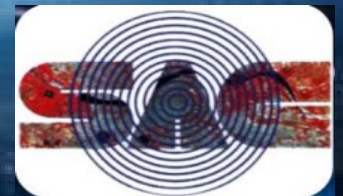


**ONLINE SHORT COURSE
ON
INTRODUCTION TO
SATELLITE NAVIGATION**



Organized by

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

Conducted by:

Space Applications Centre (SAC), ISRO

Online Mode

13 – 24 September, 2021

Introduction to Satellite Navigation

Background

Satellite Navigation, or precisely the Global Satellite Navigation System (GNSS), has extended its footprints today in every walk of life. Moreover, activities on the subject have also boosted up, in both research and industries. To cater the need of those working in this field from varied backgrounds, it has become very necessary to build up the required capacity.

Today satellite positioning has become a standard, precise and easy way for navigation with development in sensor technology. Satellite positioning has become a necessary part of our everyday life. In addition to the legacy global navigation systems of GPS and GLONASS, countries like India, China, Japan and European Union has come up with their Navigation Satellite Services. These initiatives, in addition to populating the orbits and signal spectrum are also likely to increase the satellite navigation applications manifold in varied fields. Capacity building would be the next step for efficient use of the technology in societal development. However, there is a large gap between the technology developing and disseminating the knowledge and information to the application communities. This gap can be bridged by training the professionals, researchers and user groups at different levels by transferring the state of art technology to application community through capacity building. The awareness of various existing and upcoming positioning systems and the knowledge of the concerned technology, among the decision makers would be helpful in effective use of high-end navigation and positioning systems for development of human community.

Keeping this requirement in view and considering the current Covid-19 pandemic situation, For the purpose, *Space Applications Centre, ISRO*, will be conducting an online course in Satellite Navigation, under the aegis of the *Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP)*. The course will be targeted for the beginner level and will focus on three areas, Fundamentals, Technology and Applications. The duration of the course is 2 weeks, i.e. 10 working days, starting from 13th September, 2021 and closing on 24th September, 2021.

The course is designed to serve the end objective of providing a strong concept and working level knowledge to the participants with the faculty selected from the most experienced and acclaimed scientists and engineers from the ISRO. The students will be conferred with a participation certificate on successful completion of the course.

Course Objective

The overall objective of the 10 days training course is to introduce the concepts of the existing technology of GNSS among users, researchers, professionals, decision-makers and academicians. The participants will be introduced and familiarized with the relevant topics of the subject with which they shall be able to (i) know the background of the developments (ii) understand the working principles of the systems, (iii) understand data types and data handling during hands-on sessions (iii) become acquainted with the applications and usage of GNSS and (iv) be readied for advanced courses on GNSS.

Course Contents

The contents of the course are highly integrated and designed to maximize linkages across the following key themes.

Fundamentals

- **Background**
 - Definitions, History and Types
- **Reference System**
 - Reference system, space and time coordinates
- **Position fixing Theory**
 - Linear and Quadratic functions and their solutions
- **Architecture of a Navigation System**
 - Space, Ground and User Segment, Orbital parameters

Technology

- **Navigation Payload**
 - Definition of Payload and important components
- **Navigation Signals**
 - Signal structures, Codes, Multiple access, code and carrier Ranging
- **Satellite Navigation Receivers**
 - Overview, Antenna, Frontend, correlator, nav processor
- **Data Formats and Standards**
 - RINEX, NMEA and other data formats

Applications

- **Positioning Algorithm, Errors & Performance**
- **Primary Navigation Systems**
 - GPS, GLONASS, GALILEO, NavIC and other Systems
- **Differential and Augmented GNSS**
 - Principles and Systems
- **Applications**
 - Societal and Scientific Applications

Course Details

Selection

Course mode:	Online
Announcement:	15 July, 2021
Opening of Application Submission:	15 July, 2021
Closing of Application Submission:	10 August, 2021
Participation Letter to Candidates:	31 August, 2021

Course

Number of Seats:	50
Course Fees:	Nil
Inauguration of the Course:	13 September, 2021
Closing of the Course:	24 September, 2021

Who Should Apply

Professionals

Development and Service Engineers
Technical Professionals and Decision Makers

Researchers & Students

Students and Young researchers
Researchers and Faculties from relevant areas

How to Apply

Candidates having Master's degree in science or Bachelor's degree in engineering or equivalent qualification, preferably with experience in the relevant field of study can apply.

Applicants should send the scanned copy of their application forwarded by the Head of their respective institute for consideration. The application forms are distributed with this brochure and will also be available on request to Course Coordinator, GNSS. The applicant should submit their application through e-mail to cssteapgnss@sac.isro.gov.in, within the stipulated date. Incomplete application will not be considered for selection. Selected candidates will be intimated in due course. It is mandatory for selected participants to attend all lecture sessions for successful completion of this course. There is no course fee for this course.

About CSSTEAP

CSSTEAP was established in India in November 1995 with its headquarters in Dehradun and over the past 25 years, the center has emerged as a Centre of Excellence in capacity building in the field of space science and technology application. The CSSTEAP programs are executed by the faculty of Department of Space at campuses namely, Indian Institute of Remote Sensing (IIRS), Dehradun, Space Applications Centre and Physical Research Laboratory, Ahmedabad and UR Rao Satellite Centre, Bengaluru. The training programs includes PG and Short Courses on RS & GIS, Satellite Communications, Satellite Meteorology and Global Climate, Space & Atmospheric Science, Global Navigation Satellite Systems, Small Satellite Missions and DRR regularly. Besides this, many short courses, webinars, MOOC and workshops on various themes are also organized. For more information visit www.cssteap.org.



Dr. Prakash Chauhan
Director, CSSTEAP

About SAC

Space Applications Centre (SAC), one of the major centers of the Indian Space Research Organization, is engaged in the research and development of applications of Space Technology in the field of Communications, Remote Sensing, Meteorology, and Satellite Navigation. Its achievements include development of communication, navigation and meteorological payloads and designing various applications. SAC provides its infrastructure to conduct training courses to the students of CSSTEAP. For more information, visit www.sac.gov.in



Shri Nilesh Desai
Director, SAC

Contact Us



Course Director, GNSS

Space Applications Centre,
Ahmedabad, Gujarat, INDIA

Phone: +91 79 2691 2420
cssteapgnss@sac.isro.gov.in



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

**APPLICATION FORM FOR SHORT COURSE ON
“INTRODUCTION TO SATELLITE NAVIGATION”**

September 13 - 24, 2021

Conducted by

Space Applications Centre, Ahmedabad, India

(Through Online mode)

Last date for receipt of application: August 10, 2021
(Through e-mail: cssteapgnss@sac.isro.gov.in)

**Affix
Recent Passport
Size Photograph**

1. Name (Dr/Mr/Mrs/Miss):

2. Father's Name:

3. Date of Birth (DD/MM/YYYY): 4. Place of Birth:

5. Gender (Male/Female): 6. Nationality:

7. Contact Information: Present official Address (Valid until what date):

.....
.....

Home: Office:

Mobile: E-mail:

8. Permanent home Address (in your country):

.....

Telephone: Alternate E-Mail (G-mail or Yahoo):

9. ACADEMIC QUALIFICATIONS:

Degree (Bachelor/ Master)/ Diploma	Duration of Course (mention from year to year)	University/ Institution Name	Year of passing	Grade/ %	Major Subjects/ Specialization

10. DETAILS OF EXPERIENCE:

(a) Present Position:

Organization and Complete Address.....

.....

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

(b) Experience during past 5 years:

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

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

.....

12. 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

13. DECLARATION BY THE CANDIDATE:

I have read the announcement brochure and the information provided in the application are correct.

Date :

Place:

Signature of Candidate

14. NOMINATING AGENCY CERTIFICATE:

Dr/Mr./Ms.....is nominated to attend the Short Course on "Introduction to Satellite Navigation" to be conducted by Space Applications Centre, Ahmedabad, India during September 13- 24, 2021 through online mode. It is envisaged that the knowledge and experience to be gained by him/her in this course will be utilized in of our organization. He / She possesses adequate knowledge of English Language required for the course.

Date :

Signature:

Place :

Name in Capital Letters:

Designation :

Phone No :

Email :

(Official Seal of the nominating authority)

Send the scanned copy of application form duly signed by Head of the nominating agency to the Course Director, CSSTEAP GNSS, Space Applications Centre (ISRO), through Email at cssteapgnss@sac.isro.gov.in.