

基本情報

時間割コード / Course Code	
開講区分(開講学期) / Semester	Fall and Winter Term
曜日・時間 / Day and Period	Mon4
開講科目名 / Course Name (Japanese)	21世紀の電気工学
開講科目名(英) / Course Name	Electrical Engineering in the 21st Century
教室 / Room	
定員 / Capacity	
ナンバリング / Course Numbering Code	
必修・選択 / Required/Optional	
授業形態 / Type of Class	講義科目
単位数 / Credits	2
年次 / Student Year	
分野 / Field	
担当教員 / Instructor	舟木剛 / Tsuyoshi FUNAKI
メディア授業科目 / Course of Media Class	

※メディア授業科目について

授業回数の半数以上を、多様なメディアを高度に利用して教室等以外の場所で行う授業を「メディア授業科目」としています。

学部学生が「メディア授業科目」を卒業要件に算入できるのは60単位が上限です。

なお、非該当の場合であっても、メディアを利用した授業を実施する場合があります。

詳細情報

授業サブタイトル / Course Subtitle	Electrical Engineering in the 21st Century
開講言語 / Language of the Course	English
学習方法 / Learning Method	聴講・視聴
授業の目的と概要 / Course Objective	This course explores two categories of electrical engineering in the 21st century, that is, 1) systems, control and power engineering, and 2)
履修条件・受講条件 / Requirement / Prerequisite	電気工学に興味のある者 / Students who're interested in Electrical Engineering
出欠席及び受講に関するルール / Attendance and Student Conduct Policy	
教科書・指定教材 / Textbooks	None
参考図書・参考教材 / Reference	None
成績評価に関する補足情報 / Additional Information on Grading	
合理的配慮 / Reasonable Accommodation	
特記事項 / Special Note	
オフィスアワー / Office Hour	
実務経験のある教員による授業科目 / Course conducted by instructors with practical experience	

成績評価詳細情報

学習目標(1) / Learning Goal(1)	The students acquire the fundamental knowledge of the recent electrical engineering trends.
学習目標(2) / Learning Goal(2)	
学習目標(3) / Learning Goal(3)	
学習目標(4) / Learning Goal(4)	
学習目標(5) / Learning Goal(5)	

学習目標 / Learning Goal	評価方法				
	レポート・論文				
学習目標(1) / Learning Goal(1)	○				
学習目標(2) / Learning Goal(2)					
学習目標(3) / Learning Goal(3)					
学習目標(4) / Learning Goal(4)					
学習目標(5) / Learning Goal(5)					
評価割合(%) / Grade Breakdown	100%	%	%	%	%

授業計画

回 / Time	題目 / Title	内容 / Content	授業時間外学習 / Independent Study Outside of Class
第1回	Intelligent Systems Part 1: Discrete Event Systems (Prof. Shigemasa Takai)	A discrete event system is an event-driven dynamical system. A manufacturing system is a typical example that can be regarded as a discrete event system. In this lecture, modeling frameworks for discrete event systems are introduced.	Review using the lecture materials.
第2回	Intelligent Systems Part 2: Machine Learning (Associate prof. Kazumune Hashimoto)	Machine learning (ML) has become indispensable in fields such as robotics, control, and electrical engineering. This lecture introduces fundamental concepts of deep neural networks (DNNs), a prominent ML technology.	Review using the lecture materials.

第3回	Power and Energy Systems 1(Prof. Tsuyoshi FUNAKI)	Power electronics is a technology for conversion of electrical energy. Its current and future applications are introduced in this lecture, including hot topics such as renewable power generation, wireless power transfer, electrical vehical, etc.	Review using the lecture materials.
第4回	Power and Energy Systems 2(Associate Prof. Takaaki IBUCHI)	Lectures focus on energy management technologies on the basis of electric power utilization. Basic principles of renewable energy, power storage, and energy-saving power conversion technologies based on power electronics will be explained.	Review using the lecture materials.
第5回	Remote Sensing of Precipitation (Prof. Tomoo Ushio)	Remote sensing technique of precipitation will be introduced, mainly focusing on radar technologies and satellite observation.	Review using the lecture materials.
第6回	High-energy Atmospheric Physics (Assistant Prof. Yuuki Wada)	Theory, sensing technology, and latest topics of high-energy atmospheric physics will be introduced. We investigate extreme plasmas from laboratories to the universe and develop the relevant fields of science and engineering, such as astrophysics, space physics, laser, and plasma physics.	Review using the lecture materials.
第7回	Extreme Plasma Science and Engineering I Laboratory Astrophysics (Prof. Yasuhiro Kuramitsu)	Based on these we develop technological innovations leading to medical and industrial applications.	Review using the lecture materials.
第8回	Extreme Plasma Science and Engineering II Nuclear Fusion Energy (Associate Prof. Hideaki Habara)	Nuclear fusion energy is attracting attention as a promising approach to solving environmental and energy problems. The fundamentals of nuclear reactions, including nuclear fusion, stars as a fusion plant in space, and the current and future development of fusion power generation are presented.	Review using the lecture materials.
第9回	Advanced Plasma Engineering (Associate prof. Heun Tae Lee)	In this lecture, we introduce topics arising from plasma-material interactions that are of technological and scientific interest, such as plasma processing of materials and magnetic fusion plasmas. We cover some basic physical principles, applications, and future outlook.	Review using the lecture materials.
第10回	TBD		Review using the lecture materials.
第11回	TBD		Review using the lecture materials.
第12回	Advanced Beam Systems Engineering (Associate Prof. Yuushi KATO)	Electron cyclotron resonance (ECR) ion sources have been widely used for production of high intensity multicharged ion beams for accelerators, heavy particle cancer radiotherapy, space propulsion, bio-nano materials, as well as implantation in industrial applications. With promoting basic and applied researches of ECR plasma, we are conducting research and development with respect to new beam source responsible for the next generation.	Review using the lecture materials.

第13回	Power Laser Photonics (Ass. Prof. Yoshiki Nakata)	Laser is a key technology in the era of light, encompassing high-power lasers and their applications. In this lecture, technologies for developing high-power laser systems will be introduced. Additionally, various applications, such as material processing, will be discussed.	Review using the lecture materials.
第14回	Radiation-Hydrodynamics and Laser-Matter Interaction (Prof. M. MURAKAMI)	Recent activities on researches of laser-matter interaction physics are introduced. The lecture will be given so beginners can understand easily.	Review using the lecture materials.
第15回	High-Density Plasma Physics (Prof. M. YOSHIMURA)	TBD	Review using the lecture materials.
第16回			

授業担当教員					
教員氏名 / Instructor Name	ふりがな / Name (hiragana)	所属・職名・講座名 / Affiliation, Title, Course	居室 / Office	内線 / Extension	e-mail / E-mail
舟木剛 / Tsuyoshi FUNAKI	ふなきつよし	電気電子情報通信工学専攻・教授・システム制御工学講座	E2-111	7709	funaki@eei.eng.osaka-u.ac.jp