

Special Subjects of the Department of Astronomical Science

Field	Course Code	Subject	Credit	Content of subject	Instructor
Infrared Astronomy	20DASa01**	Introduction to Optical/Infrared Telescope	2	A principle of optical and infrared telescopes is presented as well as the basics of observation such as spectroscopy and photometry.	T. Usuda S. Miyazaki S. Ohya J. Nomaru Y. Minowa
	20DASa02**	Introduction to Optics	2	Basics of optics are lectured. Topics will be aberration, and the methods to evaluate a optical system.	K. Sekiguchi, S. Miyazaki S. Hayashi Y. Hayano
	20DASa03**	Optical/Infrared Observation Instruments	2	Principles of various detectors in optical and infrared observations are lectured.	N. Gouda H. Takami S. Miyazaki S. Hayashi
	20DASa04**	Optical/Infrared Astronomy I	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.	All faculties of optical/infrared astronomy group
	20DASa05**	Optical/Infrared Astronomy II	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.	
	20DASa06**	Optical/Infrared Astronomy III	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.	
	20DASa07**	Optical/Infrared Astronomy IV	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.	
	20DASa08**	Optical/Infrared Astronomy V	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of optical/infrared astronomy.	
	20DASa09**	Precision Measurement Method	2	Lecture on the precision measurement using interferometry.	N. Gouda
	20DASa10**	Optical/Infrared Astronomy Seminar I	2	Seminar on the optical/infrared astronomy.	All faculties of optical/infrared astronomy group
	20DASa11**	Optical/Infrared Astronomy Seminar II	2	Seminar on the optical/infrared astronomy.	All faculties of optical/infrared astronomy group
Radio Astronomy	20DASb01**	Introduction to Radio Telescope	2	Lecture on the principle of radio telescope, the design and production, and basics of its control.	H. Matsuo
	20DASb02**	Introduction to Radio Observation System	2	Lecture on radio receivers, which includes low-temperature techniques and digital processing.	Y. Asaki H. Matsuo
	20DASb03**	Introduction to Instruments of Radio Astronomy	2	Lecture on principles of various detectors and spectroscopic methods in radio observations.	S. Iguchi Y. Uzawa T. Minamidani H. Matsuo A. Gonzalez S. Ishii
	20DASb04**	Radio Astronomy I	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.	All faculties of radio astronomy group
	20DASb05**	Radio Astronomy II	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.	

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Radio Astronomy	20DASb06**	Radio Astronomy III	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.	All faculties of radio astronomy group
	20DASb07**	Radio Astronomy IV	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.	
	20DASb08**	Radio Astronomy V	2	Lecture on astronomical objects, phenomena of astronomical objects and research methods in an area of radio astronomy.	
	20DASb09**	Radio Interferometry	2	Principle of radio interferometers, necessary observational technology and methods of data reduction are lectured.	S. Iguchi S. Kameno
	20DASb10**	Radio Astronomy Special Lecture	2	Lecture on Very-Long-Baseline-Interferometer. Principles and methods of data reduction are lectured.	H. Kobayashi
	20DASb11**	Radio Astronomy Seminar I	2	Seminar on radio observation and its instruments.	All faculties of radio astronomy group
	20DASb12**	Radio Astronomy Seminar II	2	Seminar on radio observation and its instruments.	All faculties of radio astronomy group
Common Base	20DASc01**	General Relativity	2	Lecture on the general relativity.	N. Gouda Y. Aso
	20DASc05**	Gravitational Dynamics	2	Lecture on basics of stellar dynamics (gravitational many-body problem and structure of galaxies) and celestial mechanics (planetary many-body problem and their orbital evolution).	N. Gouda E. Kokubo
	20DASc04**	Solar System Astronomy	2	Spin motion and deformation of planets are lectured based on geophysical methods.	K. Matsumoto
	20DASd01**	Nuclear Astrophysics	2	The lecture aims to study the stellar evolution, supernova explosion and galactic chemical evolution based on understanding the elementary processes in these macroscopic phenomena in the universe.	N. Tominaga
	20DASe13**	Solar/Stellar Physics	2	Interior structures of our sun and stars and their evolution are lectured.	T. Sekii H. Hara
	20DASd03**	Cosmic Plasma Physics I	2	Surface activity and atmospheric structure of our sun and other stars are lectured.	R. Kano H. Hara Y. Katsukawa
	20DASd04**	Cosmic Plasma Physics II	2	Observations of the structure of stellar atmosphere by UV, X-ray, and radio wavelengths are lectured.	Y. Hanaoka H. Hara
	20DASd05**	Astrophysics I	2	The lecture aims to study both theoretical and observational aspects of the evolution of the early universe, the roles of particle and nuclear processes there, and the formation and evolution of cosmic large scale structure in modern cosmology.	M. Ouchi N. Tominaga
	20DASd06**	Astrophysics II	2	Stellar system, structure and evolution of galaxies are lectured.	H. Nomura F. Nakamura
	20DASd07**	Astrophysics III	2	Lecture on interstellar matter, planetary systems and star formation.	M. Ikoma E. Kokubo
	20DASe08**	Astronomical Data Reduction	2	Lectures on astronomical data reduction, including image processing, data archive and related software.	M. Ohishi R. Kawabe K. Sekiguchi T. Takata

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Common Base	20DASe09**	Statistics for Astronomy	2	The course introduces statistical methods of analyses that are necessary in interpreting data in various fields of astronomy. While astronomical applications are the goal, the course starts from the basics.	R. Kano J. Kosugi J. Noumaru
	20DASe04**	Simulation Astronomy	2	Lecture on method of simulation for various researches of astronomy.	E. Kokubo M. Machida K. Iwasaki T. Takiwaki
	20DASe05**	Science Communication	2	Based on various examples of astronomy, the way of research outcomes to contribute to the public (public outreach) is lectured.	J. Watanabe H. Agata H. Yamaoka
	20DASe06**	Common Basic Astronomies Seminar I	2	Seminar on database astronomy, solar/cosmic plasma, and theoretical astronomy.	All faculties of common basic astronomies group
	20DASe07**	Common Basic Astronomies Seminar II	2	Seminar on database astronomy, solar/cosmic plasma, and theoretical astronomy.	All faculties of common basic astronomies group
	20DASe10**	Extrasolar planetary science	2	The course introduces observational and data-analysis methods used in exoplanet research, as well as its latest results.	M. Ikoma Y. Fujii T. Kotani
	20DASe11**	Planetary system formation	2	The course covers theoretical and observational studies of planetary system formation, starting from the basics but introducing the latest topics as well.	M. Ikoma E. Kokubo T. Kotani
	20DASe12**	Gravitational Wave Astronomy	2	Lecture on gravitational wave (GW) astronomy. GW theory is introduced. GW detectors and very recent GW detections (2015–2017) are presented.	M. Leonardi
Common	20DASf01**	Introduction to Astronomical Instruments	2	Principles of observational instruments for various wavelengths are lectured from the physical basics.	H. Takami M. Sugimoto
	90DASf01**	<i>Colloquium I [mandatory]</i>	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (1st year)	All faculty members
	90DASf02**	<i>Colloquium II [mandatory]</i>	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (2nd year)	All faculty members
	90DASf03**	<i>Colloquium III [mandatory]</i>	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (3rd year)	All faculty members
	90DASf04**	<i>Colloquium IV [mandatory]</i>	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (4th year)	All faculty members
	90DASf05**	<i>Colloquium V [mandatory]</i>	2	Colloquium on contemporary astronomy. Graduate students present and discuss progress of their own research and/or of their fields. (5th year)	All faculty members
	90DASf06**	<i>Basic Seminar I A</i>	2	Seminar on basic astronomy textbooks. (First semester of 1st year)	All faculty members
	90DASf07**	<i>Basic Seminar I B</i>	2		
	90DASf08**	<i>Basic Seminar I C</i>	2		
	90DASf09**	<i>Basic Seminar II A</i>	2	Seminar on basic astronomy textbooks. (Second semester of 1st year)	All faculty members
	90DASf10**	<i>Basic Seminar II B</i>	2		
90DASf11**	<i>Basic Seminar II C</i>	2			

Field	Course Code	Subject	Credit	Content of subject	Instructor
Common	90DASf12**	Interdisciplinary Research I	4	Seminar on current progress of astronomical sciences (3rd and 4th years).	All faculty members
	90DASf13**	Interdisciplinary Research II	2	Seminar on current progress of astronomical sciences (4th year).	All faculty members
	90DASf14**	<i>Progress Report [mandatory]</i>	6	This corresponds to a Master Thesis. Graduate students are asked also to have oral presentations. (2nd year)	All faculty members
	10DASf01**	Exercise in Scientific English	2	According to the achievement of respective students, small group exercise is given on the presentation in English, conversation and scientific writing.	All faculty members
	20DASf02**	Observation Experiment I A	2	Experiment of observation at observatory.	All faculty members
	20DASf03**	Observation Experiment I B	2		
	20DASf04**	Observation Experiment I C	2		
	20DASf05**	Observation Experiment I D	2		
	20DASf06**	Observation Experiment II A	1	Experiment of observation at observatory.	All faculty members
	20DASf07**	Observation Experiment II B	1		
	20DASf08**	Observation Experiment II C	1		
	20DASf09**	Observation Experiment II D	1		
	20DASf10**	Special Lecture I	2	Lecture by visiting professors of National Astronomical Observatory. A specific research area of astronomy is overviewed.	Visiting professor
	20DASf11**	Special Lecture II	2		
	20DASf12**	Special Lecture III	2		
	20DASf13**	Special Lecture IV	2		
	20DASf14**	Special Lecture V	1		
	20DASf15**	Special Lecture VI	1		
	20DASf16**	Special Lecture VII	1		All faculty members Visiting professor
	20DASf17**	Special Lecture VIII	1		
	20DASf18**	Special Lecture IX	1		
	20DASf19**	Special Lecture X	1		
	20DASf20**	Special Lecture XI	1		
20DASf21**	Special Lecture XII	1			
20DASf22**	Special Lecture XIII	1			
20DASf23**	Special Lecture XIV	1			

*Underlined courses in italic* are all mandatory for the students of the 5-year doctorate program.

*Italicized courses* without underline are also mandatory, but one course should be selected from the subject set.

A two-digit number or letter will be entered to \*\* according to the semester or the lecturer in charge.