RESEARCH AND TRAINING UNIT FOR NAVIGATIONAL ELECTRONICS
OSMANIA UNIVERSITY - HYDERABAD 500007

Two 5-Day Short Courses on
GLOBAL NAVIGATIONAL SATELLITE SYSTEMS (GNSS-16)

GNSS TECHNOLOGIES & APPLICATIONS (Course Code: NERTU/SC/64) (08-12, DECEMBER 2016)	GNSS SIGNAL PROCESSING (Course Code: NERTU/SC/65) (13-17, DECEMBER 2016)

Location: NERTU Auditorium, OU

Dates : December 08-17, 2016

Time : 09.00AM – 05.30PM

SPEAKERS

1. Dr.K.S.Parikh, SAC
2. Shri.Mruthyunjaya, ISAC
3. Shri U.N.Mishra, SoI
4. Smt. Saumi De, SAC
5. Smt. Sudha Rani, DLRL
6. Shri M.Kannan, RCI
7. Dr.Nirvikar Dashora, NARL
8. Dr.Prasad Krishnan, IIITH
9. Dr.Joshi Catherine NGRI
10. Dr.Qudussa Sultana, DCET
11. Dr.Lalitha Vadlamani, IIITH
12. Prof.Sasibhushana Rao, ECE, AU
13. Dr.Arjun Singh, Shakti Aviation
14. Prof.A.D.Sarma, CBIT
15. Prof.P.Laxminarayana, NERTU, OU

Registration Fee (in INR)

	Basic or Advanced	Both
Full Time Students	3,000	5,000
Teachers	6,000	9,000
Scientists from R & D Organizations	9,000	15,000
Engineers from Industries & Commercial Organizations	15,000	25,000

DD/Cheque should be drawn in favor of

The Director, NERTU, OU

Accommodation Available for limited number of participants at University Guest House on payment basis.

Last Date for Registration:
November 30, 2016
For Schedule, Registration Form and other Details, please see the website
www.osmania.ac.in or
http://www.uceou.edu
or Contact the Coordinator, GNSS-16

Prof.P.Laxminarayana, Director, NERTU

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Overview of Course: GNSS Technologies and Apllications (Basic)

The first two GNSS systems GPS and GLONASS were developed by defence departments of USA and Russia, almost every citizen in the USA, Russia and in the world are using GPS for navigation and other applications. Augmentation systems like WAAS, EGNOS, MSAS and GAGAN were developed to improve the accuracy, continuity, availability and integrity of GPS in their regions for civilian aviation and other applications. Further other GNSS constituents COMPASS and Galileo were developed by China and European Union. QZSS is the Japan's Regional Navigational Satellite system cum augmentation system. Similarly IRNSS is the Regional Navigational Satellite system developed by India to cover the India and its surrounding region.

The main objective of this course is to introduce the basic concepts of Global Navigational Satellite Systems, its applications and its limitations. This basic course will cover the topics: Principle of operation of GPS or any GNSS system, architecture of GPS, GLONASS, Galileo, Compass and Navic etc. Errors in GPS or GNSS, principle of operation, architecture and Signal structure of GNSSs, DGSPS, augmentation systems, WADGPS and Applications of GNSS. Basics of GNSS receiver specifications, and integration of GNSS receiver or chip with other applications. **Expected participants are working engineers, scientists, academicians, research scholars and students interested to understand the mechanism of GNSS for different applications and its limitations. This course is open for all candidates, who are interested to understand the basic concepts of GNSS.**

Overview of Course: GNSS Signal Processing (Advanced)

Though many people are using GPS or GNSS for navigation and other applications, very few people are working to develop the GNSS receivers and simulators, where lot of signal processing and communication concepts are required. Ofcourse understanding all concptes required to develop a complete GNSS system is more difficult and challenging problem. So this course will cover the basics of GNSS receiver, software receiver algorithms, integration of GPS with other navigation systems etc.

The main objective of the course is to give the basic concepts and advances in development of GNSS Systems and software receiver. The topics to be covered are: Basics of signal processing and communication, Signal structure of GNSS systems, Overview of GNSS receiver, Antennas and front ends, Signal Acquisition, Carrier and Code Tracking, Data Processing, Navigation Solution, Kalman Filtering and assisted GPS, GNSS and INS integration. Targeted participants are working engineers, scientists, academicians, research scholars and students interested to work or do the research in software radio or GNSS receivers. **Participants are expected to have the UG level knowledge in signal processing and communication engineering.**

About NERTU

The Research and Training Unit for Navigational Electronics (NERTU) is established in 1982. It is the focal point for research and training in the areas of Electronic Navigation in India. Since its inception, NERTU has successfully executed **47** sponsored and consultancy projects funded by DRDO, ISRO, DST, MIT, ECIL, HAL, BEL, AICTE and ASL. Currently, several projects in different areas related to navigation, signal processing and communications are in progress. It has also conducted **60** short term courses/workshops/conferences on various topics of signal processing, communications and navigation.

NERTU has been conducting almost one or two short term courses per year in the area of GNSS, since 1992. Scientists, engineers, academicians and research scholars from many organisations have participated and benefited from these courses. There was very good participation in the GNSS -14 and GNSS-15, from many organizations spread throughout India.

Interested candidates can download the registration form from www.osmania.ac.in or http://www.uceou.edu and send the filled form along with DD/Cheque, before November 30, 2016, to "The Coordinator, GNSS-16, Research and Training Unit for Navigational Electronics (NERTU), Osmania University, Hyderabad 500007".

Two 5-Day Short Courses on GLOBAL NAVIGATIONAL SATELLITE SYSTEMS 08-17, December 2016 (Tentative Schedule)

Research and Training Unit for Navigational Electronics, Osmania University, Hyderabad-500007

		09.00 - 10.00	10.00 - 11.00	11.30-13.00	14.00.15.30	16.00-17.30
Day-1 **Thu 08/12**	GNSS Technologies and Apllications	Registration 09.00 - 10.00	**Inaugural Function**	**Overview of GNSS** Prof.P.Laxminarayana	**GPS Architecture** Prof.P.Laxminarayana	**GPS Signal Structure** Dr.Qudussa
Day-2 **Fri 09/12**		**Error Sources, Models Measurements and Observable Modeling** Prof.A.D.Sarma	Prof.A.D.Sarma	**Other GNSS Constellations GLONASS/Galileo** Dr.Arjun Singh	**Other GNSS Constellations QZSS and Beidou** Dr.Arjun Singh	**Positioning Techniques and DOP** Prof.P.Laxminarayana
Day-3 **Sat 10/12**		**Differential Concepts and DGPS** Prof.P.Laxminarayana	**Augmentations Systems** Dr.Arjun Singh	**DGPS Standards** Dr.Arjun Singh	**GNSS Receiver Basics & Practical Aspects**	**GNSS Market** Prof.P.Laxminarayana
Day-4 **Sun 11/12**		**GNSS Applications-Civil Aviation** AAI	**GNSS Applications-Civil Aviation** AAI	**Geodesy and Datums** Shri U. N. Mishra	**GNSS Applications-Surveying-Geospatial** Shri U. N. Mishra	**GNSS Applications-Defence** Shri M.Kannan
Day-5 **Mon 12/12**		**Time & Frequency Applications** Smt. Sudha Rani	**GPS and Crustal deformation studies in India** Dr Joshi Catherine	**IRNSS/NAVIC** Ssri.L.Mruthyanjaya	**IRNSS/NAVIC** Shri.L.Mruthyanjaya	
Day-6 **Tue 13/12**	GNSS Signal Processing (Advanced)	Registration & Course Overview Prof.P.Laxminarayana	**Overview of GNSS** Prof.P.Laxminarayana	**GPS Signal Structure and Message Content** Dr.Qudussa	**Spreading Codes and characteristics Error Correction Codes** Dr.Prasad Krishnan	**Spreading modulations and signal mathematical representations** Dr.V.Lalitha
Day-7 **Wed 14/12**		**GLONASS signals** Prof.P.Laxminarayana	**Galileo signals** Prof.P.Laxminarayana	**QZSS and BeiDou (Compass) signals**	**IRNSS Signals**	**GNSS Receiver Overview** Prof.P.Laxminarayana
Day-8 **Thu15/12**		**GNSS Antennas** Dr.K.S.Parikh	**Receiver front-end design** Dr.K.S.Parikh	**Analog to digital conversion**	**Synchronization/ Acquisition** Prof.P.Laxminarayana	**Digital Tracking Loop Design-Basics**
Day-9 **Fri 16/12**		**Carrier tracking** Mrs. Saumi De	**Code tracking** Mrs. Saumi De	**Scintillations/DLL/PPL/ Cycle Slip in Software and Hardware approach** Dr.Nirvikar Dashora	**Data Decoding Navigation Solutions Algorithms: Pseudo range & PVT** Prof.P.Laxminarayana	**Receiver Impairments and Enhancements**
Day-10 **Sat 17/12**		**Basics of Kalman Filtering** Prof.Sasibhushan	**Kalman Filtering for GNSS Navigation** Prof.Sasibhushan	**GPS and INS Integration** Shri M.Kannan	**Tools and Softwares for development of GNSS Receivers and Applications** Prof.P.Laxminarayana	**Valedictory Function**

(Between columns: TEA / LUNCH / TEA)