SOKENDAI CampusPlan Web Service

Syllabus Reference

Course title	Introduction to Observational Astronomy I		
Term	前期 1st Half		
Credit(s)	2		
The main day		The main period	
School/Program	School of Physical Sciences		
Department/Program	Common Subjects of Physical Sciences		
Category	Common Subjects of Physical Sciences		
Lecturers	KAWABE, NAMIKI, NAGAI, HADA		

Instructor

Full name
* KAWABE RYOHEI
NAMIKI NORIYUKI
NAGAI HIROSHI
HADA KAZUHIRO

Outline	This course introduces the latest views of the universe and solar systems unveiled by observations with ground-based telescopes and space missions (optical/IR observations will be briefly covered as well as radio observations). We learn the historical overviews of radio observations, various radio emissions, observing techniques such as radio interferometer and VLBI, and results from observations of star- and planet-forming regions, our Galaxy, cosmic star formation. Also, we learn lunar and planetary missions and planetary science.
Goal	This course aims at understanding importance and essence in observations of the solar system and universe with using state-of-art telescopes and instruments and also aims at acquiring basic knowledge desired for planning original astronomical observations using telescopes and instruments best-fit for your own ideas and science.

Grading system

	Grading system
Grading system	01:Four-grade evaluation (A,B,C,D)

Grading policy	Grading will be based on examinations (including reports, oral examinations during lectures) and your attendance rate. You should be rated higher than 60 points out of 100 for earning credit in this course.
Lecture Plan	1) Key Features and Roles of Radio Observations(Kawabe):Key features of radio observations will be introduced with their roles in astronomy and astrophysics. 2) Overview of Radio Emissions (Kawabe):Various emissions in meter- to submillimeter- wavelength are explained together with physical quantities inferred from the observations of radio continuum emissions and spectral-line emissions. 3) Interstellar Matter(Kawebe):The basic characteristics of interstellar matter will be overviewed with showing observational results. 4) Introduction to lunar and planetary missions (Namiki):In lunar and planetary missions, observational methods are classified into three types; remote sensing observations, lander equipment, and sample return. Methodology of these types are briefly explained. 5) Gravity Measurement(Namiki):Gravity measurement by using range rate data, and its implication to planetary interiors are discussed. 6) Topography measurement (Namiki): Range data are used to reconstruct topography model of planetary bodies. Origin and evolution of planets and satellites are elucidated from gravity and topography data. 7) Star Formation(Kawabe):The process of star formation with showing latest observational results and basic dynamics of interstellar matter will be lectured. 8) Planet Formation and Exoplanets(Kawabe):The process of planet formation and latest ALMA results

	of protoplanetary disks will be overviewed together with the recent advancement of exoplanet research. 9) Galaxies(Nagai):How radio astronomy has unveiled the ISM composition in galaxies, star formation, in galactic scale, and galaxy evolution will be explained. 10) Active Galactic Nuclei (Nagai):Understanding of active galactic nuclei including circumnuclear region (< ~ 100 pc) and close vicinity of the black hole from the radio-astronomy viewpoints will be explained. 11) Radio Astronomy with Time-domain astronomy with radio astronomy (Nagai):Review the science with time-domain and multi-messenger astronomy and its relation with radio astronomy. 12) Introduction to VLBI(Hada):A general overview of VLBI astronomy (basics, features, VLBI networks in the world, science) will be presented. 13) Basics/Fundamentals of VLBI(Hada):Some fundamentals of VLBI technique and observations (how VLBI works, observables, calibration, imaging, comparison with connected arrays etc.) will be lectured. 14) VLBI Data Analysis (Hada):Practical procedures of VLBI data reduction, calibration and imaging will be lectured. 15) Science with VLBI(Hada):Various key science topics achieved by VLBI (black-hole shadow, active galactic nuclei, star formation regions, galactic astrometry etc.) will be introduced together with recent observational results.
Location	NAOJ Mitaka Campus
Language	English
Textbooks and references	Not specifies

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