START-2026 Theme: "Observations from space"

Lecture Topics and Speakers

No.	Date and Time (hrs)	Lecture Title	Synopsis	Speaker
	11th March 2026 15:00 – 15:30	**Inauguration**		
Introductory Lecture (Setting the Context of START 2026)				
	11th March 2026 15:45 – 16:30	What, Why and How do we Observe from Space: Context Lecture to the START-2026	An overview lecture	Dr. Tirtha Pratim Das, Director, SPO, ISRO HQ
I.	**Foundations & Motivation**			
2	12th March 2026 15:15 – 16:00	**The Electromagnetic Spectrum**	Map specific spectral bands (Gamma to Radio) to the physical processes they reveal in the universe	Prof. Somak Roychowdhury, VC, Ashoka University
3	12th March 2026 16:00 – 16:45	**Orbital Mechanics**	Kepler's Laws and the specific utility of different orbits. Contrast Geostationary (weather/comm) with Polar/Sun-synchronous orbits (consistent lighting for Earth imaging)	Shri M Srikant, URSC
4	13th March 2026 15:15 – 16:00	**The Space Qualification and Environment**	Discuss on harsh environment, space qualification, vacuum effects (outgassing), thermal cycling in sunlight vs. shadow, and the impact of solar flares and cosmic rays on sensitive electronics, Challenges faced by astronauts in space environment	Dr. Srikar, URSC
II.	**Earth Observation (Remote Sensing)**			
5	13th March 2026 16:00 – 16:45	**Principles of Remote Sensing**	Distinguish between passive (sunlight reflection) and active (laser/radar) sensing. Introduce spatial, spectral, and temporal resolution as the "Big Three" metrics	Dr.R.P.Singh, IIRS
6	16th March 2026 15:15 – 16:00	**Optical hyperspectral Imaging**	How multi-spectral imaging differentiates between urban concrete, water bodies, and healthy forests	Dr.B.N.Sharma, SAC

7	16th March 2026 16:00 – 16:45	**Microwave & Radar (SAR)**	Detail how Synthetic Aperture Radar (SAR) "sees" through clouds and smoke. Explain "backscatter" and its use in flood mapping and deforestation	Dr.Dharmendra Kumar Pandey, SAC
8	17th March 2026 15:15 – 16:00	**Thermal Remote Sensing**	Focus on Planck's Law. Explain how measuring long-wave infrared allows us to monitor global warming, ocean currents, and urban heat islands at night	Dr.Mehul Pandya, SAC
9	17th March 2026 16:00 – 16:45	**Atmospheric Sounding**	Describe "limb sounding" and vertical profiling. Cover how sensors detect trace gases and moisture levels at different altitudes to predict weatherand radio sounding	Dr. Munn Vinayak Shukla, SAC
III. Space-Based Astronomical observations				
10	18th March 2026 15:15 – 16:00	**High-Energy Astrophysics**	Focus on "grazing incidence" mirrors. Explain why X-rays require special optics and what they reveal about black hole accretion disks and supernovae	Dr. Santosh Vadawale, PRL
11	18th March 2026 16:00 – 16:45	**Ultraviolet Astronomy**	Observation of the "hot universe." Why UV is critical for studying the birth of massive stars and the composition of the interstellar medium.	Dr. Girish V, SPO, ISRO HQ
12	20th March 2026 15:15 – 16:00	**Visible Light Astronomy**	Discuss the elimination of "atmospheric breaking" (scintillation). Explain how space allows for ultra-stable photometry and extremely deep-field imaging	Prof.Anandamayee Tej, IIST
13	20th March 2026 16:00 – 16:45	**Infrared Astronomy**	Focus on the need for cryogenic cooling. Explain how IR wavelengths penetrate dust clouds to reveal protostars and redshifted galaxies from the early universe	Prof.Sashikiran Ganesh , PRL
14	23rd March 2026 15:15 – 16:00	**Sub-millimeter Astronomy**	Cold-universe physics, thermal emission from dust and molecular rotational transitions. Why high-altitude, dry sites are required to avoid water vapor absorption	Prof. Bhaswati Mookerjea, TIFR

			and how this field reveals star-forming nurseries and the Early Universe	
15	23rd March 2026 16:00 – 16:45	**Radio Astronomy**	Non-thermal emission (synchrotron and free-free) and the 21cm line of neutral hydrogen. Explain antenna theory (single-dish vs. interferometry), brightness temperature, and the ability to observe the sky regardless of day, night, or interstellar dust obscuration. A brief introduction to GMRT	Dr. Mayuri Rao, RRI
16	24th March 2026 15:15 – 16:00	**Multi-Messenger Astronomy**	Discuss the synergy between "Light" and "Non-light" signals. How space telescopes are alerted to follow up on gravitational wave detections or neutrino bursts.	Prof. Somak Roychowdhury, VC, Ashoka University
IV. Instrumentation & Technology for Space-Based Exploration				
17	24th March 2026 16:00 – 16:45	**Optics in Space**	Discuss material choices (e.g., Beryllium) for lightness and thermal stability. Cover the complexity of folding mirrors and "wavefront sensing" to maintain focus	Dr. B. Vishweshwar Rao, Sci./Eng.- SG, LEOS
18	25th March 2026 15:15 – 16:00	**Detectors and Sensors**	Compare CCD vs. CMOS technology. Explain the "Photoelectric Effect" and how quantum efficiency determines how many photons are actually captured	Sri.Nitesh Thapa, SAC
19	25th March 2026 16:00 – 16:45	**Spectroscopy Fundamentals**	How gratings and prisms disperse light. Focus on identifying "spectral lines" to determine temperature, pressure, and chemical abundance	Prof.Mudit Srivastava, PRL
20	26th March 2026 15:15 – 16:00	**Photometry and Astrometry**	The measurement of light intensity over time (light curves) and the precise mapping of stellar positions to detect exoplanets via the wobble/transit methods	Dr.Priyanka Chaturvedi, TIFR
21	26th March 2026 16:00 – 16:45	**Mass Spectrometry**	How mass spectrometers carry information about planetary atmosphere; working principle, examples from recent missions	Dr. M B Dhanya, SPL

22	30th March 2026 15:15 – 16:00	**Langmuir Probes and Particle Measurements**	Introduction to Langmuir Probes, working principle; Particle detectors, parameters measured (electron temperature, electron concentration, etc.)	Dr. Smitha V T, SPL
23	30th March 2026 16:00 – 16:45	**Measurement of Planetary Ground Vibraions**	Seismometers for planetary exploration, MEMS-based seismometers, working principles, example of Ch-3 seismometer	Dr. Jiju John, LEOS
V.	**Data Processing and Research Opportunities**			
24	1st April 2026 15:15 – 16:00	**An Introduction to SPICE**	The need of contextual information in space-based observation, Concept of Kernels, types of Kernels, etc	Sri. Ajay Kumar Prashar, SAC
25	1st April 2026 16:00 – 16:45	**The Data Downlink and Archival**	"Deep Space Network" (DSN). Discuss on different data levels, compression, bit-error rates, and the constraints of limited bandwidth from distant spacecraft; data archival philosophy	Shri Himanshu Pandey, ISTRAC
26	2nd April 2026 16:00 – 16:45	**Space Science and Technology Career Opportunities in India**	Various domains of Space Science, Major Laboratories/ Institutes / Centres involved in Space Research, Opportunities for student internship, project and apprenticeship	Dr. K. Praveen Kumar, ISRO HQ