Fusion Science

Course Code	Course	Credit	Content of Subject
40FSS001**	Introduction to Project Management	1	Project is an individual or collaborative enterprise for achieving a particular aim. In order to complete the project within the deadline, tasks, the process, works, costs and risks should be carefully managed. This lecture provides the fundamental knowledge on the project management and examples of big projects in the world, so as to improve your ability for problem solution and management.
40FSS002**	Scientific English Writing and Presentation at International Conferences	2	Because international collaboration is often required for the successful development of magnetic fusion energy, as seen in the case of ITER, the ability of communication in English is a ″prerequisite″ to be a successful research scientist. A series of lectures will provide students with the basic knowledge to write and present technical papers in English for international conferences, also with practice in reading technical literature and a with a review of relevant grammatical topics.
40FSS003**	Fundamentals of Fusion Science	2	The lecture is an introduction to basic plasma physics and reactor system engineering for nuclear fusion describing the history and present status of the fusion research. The objective is to obtain the overall understanding of fusion science, intorducing the most advanced issues in large plasma experiments, large-scale simulation studies, and reactor engineerings.
40FSS004**	Fundamentals of Plasma Experiment	2	The lecture focuses on error analysis in plasma diagnostics, emphasizing the use of mathematical statistics, specifically the normal distribution and the application of least-squares fitting.
40FSS005**	Exercise of scientific paper analysis	2	The aim of the lecture is to learn error analysis for allowing the scientists to estimate how large his uncertainties are, and to help him to reduce them when necessary. The basics of plasma diagnosis are reviewed. The error analysis based on the mathematical statistics and the least-squares fitting as its application are studied. The normal distribution and other important distributions are treated.
40FSS006**	Basic exercise on physics and engineering 1	2	Lectures will provide students with the basic knowledge and techniques necessary to conduct experimental research on fusion plasmas. In the labs, students will learn the basic techniques for handling and designing vacuum equipment, measurement equipment, and high voltage and high current equipment.
40FSS007**	Basic exercise on physics and engineering 2	2	In this exercise program, the bases of the techniques for safe experiments: radiation handling, high pressure and cryogenic gas handling, and analyses of plasma facing materials, are given.

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40FSS008**	Basic exercise on physics and engineering 3	2	This exercise gives basic knowledge such as data processing, programming, and applied mathematics for plasma physics researches.
40FSS009**	Basic digital circuit design and development for measurement and control systems	1	Students will learn the basic digital circuit design techniques for building measurement and control systems, and through interactive exchanges with the lecturer, they will actually develop FPGA digital circuits, practically acquiring the content of the lectures so that they can apply it to their individual research sites.
40FSS010**	Plasma Physics 1	2	Basic plasma physics will be covered; single particle motion, plasma as a fluid, plasma waves, diffusion and resistance. In addition, the concept of magnetic confinement fusion and recent fusion research are described.
40FSS011**	Plasma Physics 2	2	For the students who have completed Plasma Physics I, advanced contents of the fundamental physics in mainly the fusion plasmas behavior are explained. Both aspects of the microscopic particle property and the macroscopic fluid property are shown.
40FSS012**	Fusion System Engineering	2	This lecture provides an overview of the fusion system and its basic components, such as magnets, heating devices, and in-vessel components, including their requirements, functions, and future issues.
40FSS013**	Fusion plasma science seminar ⅠA	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS014**	Fusion plasma science seminar ⅠB	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS015**	Fusion plasma science seminar ⅡA	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS016**	Fusion plasma science seminar ⅡB	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.

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40FSS017**	Fusion plasma science seminar ⅢA	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS018**	Fusion plasma science seminar ⅢB	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS019**	Fusion plasma science seminar ⅣA	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS020**	Fusion plasma science seminar ⅣB	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS021**	Fusion plasma science seminar ⅤA	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS022**	Fusion plasma science seminar ⅤB	2	Learn the latest information on research activities by attending colloquiums on fusion plasma sciences. Improve students' ability for making an excellent presentation. Study how to examine their research by joining the discussions in the colloquiums.
40FSS023**	Advances in Plasma Science	2	The basic physics of plasma transport at the peripheral region and plasma-wall interaction in magnetically confined fusion devices are explained. In addition, the basics of atomic and molecular processes in plasmas and a collisional-radiative model for spectroscopic diagnostics are explained.

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40FSS024**	Fusion Reactor Materials	2	Theories of elasticity, plasticity, strengthening and radiation damage of materials are reviewed. Tensile testing is lectured as a typical examination for materials. The operating environments of materials in ITER and future DEMO reactors are explained, in which typical candidate materials for both environments and requirements to be improved in the candidates, will be shown.
40FSS025**	Fundamentals of Simulation Science	2	Concepts, basic equations, algorithms, visualization analysis, characteristics and limitations of the models, numerical errors and data science approach are described for particle, fluid and gyro kinetic models commonly used in plasma simulations.
40FSS026**	Mathematical Physics	2	This lecture presents basic methods of mathematical physics used in Plasma Physics and Fusion Science. As examples of application, one learns plasma kinetic theory and the correspondence between particle ensembles and fluids.
80FSS001**	Fusion plasma science investigation Ⅰ A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS002**	Fusion plasma science investigation Ⅰ B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS003**	Fusion plasma science investigation Ⅱ A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS004**	Fusion plasma science investigation Ⅱ B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS005**	Fusion plasma science investigation Ⅲ A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.

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80FSS006**	Fusion plasma science investigation Ⅲ B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS007**	Fusion plasma science investigation Ⅳ A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS008**	Fusion plasma science investigation Ⅳ B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS009**	Fusion plasma science investigation Ⅴ A	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.
80FSS010**	Fusion plasma science investigation Ⅴ B	2	Seminar is organized for small number of students on fusion plasma science. Basic scientific knowledge, intelligence and flexibility are trained for the basis of original research. Teachers in the same research field as students lead seminar as core members.