

基本情報	
時間割コード／Course Code	Fall and Winter Term Wed5 情報ネットワーク学入門 Introduction to Information Networking #CALC! #CALC! Lecture (Can be taken online) 2 2 All Staff (SARUWATARI Shunsuke, ARAKAWA Shin-ichi, KOIZUMI Yuki, UCHIYAMA Akira, KOMINAMI Daichi, HASEGAWA Tooru, YAMAGUCHI Hirozumi, #CALC!
開講区分(開講学期)／Semester	
曜日・時間／Day and Period	
開講科目名／Course Name (Japanese)	
開講科目名(英)／Course Name	
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	
単位数／Credits	
年次／Student Year	
分野／Field	
担当教員／Instructor	
メディア授業科目／Course of Media Class	

詳細情報	
授業サブタイトル／Course Subtitle	Introduction to Information Networking
開講言語／Language of the Course	English
学習方法／Learning Method	
授業の目的と概要／Course Objective	This lecture presents an advanced introduction to modern information networking technologies. This lecture also covers introductory topics for networking research methodologies such as system performance analysis techniques and networking algorithms.
履修条件・受講条件／Requirement / Prerequisite	Students had better know the basic principles of information networks.
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	Not specified, but the following is a reference book James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach (7th Edition), Pearson, 2017.
参考図書・参考教材／Reference	Andrew S. Tanenbaum and David J. Wetherall, Computer Networks (5th Edition), Prentice Hall, 2010.
成績評価に関する補足情報／Additional Information on Grading	Report 80% +Work at the course 20% (no examination)
合理的配慮／Reasonable Accommodation	#REF!
特記事項／Special Note	
オフィスアワー／Office Hour	18:10-18:40, Wednesday
実務経験のある教員による授業科目／Course conducted by instructors with practical experience	This lecture is a part of the IST program "Information Technology Special Course in English (ITSCE)".

成績評価詳細情報	
学習目標(1)／Learning Goal(1)	Understand basic concepts of information networks.
学習目標(2)／Learning Goal(2)	Explain various concepts and mechanisms of information networks you use every day.
学習目標(3)／Learning Goal(3)	
学習目標(4)／Learning Goal(4)	
学習目標(5)／Learning Goal(5)	

	評価方法				
学習目標／Learning Goal	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	1 Computer Networks and the Internet	1.1 What Is the Internet? 1.2 The Network Edge 1.3 The Network Core 1.4 Delay, Loss, and Throughput in Packet-Switched Networks 1.5 Protocol Layers and Their Service Models 1.6 Networks Under Attack 1.7 History of Computer Networking and the Internet	Review the lecture.
第2回	2 Application Layer	2.1 Principles of Network Applications 2.2 The Web and HTTP 2.3 Electronic Mail in the Internet 2.4 DNS—The Internet's Directory Service 2.5 Peer-to-Peer Applications	Review the lecture.
第3回	2 Application Layer	2.6 Video Streaming and Content Distribution Networks 2.7 Socket Programming: Creating Network	Prepare reports on the assigned problem during the lecture.
第4回	3 Transport Layer	3.1 Introduction and Transport-Layer Services 3.2 Multiplexing and Demultiplexing 3.3 Connectionless Transport: UDP 3.4 Principles of Reliable Data Transfer 3.5 Connection-Oriented Transport: TCP	Review the lecture.
第5回	3 Transport Layer	3.6 Principles of Congestion Control 3.7 TCP Congestion Control 3.8 Evolution of transport-layer functionality	Prepare reports on the assigned problem during the lecture.

第6回	4 The Network Layer: Data Plane	4.1 Overview of Network Layer 4.2 What's Inside a Router? 4.3 The Internet Protocol (IP): IPv4, Addressing, IPv6, and More 4.4 Generalized Forwarding and SDN 4.6 Middleboxes 5.1 Introduction 5.2 Routing Algorithms 5.3 Intra-AS Routing in the Internet: OSPF	Review the lecture.
第7回	5 The Network Layer: Control Plane	5.4 Routing Among the ISPs: BGP 5.5 The SDN Control Plane 5.6 ICMP: The Internet Control Message Protocol 5.7 Network Management, SNMP, and NETCONF/YANG	Prepare reports on the assigned problem during the lecture.
第8回	6 The Link Layer and LANs	6.1 Introduction to the Link Layer 6.2 Error-Detection and -Correction Techniques 6.3 Multiple Access Links and Protocols 6.4 Switched Local Area Networks 6.5 Link Virtualization: A Network as a Link Layer	Review the lecture.
第9回	6 The Link Layer and LANs	6.6 Data Center Networking 6.7 Retrospective: A Day in the Life of a Web Page Request	Prepare reports on the assigned problem during the lecture.
第10回	7 Wireless and Mobile Networks	7.1 Introduction 7.2 Wireless Links and Network Characteristics 7.3 Wireless LANs 7.4 Cellular Networks: 4G and 5G	Review the lecture.
第11回	7 Wireless and Mobile Networks	7.5 Mobility Management: Principles 7.6 Mobility Management in Practice 7.7 Wireless and Mobility: Impact on Higher-Layer Protocols	Prepare reports on the assigned problem during the lecture.
第12回	8 Security in Computer Networks	8.1 What Is Network Security? 8.2 Principles of Cryptography 8.3 Message Integrity and Digital Signatures 8.4 End-Point Authentication 8.5 Securing E-Mail 8.6 Securing TCP Connections: SSL 8.7 Network-Layer Security: IPsec and Virtual Private Networks 8.8 Securing Wireless LANs and 4G/5G Cellular Networks 8.9 Operational Security: Firewalls and Intrusion Detection Systems	Prepare reports on the assigned problem during the lecture.
第13回	State-of-the-Art Network Research Issues (1)	Selected Topics from the State-of-the-Art Network Research Issues (1)	Review the lecture.
第14回	State-of-the-Art Network Research Issues (2)	Selected Topics from the State-of-the-Art Network Research Issues (2)	Review the lecture.
第15回	State-of-the-Art Network Research Issues (3)	Selected Topics from the State-of-the-Art Network Research Issues (3)	Prepare reports on the assigned problem during the lecture.

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
Masayuki Murata	ムラタマサユキ	Graduate School of Information Science and Technology, Professor	A613	4540	murata@ist.osaka-u.ac.jp