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Global Navigation Satellite Systems And Applications

By Prof. Arun K. Saraf | IIT Roorkee

 Go to course [\(course?user_email=krishnajyothi.n@gmail.com\)](#) **Learners enrolled: 1700**


The proposed course provides basic understanding about digital elevation models (DEMs) and their applications in Civil Engineering and Earth Sciences. Further, in the proposed course various DEMs, their source, generation techniques, derivatives, errors and limitations would be discussed extensively. Surface Hydrologic Modelling using DEMs, modelling derivatives and their applications would also be discussed.


INTENDED AUDIENCE: Under and post-graduate engineering and post graduate science students/Faculty

PRE-REQUISITES: Current students of engineering, post graduate science students and PhD students should have basic knowledge of GIS and Remote Sensing

INDUSTRY SUPPORT: Geoinformatics companies, e.g NIIT, ESRI India, Leica Geoinformatics, MapmyIndia, ISRO, etc.

Summary

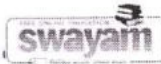
Course Status :	Completed
Course Type :	Elective
Duration :	4 weeks
Category :	<ul style="list-style-type: none"> Earth Sciences
Credit Points :	1
Level :	Undergraduate
Start Date :	29 Jul 2019
End Date :	23 Aug 2019


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Exam Date :

29 Sep 2019 IST

Note: This exam date is subjected to



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at availability. You can check final exam date on your hall ticket.

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Course layout

WEEK-1: Introduction to Global Navigation Satellite System (GNSS)

- How position is determined by the GNSS? (Part-I)
- How position is determined by the GNSS? (Part-II)
- How position is determined by the GNSS? (Part-III)
- NAVSTAR - Global Positioning System

WEEK-2: Global Navigation Satellite System (GLONASS)

- BeiDou Navigation Satellite System (BDS)
- Indian Regional Navigation Satellite System (IRNSS)
- GALILEO
- Quasi-Zenith Satellite System (QZSS)

WEEK-3: Differential Global Navigation Satellite System (DGNSS)

- REAL-TIME KINEMATIC (RTK)
- Satellite Based Augmentation System (SBAS)
- GNSS Errors
- GNSS Correction Methods

WEEK-4: Why altitude estimated by GNSS receivers is not very accurate

- Global Navigation Satellite Systems (GNSS) Applications - I
- Global Navigation Satellite Systems (GNSS) Applications - II
- GNSS: Current Trends and Future
- GNSS: Opportunities in India

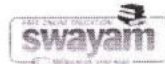
Books and references

- Awange, J. L., 2012. Environmental Monitoring using GNSS: Global Navigation Satellite Systems, Springer, London.
- Bhatta, B., 2010. Global Navigation Satellite Systems: Insights Into GPS, Glonass, Galileo, Compass, and Others, BS Publications, New Delhi.
- Grewal, M. S., Weill, L. R., Andrews, A. P., 2006. Global Positioning Systems, Inertial Navigation, and Integration, John Wiley & Sons, New York.
- Hofmann-Wellenhof, B., Lichtenegger, H., Wasle, E., 2008. GNSS – Global Navigation Satellite Systems, Springer, Verlag Wien.
- Hofmann-Wellenhof, B., Lichtenegger, H., Collins, J., 2001. Global Positioning System Theory and Practice, Springer, Verlag Wien.
- Tan, S., 2018. GNSS Systems and Engineering: The Chinese Beidou Navigation and Position Location Satellite, JohnWiley & Sons, Singapore

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Instructor bio


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Prof. Arun K. Saraf is Ph. D. (Remote Sensing) from University of Dundee, United Kingdom. Presently he is working as Professor in the Department of Earth Sciences, Indian Institute of Technology, Roorkee, and teaches courses on Geographic Information Systems (GIS), Advanced GIS, Remote Sensing, Geomorphology etc. to undergraduate and post-graduate students of Geological Technology and Applied Geology. He was also Head of Department of Earth Sciences between Jan. 2012 – Feb. 2015. He was first in the country to introduce GIS course to post-graduate students in the year 1990. In 1986, he was awarded "National Fellowship to Study Abroad" by Govt. of India for his doctoral degree. Further, in 1993 he was awarded "Indo-US S&T Fellowship" and worked in Goddard Space Flight Centre, NASA, USA for Post Doctoral Research. He has been also awarded "National Remote Sensing Award-2001" by Indian Society of Remote Sensing and "GIS Professional of the Year Award-2001" by Map India 2002 for his outstanding research contributions in the fields of Remote Sensing and GIS. Earlier, he has also been given several Khosla Research Awards and Prizes by then University of Roorkee. So far Prof. Saraf has published more than 100 research papers in journals of repute (ISI) and supervised 11 Ph.Ds. He was also Associate Editor of International Journal of Remote Sensing during 2003-2015. Through funding from DST, Min. of Earth Sciences, CSIR, Prof. Saraf has been able to establish and operating NOAA-HRPT Satellite Earth Station at IITR since Oct. 2002, first in any educational institute in the country. This Earth Station is still operational and acquiring data from NOAA-18 & 19 day-and-night. Further, recently Prof. Saraf have also recorded three NPTEL video courses on Introduction to Geographic Information Systems, Introduction to Remote Sensing and Digital Image Processing of Remote Sensing Data.

Course certificate


- The course is free to enroll and learn from. But if you want a certificate, you have to register and write the proctored exam conducted by us in person at any of the designated exam centers.
- The exam is optional for a fee of Rs 1000/- (Rupees one thousand only).
- Date and Time of Exams: 29th September 2019 Morning session 9am to 12 noon; Afternoon Session 2pm to 5pm.
- Registration url: Announcements will be made when the registration form is open for registrations.
- The online registration form has to be filled and the certification exam fee needs to be paid. More details will be made available when the exam registration form is published. If there are any changes, it will be mentioned then.
- Please check the form for more details on the cities where the exams will be held, the conditions you agree to when you fill the form etc.

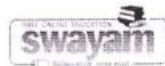
CRITERIA TO GET A CERTIFICATE

- Average assignment score = 25% of average of best 3 assignments out of the total 4 assignments given in the course.
- Exam score = 75% of the proctored certification exam score out of 100
- Final score = Average assignment score + Exam score

I WILL BE ELIGIBLE FOR A CERTIFICATE ONLY IF AVERAGE ASSIGNMENT SCORE $\geq 10/25$ AND EXAM SCORE $\geq 30/75$.

- If one of the 2 criteria is not met, you will not get the certificate even if the Final score $\geq 40/100$.
- Certificate will have your name, photograph and the score in the final exam with the breakup. It will have the logos of NPTEL and IIT Roorkee. It will be e-verifiable at nptel.ac.in/noc (<http://nptel.ac.in/noc>).
- Only the e-certificate will be made available. Hard copies are being discontinued from July 2019 semester and will not be dispatched.


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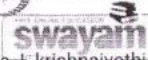


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4	$\frac{1}{2}$ FDP of one week
8	Full FDP of one week
12	$1\frac{1}{2}$ FDP



Duration of NPTEL course: 4 Weeks



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This certificate is awarded to

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for successfully completing the course

**Global Navigation Satellite Systems and
Applications**

with a consolidated score of **61 %**

Prof. Andrew Thangaraj
NPTEL Coordinator
IIT Madras

Prof. Dileep N. Malkhede
Advisor-I (Research, Institute & Faculty Development)
All India Council for Technical Education

(Jul-Aug 2019)

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To validate and check scores: <http://nptel.ac.in/noc>

The candidate has studied the above course through MOOCs mode, has submitted online assignments and passed proctored exams.
This certificate is therefore acceptable for promotions under CAS as per AICTE notifications dated 24th July 2018, similar to other refresher / orientation courses.
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Department: Electronics and Communication Engineering

2019-20

REPORT

FDP on “Global Navigation Satellite Systems And Applications”

Date of program: 29-07-2019 to 23-08-2019

Resource person: Prof. Arun K. Saraf, IIT Roorkee

About the Program: The proposed course provides basic understanding about digital elevation models (DEMs) and their applications in Civil Engineering and Earth Sciences. Further, in the proposed course various DEMs, their source, generation techniques, derivatives, errors and limitations would be discussed extensively. Surface Hydrologic Modelling using DEMs, modelling derivatives and their applications discussed. This course improves my teaching strategies and skills as a beginner.

Signature of the Faculty member

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