled CNC and EDM machines, components screening facility and Bonded store. Computer Aided Design (CAD) facility established in the centre facilitates mechanical and electronic design and drawing generation. SAC has a state-of-the-art, Planetary Simulation and Immersive Visualisation (PLASIV) lab for display of digital elevation models of satellite data.

Quality Assurance: SAC has a dedicated entity responsible for the formulation and implementation of reliability and quality practices, to ensure that all projects undertaken, meet the high degree of quality and consistency. This is implemented through a comprehensive and all-encompassing quality program, covering all aspects of product development that includes multi-tiered design review; careful selection of components and materials; thorough qualification of fabrication processes; stringent quality control during fabrication; and comprehensive characterisation of the developed product through a rigorous test and evaluation. Each of these activities are regularly monitored through quality Audits. The quality program and practices are implemented not only within the centre, but at sub-contractor's facilities as well.

SAC has active collaborations with industry, academia, national and international institutes for research and development.

Under the out reach program SAC has also established state-of-the-art in-house and mobile exhibitions to propagate Space applications & associated technologies amongst students and public at large.

SAC has a well-stocked library to support various R&D activities. The library is affiliated with many international repositories and national repositories like IEEE, SPIE etc. and users may use Wi-Fi to download e-papers and online journals.

The administrative divisions of SAC deal with personnel & general administration, purchase & stores, accounts & finance, etc.

SAC has a dedicated fraternity of 2000+ personnel, comprising of 1700+ scientific & technical personnel and 300+ administrative personnel.

ABOUT COURSE

MEDIUM OF INSTRUCTIONS

The medium of instruction is English. **Proficiency both in written and spoken English is MUST. Candidates 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 in the country or by the local UNDP. The head of the nominating/sponsoring organisation need to affirm the applicant's competence in spoken and written English language. Preference will be given to those who have secured high score in TOEFL examination. Supporting document regarding the accreditation of the institute should be enclosed along with the application.

FACULTY

The faculty for the course consists of scientists and engineers in different fields, drawn from Space Applications Centre, other Centres of Indian Space Research Organisation (ISRO) and various other agencies/Universities from India and other countries, mainly from Asia and the Pacific region. These experts have long and varied experience in the field of satellite communications, satellite technologies and applications. The core faculty has a strong scientific background with a number of publications, experience of participating in international scientific programs and organising a number of courses to their credit.

TECHNICAL FACILITIES

Space Applications Centre has state of the art clean room and various well-equipped laboratories, where, research & development on satellite communication and related topics are carried out. SAC has entire infrastructure to design, develop and fabricate the satellite payloads and associated ground segment. SAC also has capability for installation and commissioning of earth stations on turnkey basis and provides consultancy services to various agencies in building various high end infrastructure .

COURSE METHODS AND TEACHING AIDS

ISRO and SAC has developed expertise in satellite communication over the four decades and launched many communication satellites. Modern methods of teaching and instruction will be used for imparting training during the course. Soft copies of the lectures will be supplied to all the students. The course methods include classroom lectures, online lectures (if necessary), video lectures, computer-based training packages, laboratory experiments, group discussions, demonstrations, seminar presentation and field work / case studies (as applicable). Computer-based interactive packages will also be used for self-learning.

TECHNICAL TOURS

As part of the course, the participants may have the opportunity to visit different centres of ISRO/Dept. of

Space, Govt. of India and other organisations concerned with GNSS depending on Covid pandemic situation. Attending technical tour, as per the course program and schedule is mandatory for all participants.

EVALUATION PROCEDURE

The performance of the participants will be assessed through both external and internal theory tests, practical and computer-assisted interactive tests at periodic intervals during each semester of the course. Participants who are not able to qualify in the prescribed examinations for the 9-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 of the 9-months course, the Centre will award Post Graduate Diploma Certificate. If an eligible participant completes Phase-II Project work i.e. research project in home country satisfactorily within four years of joining of PG Course, the candidate may submit the work to Andhra University (India). The Andhra University will consider award of M.Tech. degree, provided that the participant satisfies all other eligibility criteria.

COURSE EXPENSES AND FINANCIAL ASSISTANCE TO PARTICIPANTS (for Offline course)

The overall expenses for the Course for each participant include Course Fee of Approx. US$ 6000 besides cost for the international travel (to/from Ahmedabad), Local tours and Living expenses.

For this Course, Government of India has offered to waive off the course fee of US $ 6000 per participant of the Asia-Pacific region selected by the Centre.

Thus, no course fee is payable by the selected participants from the Asia Pacific region. However, the participants, who find suitable sponsorship or funding for meeting these expenses, will be given preference.

Government of India also offers a living expenses of INR 16000/- per month fellowship* to only few eligible candidates from the Asia Pacific region. In addition, the following allowances are also offered to all the students.

- Book & printing allowance – INR 2,000 (One time)
- Project allowance-INR 1,500 (one time)
- Further, the expenses of any technical tour conducted and arranged by CSSTEAP is also born by the Government of India

** The selection of recipients of the fellowship will be at the discretion of CSSTEAP.*

The Centre is also trying to obtain financial assistance for international travel of the participants of the Asia-Pacific region through agencies like UN Office for Outer Space Affairs (UN-OOSA), UN Economic & Social Commission for Asia and the Pacific (UN-ESCAP).

Candidates proposing to avail the GOI Fellowship and the international travel assistance have to specifically request for the same in Application Form.

Preference will be given to the sponsored candidates, whose nominating organisation provides fully or partly international air travel (both ways) and/or fellowship.

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 nominating /sponsoring institute/organisation for covering entire health and disability risks. No medical expenses will be borne by the Centre. However, participants may 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. Candidate in sound physical and mental health only need to apply.** Participant, who is not covered by appropriate medical insurance while in India, would be required to take a medical insurance policy in India by themselves.

Medical fitness certificate from Authorised government medical officer covering status of eye, chest (Tuberculosis), vaccinations, heart, lungs, liver, spleen, hydrocele, skin & V.D., Hepatitis, HIV, Yellow fever and other contagious diseases be enclosed with the application form.

(In case if any medical information requiring attention is hidden and if 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 only. Kitchenette facility will be available to the participants. A sum of INR 1500/- per month is to be paid by each participant towards accommodation charges. Boarding and other expenses such as cooking gas are to be borne by the participants. Spouse or any other person will NOT 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 not allowed. Vehicle parking facility will not be provided to the participants within the office premises. No religious or political activities are allowed within the office premises.

COURSE AT A GLANCE

Phase–1 of the course consists two semesters including the Pilot Project in the second semester. Each semester covers specific areas of GNSS. Laboratory experiments and practical demonstration using earth station will be conducted in all the subjects wherever applicable. Broad topics covered in each semester are given below.

SEMESTER 1

Paper № MGNSS.I.1A
Foundation Course

- Introduction to the course and familiarization with logistics and library
- Introduction to activities of CSSTEAP, ISRO and SAC
- Introduction to space agencies and operators
- Basic building blocks of communication
- Introduction to satellite communication
- Principles of satellite navigation
- Introduction to satellite navigation systems
- Engineering Mathematics

Paper № - MGNSS.I.1B
Foundation Lab

- Test instruments – familiarization and operation
- Simulation tools - Matlab and Simulink

Paper № - MGNSS.I.2A
Fundamentals of NAVCOM
Introduction to SATCOM

- Fundamentals of Satellite Orbits & Kepler's Laws
- Propagation of EM Waves
- Fundamentals of Antenna
- Analog and Digital Modulation Techniques
- Multiple access techniques
- Spread spectrum communications & Spreading codes
- Channel Coding & its advantages
- Continuous and Discrete signals and System
- Basics of Digital Signal Processing
- Filtering Techniques: LPF, HPF, BPF
- Basics of PSK Demodulation: PLL, FLL, DLL

Introduction to SATNAV

- GNSS Terminologies
- Definition, History of navigation,
- Conventional Navigation Systems
- Background, concepts and evolutions of GNSS
- GNSS Modulations: BPSK, BOC, MBOC

- Ranging Codes
- Channel characteristics in Satellite Navigation Systems
- Generalized Navigation Signal Structure
- Reference Co-ordinate Systems and its transformations

Paper № - MGNSS.I.2B

Fundamentals of NAVCOM Lab

MATLAB coding of BPSK, QPSK Modulation & Demodulation

- BER Test Set up and Measurements
- Link budget spreadsheet
- Introduction to STK.
- Simulation of Satellite Orbits in STK
- Matlab simulation of PN codes
  - Matlab Simulation of Gold Codes
- Matlab Simulation of GNSS Modulations (BOC, MBOC)

Paper № - MGNSS.I.3A

GNSS Signals and Systems

GNSS System Architecture & Signals

- Generalized system architecture
- Concepts of Frequency and Time
- Basic Attributes of GNSS Signals
- Link Budget Analysis, Data & Pilot components
- GNSS interoperability, compatibility and Co-ordination
- Signal Design for ranging, anti-jamming, anti-spoofing and multiple
- access
- Error Correcting Codes: FEC, BCH, LDPC
- Error Detection Scheme: CRC, Parity Schemes
- Restricted Signals: Key Features, Need of Encryption
- GNSS Navigation Message Structures Design
- GNSS Signal Details: GPS, Galileo, GLONASS, Compass, NavIC,QZSS

Space Segment

- Satellite Navigation Constellation: Design criteria's, Walker, Regional constellation
- Spacecraft Systems: Overview of various spacecraft platforms,Spacecraft subsystems (ACOS, Power, Communication, Thermal etc.)
- Features of a navigation satellite, Mission Operations and Management.
- Navigation payloads: Functional, Performance and Mission Requirements
- Atomic Clocks: Principle of Operation; various Clock Technologies and their performance, clock characterization, Allan deviation
- Subsystems of Payload: Digital subsystems, timekeeping subsystems,
- Active and passive Microwave subsystems
- GNSS Signal Combining architectures
- Satellite Navigation Antennas, Isoflux pattern, significance of phase center
- Quality and Reliability aspects of space systems
- Electrostatic discharge hazards, EMI, EMC, RFI, Radiation effects
- Relativistic effects in GNSS
- Orbital perturbations

Control Segment

- GNSS Control Segment: Functional and Performance Requirements

- Elements of Control Segment
- GNSS Reference Stations
- GNSS System/Network Time; Timing/Frequency References for Network Time
- Two way ranging, time transfer and synchronization
- Satellite Orbit Determination, Modelling and Prediction:
- Satellite Clock Correction: Estimation & Prediction
- GNSS Integrity Monitoring
- Control Segment: Operational Concepts

Advance Topics

- Advance System Concepts: LEO assisted, LEO navigation constellation
- Autonomous Navigation Concepts: Inter-satellite Links, TWTSFT
- Future trends related to the overall system architectures

Paper № - MGNSS.I.3B

GNSS Signals and Systems

GNSS constellation simulation and visualization

- Standard Navigation Data Exchange Formats: RINEX, YUMA, TLE
- Visibility analysis, look angles, DOP analysis, received powers,Doppler etc., effects of satellite downtime, terrain obstructions
- Estimating system availability and performance for any given operating scenario
- Design of a regional navigation constellation based on participant's region or interest
- Modulations in GNSS (based on Matlab and VSG/VSA)
- Spread Spectrum basics
- Simulation of multi-GNSS positioning using Constellation simulator and Receiver.
- NavIC messaging feature live demonstration and message designing.

Paper № - MGNSS.I.4A

Navigation Receivers

- Generalized GNSS Receiver Architecture
- Characteristics of GNSS Antenna: Types of Antenna
- Radio-Frequency (RF) front end
- Different Acquisition techniques
- GNSS Signal Tracking
- Challenges for weak signal acquisition and tracking
- Coherent and non-coherent delay lock tracking, Vector DLL/FLL
- Maximum Likelihood estimate of delay and position
- Receiver noise performance
- Navigation Data Demodulation, Decoding and Processing
- Measurement of pseudo range
- User position and Velocity determination
- GNSS Simulators & Receiver Testing
- Receiver Output (1pps signal), NMEA, RINEX
- Multipath – Simulation & Mitigation
- Interference Detection & Mitigation
- FPGA and ASIC based Receiver Design concepts
- Software Defined Radio (SDR)

Advance Topics

-Basics of Kalman Filtering

-Kalman Filtering for Navigation

Paper № - MGNSS.I.4B

Navigation Receivers Lab

- Mat-lab Simulation of GNSS Signal Acquisition Techniques Coherent and non-coherent delay lock loops Doppler decoding from navigation data
- Receiver noise performance
- Measurement of pseudo range

Paper № - MGNSS.I.5A

Position Determination Techniques

Principle of GNSS Operation

- Trilateration Concept
- Ephemeris and Almanac
- Determination of satellite position, velocity, visibility and ground tracks
- Use of Pseudo-Ranges in Position Calculation
- Code and carrier phase measurements
- Position, Velocity and Time determination techniques
- Errors in GNSS measurements and its mitigation
- Ionospheric Delay Computation & Ionospheric Models (Klobuchar Model, Grid Model, NeQuick Model)
- Troposphere impact on position
- Single point position technique models and estimation methods
- Receiver Position Computation with Single Constellation
- User Receiver Position Calculation with Multi Constellation

Paper № - MGNSS.I.5B

Position Determination Techniques Lab

GNSS Measurements: Pseudo-ranges and code phase measurements

- Carrier Phase Measurements
- Doppler Measurements
- Iono-tropo delay corrections
- User position and Velocity determination
- NMEA, RINEX Format Decoding
- Solving Linearization equation in Mat-lab
- Orbit errors and Satellite Clock errors simulation in STK

Paper № - MGNSS.I.6

Seminar

- **<Topics relevant to the students on GNSS applications>**

SEMESTER-II

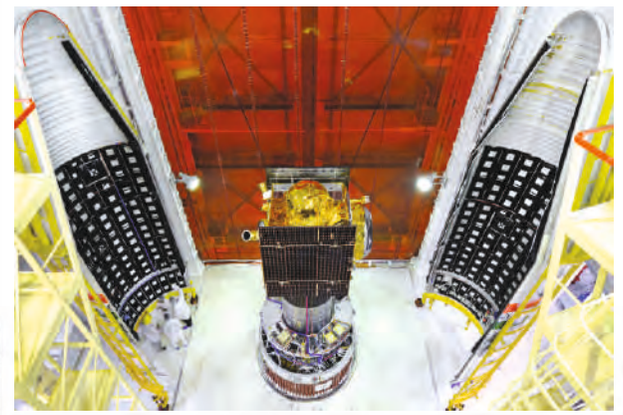
Paper №. - MGNSS.II.1A

Technologies for Advanced receivers and Augmented Systems

- Basics of Encryption and use in GNSS
- Jamming and Interference
- GNSS Spoofing & Receiver Anti Spoofing Techniques
- Basic Concepts of Differential GNSS (DGNSS)
- Real Time and Post Processing DGNSS

  -Real Time Kinematics (RTK)

  -Advanced Receivers(Receivers for Military use, GNSS Reference Receivers, Space Grade Receivers, Differential Receivers, Timing Receivers, GNSS Receivers for Mobile Applications)



- Need for Augmentation Systems
- Satellite-Based Augmentation Systems (SBAS)[Case study of EGNOS, WAAS, MSAS, GAGAN, SDCM, SNAS and SACCSA]
- Ground-Based Augmentation Systems (GBAS), LAAS
- Pseudolite System: Advantage and Challenges
- GNSS Networks (IGS, CORS)

Paper № - MGNSS.II.1B

Technologies for Advanced receivers and *Augmented Systems LAB*

- RTK Demonstration & Experiment
- Demo of GNSS Receiver, Interface to PC & Operation
- Experiment on DGPS
- Dual & Multi Frequency GPS Receivers
- Commands, Programming & Data Logging
- SBAS Receivers: Enabling SBAS Mode & Receiving SBAS Messages
- Error Correction Using SBAS Data
- Technical Visit / Field Visit

Paper № - MGNSS.II.2A

GNSS/INS Integrated Navigation

- Inertial Navigation Systems
- Inertial Sensors
- Inertial Measurement Units
- Inertial Navigation Equations
- Functional Aspects
- Integration of GNSS and INS data using Kalman Filter
- Indoor Navigation
- Typical Applications of integrated navigation

Paper № - MGNSS.II.2B

GNSS/INS Integrated Navigation Lab

- Familiarisation with Inertial Sensors
- Handling Inertial Measurement Units
- Positioning with INS systems
- Integration with GNSS

Paper № - MGNSS.II.3A

GNSS Applications

- Overview of GNSS Applications:
- Designing of Applications

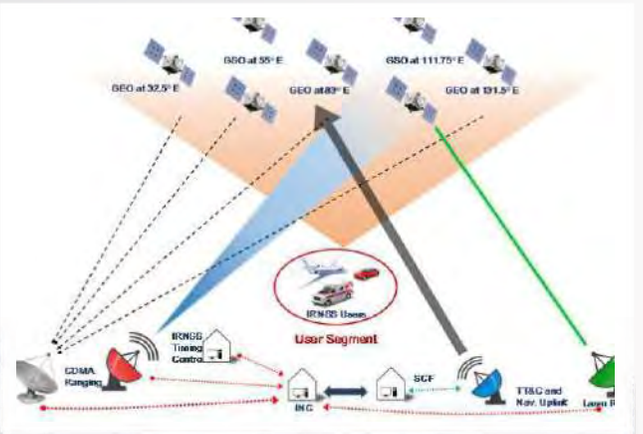
Societal Applications

- Professional and personal navigation
- Location Based services
- Vehicle Tracking
- Aircraft navigation.
- Maritime navigation
- Disaster and Natural Hazard management
- GNSS for Agriculture
- Navigation and Communication integrated applications
- Safety of life Applications

Scientific Applications

- Geodesy
- GIS/ Mapping & Surveying
- On board Orbit determination
- Atmospheric parameters retrieval using GNSS including radio occultation
- GNSS reflectometry
- Seismographic studies using GNSS
- Radiosonde, HSP-PAD
- GNSS altimetry

Strategic Applications:



- Space Flight Navigation
- Ballistic missiles
- Cruise missiles
- Other GNSS applications for Defense
- Timing Applications/networks and frequency synchronization
- Heavy Equipment navigation

Revenue Model for GNSS applications

- Business in GNSS
- Intellectual property and revenue sources for GNSS applications

Paper № - MGNSS.II.3B

GNSS Applications Lab

Designing of Applications

- GIS/mapping
- Design aspects of software for integrating location-based services with position
- Combining satellite navigation with satellite communication

Demonstration of typical applications

- Commercial/Societal application: Vehicle tracking system.
- Scientific application: Real time ionosphere

Paper № - MGNSS.II.4A

Space Weather and GNSS

Ionosphere:

- Definition, structure and dynamics, driving forces
- Dispersive estimation and corrections – Dual frequency measurements
- GNSS monitoring of Ionosphere by ground and space based measurements
- Ionospheric scintillation and their impact, monitoring and modelling
- Ionospheric corrections and threat models

Space Weather:

- Overview and elements of space weather (Sun, Solar activities, solar wind, IMF, etc.)
- Magnetosphere, Thermosphere and MIT coupling
- Interaction of Solar wind with earth's magnetosphere and its effects (PPEF, DDEF etc.) relevant to ionosphere
- Geomagnetic storms and sub-storm effect on ionosphere, ionospheric storms.
- Particle trapping and Van Allen Belt

Impact of space weather events on GNSS

- Satellites: Energetic particles bombardment and interference with solar radio emission.
- Signals and Receivers: ionospheric plasma enhancement, plasmaspheric variation, plasma instabilities and irregularity formation and effects on Radio wave propagation like scintillation

Paper No. - MGNSS.II.4B

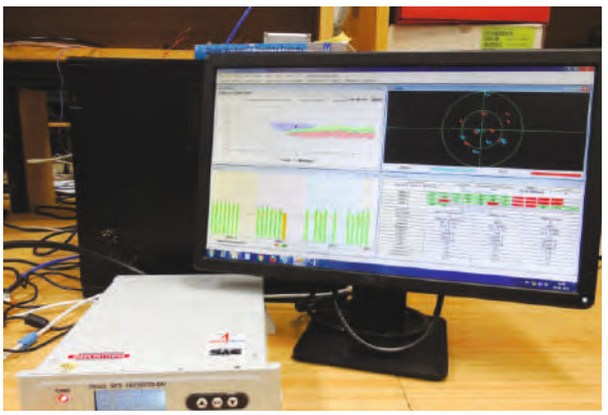
Space Weather and GNSS Lab

- Acquaintances with ionospheric data
- Acquaintance with Space weather parameters
- Study effects of Space Weather on ionospheric irregularities
- Study of Ionospheric scintillation:
- Visits to relevant labs and facilities

Paper No. - MGNSS.II.5

PILOT PROJECT

<Project definition, considering needs of the participant's country, topic of interest of
the participant and work leading towards the one year



CREDIT SYSTEM

Credits will be awarded to the participants based on evaluation through internal and external tests and practicals. Topic-wise credit system, followed for the Course, is given below.

Credit System for Post Graduate Diploma Course in Global Navigation Satellite Systems (GNSS-4)*

Paper	SUBJECTS	SUBJECT CREDITS
SEMESTER-I		
MGNSS.I.1A	Foundation Course	3
MGNSS.I.1B	Foundation Lab	1
MGNSS.I.2A	Fundamentals of NAVCOM	2
MGNSS.I.2B	Fundamentals of NAVCOM Lab	2
MGNSS.I.3A	GNSS Signals and Systems	5
MGNSS.I.3B	GNSS Signals and Systems Lab	3
MGNSS.I.4A	Navigation Receivers	4
MGNSS.I.4B	Navigation Receivers Lab	2
MGNSS.I.5A	Position Determination Techniques	4
MGNSS.I.5B	Position Determination Techniques lab	2
MGNSS.I.6	Seminar	2
	Semester-I Total Credits	**30**
SEMESTER-II		
MGNSS.II.1A	Technologies for Advanced receivers and Augmented Systems	4
MGNSS.II.1B	Technologies for Advanced receivers and Augmented Systems Lab	2
MGNSS.II.2A	GNSS/INSS Integrated Navigation	3
MGNSS.II.2B	GNSS/INSS Integrated Navigation Lab	1
MGNSS.II.3A	GNSS Applications	4
MGNSS.II.3B	GNSS Applications Lab	2
MGNSS.II.4A	Space Weather and GNSS	2
MGNSS.II.4B	Space Weather and GNSS Lab	2
MGNSS.II.5	Pilot Project	10
	Semester-II Total Credits	**30**
	TOTAL	**60**

*** Subject to minor changes**

PHASE – II: ONE YEAR PROJECT

Each eligible scholar, 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 Phase-I in an area relevant to the development of the nominating institution /country. The nominating institution /country is obliged to guarantee that the scholar, on the return, will be provided all facilities to carry out the research work.

In order to make the best use of the knowledge and skill acquired by the participant, the nominating agency is also expected to ensure that the returning 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. However, few meritorious students may be considered for awarding six months to one-year fellowship as per the requirement to complete their one-year project work at CSSTEAP, India. The awardee will be provided support for international travel, travel in India and fellowship.

This course program will be considered complete on acceptance/approval of the submitted project report by Andhra University (India).

ABOUT ANDHRA UNIVERSITY

Andhra University was established in 1926. It is a premier institute of higher learning and a trend-setter 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. The University has strong faculty and was headed by the greatest personalities like Dr. C. R. Reddy, Dr. S. Radhakrishna and others as Vice-Chancellors. Andhra University is one of the premiere Universities in India in terms of Research by the Department of Science and Technology, Govt. of India. Andhra University has one of the biggest Engineering Colleges consisting of large number of Engineering Departments offering UG and PG programs. It has chemical, Electronics and Communication, Computer Science and Systems, Civil, Mechanical, Remote Sensing, Marine, Naval Architecture, Architecture and Planning, Metallurgical, Instrument Technology, Environmental, Electrical and Electronics Engineering Departments. It also offers PG programs in 42 specializations in the above Departments including Nanotechnology, Bio-informatics, Bio-medical, Geo-informatics etc. All the courses are accredited by NBA for 5 years indicating 'A' Grade.

ABOUT AHMEDABAD CITY

Ahmedabad is a metropolitan city and an important business center in Western India. A large number of industries including renowned textile mills are located in and around Ahmedabad. Well-known educational

and research institutions like Indian Institute of Management, Indian Institute of Technology (IIT-GN), Physical Research Laboratory (PRL), Ahmedabad Textile Industries Research Association (ATIRA), National Institute of Design (NID), Space Applications Centre (SAC/ISRO), Institute of Plasma Research (IPR), Centre for Environment Planning and Technology (CEPT) etc. are located here in addition to many universities like Gujarat University, Gujarat Technological University, Gujarat Vidyapeeth, Nirma University, Ahmedabad University, National Law University, National Forensic Sciences University etc.

The famous Sabarmati Ashram, from where Mahatma Gandhi, Father of the Nation organised the non-violent movement during India's freedom struggle, is also situated here. The other places to see in and around Ahmedabad are Adalaj step-well, Kankariya lake, Swaminarayan temple, Vechaar - Utensil museum, Auto World – vintage car museum, Sabarmati river front, Science City etc. There are many restaurants, which serve Gujarati, North Indian, South Indian and continental cuisine. The city has many malls, multiplexes and shopping streets.

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 touch and originate at Ahmedabad. Ahmedabad has Metro rail connectivity within certain parts of the city.

The 9-day dance festival of Garba (October-November), the light and cracker festival of Diwali, the kite festival of Makarsankranti (January 14) and the colour festival of Holi (March) are occasions to enjoy in Ahmedabad. Summers from April to June are very hot. Rainfall in the area is moderate to scanty. The weather is pleasant during November to March.

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

APPLICATION FORM FOR FOURTH POST GRADUATE COURSE ON "GLOBAL NAVIGATION SATELLITE SYSTEMS"

August 1, 2022 to April 30, 2023
at
Space Applications Centre, Ahmedabad, India
Last date for receipt of application: May 01, 2022

GNSS-04
(for office use only)

Application No. :.....

Date Received :.....

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

Affix
Recent Passport
size Photograph

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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. Present Contact Information: (Include Organisation Name, Head of Organisation, Complete Address etc):

.....

.....

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

Home: ..... Office:.....

Mobile:..... Fax:..... E-Mail:.....

9. Permanent Home Address (in your country):.....

.....

.....

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

Telephone:..... Mobile No..... Fax:.....

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

10. Nearest International Airport (Specify the place/city).....

Important:
a) It is essential that full passport details are mentioned in the Application Form. Application Form without passport details may not be considered.
b) Providing alternate email-id would ensure timely communication with applicants.
c) 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).

11. ACADEMIC QUALIFICATIONS:

Degree/(Bachelor/ Master)/ Diploma/School	Normal Duration of Course (mention start and end 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 (2020-2021)

(b) Experience during past 5 years:

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

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

.....

.....

.....

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

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.....

*If required attach separate sheet.

(c) Will you be able to attend classes regularly, if the course/ part of the course is conducted online?

.....

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 GNSS 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) Have you ever been infected by Covid-19 virus? If Yes, When? .....

b) Are you vaccinated against Covid-19 virus? .....

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

d) If yes, please specify nature of illness .....

e) 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 Candidate

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20. SPONSORING / NOMINATING / ENDORSING AGENCY CERTIFICATE:

Dr/Mr./ Ms.....is sponsored/ endorsed by..... to attend the **Fourth Post Graduate Course in "Global Navigation Satellite Systems"** to be held at Space Applications Centre, Ahmedabad, India during August 1, 2022 – April 30, 2023. We envisage to utilize his/her experience in specific tasks of our organisation / agency. The candidate will be allowed to 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. He / She will be allowed to attend the classes if the course/part of the course is conducted online. 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 :
	Email :
(Official Seal of the sponsoring or nominating authority)	

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

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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 GNSS - 04 of CSSTEAP to be held at Space Applications Centre, Ahmedabad, India during August 1, 2022 – April 30, 2023.

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 GNSS-04, Space Application Centre, Ahmedabad, India by fax (+91-79-2691-5807) or Email to **cssteapgnss@sac.isro.gov.in** for quick processing. Original hard copy to be sent through Indian Embassy/High Commission of your country or through your Embassy/High Commission in New Delhi, India, after getting it duly signed by the sponsor / nominating officer

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 organisation or transcript in English can also be submitted.
- Expecting mothers are advised to take a judicious decision before applying and joining the course. Please indicate this information in application form.
- Smoking and consuming alcoholic drinks in class room, office campus and Hostel premises is strictly prohibited.
- Submisson of Covid-19 negative report by contry's authorized medical agency is must at the beginning of the course.
- Candidate is required to strictly follow all necessary covid-19 guidelines recommended by Government of India.

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IMPORTANT DATES FOR GNSS – 04 COURSE

Last date for Receipt of Applications	**May 01, 2022**
Information of Selection	**May 31, 2022**
Commencement of the Course	**August 1, 2022**
Completion of Phase-I (in India)	**April 30, 2023**

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,

Dr. Rajat Acharya
Course Director, GNSS-04, CSSTEAP
Bldg. No.: 24A, Room No.: 20,
Space Applications Centre
Indian Space Research Organisation
Department of Space, Govt. of India
Ambawadi Vistar P.O.,
AHMEDABAD – 380 015
Gujarat (INDIA)
Phone : +91 – 79 – 2691 2420
Fax : +91 – 79 – 2691 5807
Email : cssteapgnss@sac.isro.gov.in

Note: You are requested to directly e-mail a scan copy of the application form signed by the nominating organization, to cssteapgnss@sac.isro.gov.in for taking necessary advance action.

CSSTEAP

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

PRL CAMPUS
Physical Research Laboratory
Navrangpura
Ahmedabad- 380 009 (INDIA)
Tel: +91-79-26314759
Fax: +91-79-2630 2275

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

URSC CAMPUS
U R Rao Satellite Centre
Vimanpura Post
Bengaluru- 560017 (INDIA)
Tel: +91-80-25084383
Fax: +91-80-25084477

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

DELHI OFFICE
Department of Space
Lok Nayak Bhawan
3rd floor, Khan Market
New Delhi- 110 003 (INDIA)
Tel: +91-11-2469 4745
Fax: +91-11-24693871