

北海道大学シラバス					
科目名 Wireless Sensor Networks and IoT					
講義題目					
責任教員 (所属) 宮永 喜一 (大学院情報科学研究所)					
担当教員 (所属) 宮永 喜一 (大学院情報科学研究所) Eryk Dutkiewicz (シドニー工科大学) Negin Shariati Moghadam (シドニー工科大学)					
科目種別	情報科学院専門科目			他学部履修等の可否	可
開講年度	2019	期間	2学期	時間割番号	215603
授業形態	講義	単位数	1	対象年次	～
対象学科・クラス				補足事項	
ナンバリングコード					
大分類コード	大分類名称				
レベルコード	レベル				
5	大学院 (修士・専門職) 専門科目 (基礎的な内容の科目)、大学院共通授業科目				
中分類コード	中分類名称				
小分類コード	小分類名称				
言語 英語で行う授業					
実務経験のある教員等による授業科目					

キーワード

Wireless Sensor Network, IoT, Circuits and Systems, Energy Harvesting, Analog Circuits, LSI

■ ■ 授業の目標

Wireless sensor networks are distributed systems. In these networks, small autonomous devices collect environmental data (such as location, speed, temperature, humidity and sound level) and medical data (such as heart rate, blood oxygen level and pulse rate). Sensor networks and IoT devices are designed and developed for many different applications, including environmental monitoring, agricultural monitoring, medical monitoring, habitat monitoring and military surveillance. In this lecture, the design methods of wireless sensor networks and IoT devices are introduced. In particular, the technology on natural energy harvesting is explained and its circuits designs are also introduced.

■ ■ 到達目標

By the end of this course you will be able to

1. know the protocol and structures of wireless sensor network and IoT.
2. know how to design a simple IoT devices and to design the energy harvesting modules.
3. present the behavior of wireless sensor network and IoT in detail.

■ ■ 授業計画

Lecture 1: Overview of WSN and IoT
Lecture 2: Design of WSN
Lecture 3: Multi-Media IoT system (1)
Lecture 4: Multi-Media IoT system (2)
Lecture 5: Resource (energy) management in WSN/IoT
Lecture 6: Design of Energy Harvesting for IoT devices (1)
Lecture 7: Design of Energy Harvesting for IoT devices (2)
Lecture 8: Applications of WSN/IoT

■ ■ 準備学習(予習・復習)等の内容と分量

It is required for students to make enough preparation and review before and after each lecture. For each lecture, 90 min preparation and 90 min review are required.

Lecture materials are available on the e-Learning of Hokkaido University.

■ ■ 成績評価の基準と方法

Students whose attendance rate is less than 70% cannot get any evaluation. Evaluation is based on the term report (90%) and the lecture participation (10%). By the term report, students' deep understanding of a specific technology and presentation skills are evaluated. The evaluation is based on 5 grades. The ratio of S is not greater than 15% of registered students. The ratio of S and A is not greater 50% of registered students.

■ ■ 有する実務経験と授業への活用

■ ■ 他学部履修の条件

■ ■ テキスト・教科書

References will be introduced in the lecture.

■ ■ 講義指定図書

■ ■ 参照ホームページ

■ ■ 研究室のホームページ

<https://csw.ist.hokudai.ac.jp/>

■ ■ 備考

Recommended Course (Course highly recommended to be taken together with this course):

1. Introduction to Wireless Sensor Networks and IoT
2. Cyber Security Fundamentals
3. Cyber Security

■ ■ 更新日時

2019/02/04 12:00:03

Hokkaido University Syllabus						
■■ Course Title Wireless Sensor Networks and IoT						
■■ Subtitle 						
■■ Instructor (Institution) Yoshikazu MIYANAGA (Faculty of Information Science and Technology)						
■■ Other Instructors (Institution) Yoshikazu MIYANAGA (Faculty of Information Science and Technology) Eryk Dutkiewicz Negin Shariati Moghadam						
■■ Course Type				■■ Open To Other Faculties / Schools		OK
■■ Year	2019	■■ Semester	2nd Semester	■■ Course Number	215603	
■■ Type of Class	Lecture	■■ Number of Credits	1	■■ Year of Eligible Students	~	
■■ Eligible Department / Class					■■ Other Information	
■■ Numbering Code						
■■ Major Category Code		■■ Major Category Title				
■■ Level Code		■■ Level				
5		Specialized Subjects (basics) in graduate level (Master's Course and Professional Course), Inter-Graduate School Classes				
■■ Middle Category Code		■■ Middle Category Title				
■■ Small Category Code		■■ Small Category Title				
■■ Language Type						
Classes are in English.						
■■ Course list by the instructor with practical experiences						

■■ Key Words

Wireless Sensor Network, IoT, Circuits and Systems, Energy Harvesting, Analog Circuits, LSI

■ ■ Course Objectives

Wireless sensor networks are distributed systems. In these networks, small autonomous devices collect environmental data (such as location, speed, temperature, humidity and sound level) and medical data (such as heart rate, blood oxygen level and pulse rate). Sensor networks and IoT devices are designed and developed for many different applications, including environmental monitoring, agricultural monitoring, medical monitoring, habitat monitoring and military surveillance. In this lecture, the design methods of wireless sensor networks and IoT devices are introduced. In particular, the technology on natural energy harvesting is explained and its circuits designs are also introduced.

■ ■ Course Goals

By the end of this course you will be able to

1. know the protocol and structures of wireless sensor network and IoT.
2. know how to design a simple IoT devices and to design the energy harvesting modules.
3. present the behavior of wireless sensor network and IoT in detail.

■ ■ Course Schedule

Lecture 1: Overview of WSN and IoT

Lecture 2: Design of WSN

Lecture 3: Multi-Media IoT system (1)

Lecture 4: Multi-Media IoT system (2)

Lecture 5: Resource (energy) management in WSN/IoT

Lecture 6: Design of Energy Harvesting for IoT devices (1)

Lecture 7: Design of Energy Harvesting for IoT devices (2)

Lecture 8: Applications of WSN/IoT

■ ■ Homework

It is required for students to make enough preparation and review before and after each lecture. For each lecture, 90 min preparation and 90 min review are required.

Lecture materials are available on the e-Learning of Hokkaido University.

■ ■ Grading System

Students whose attendance rate is less than 70% cannot get any evaluation. Evaluation is based on the term report (90%) and the lecture participation (10%). By the term report, students' deep understanding of a specific technology and presentation skills are evaluated. The evaluation is based on 5 grades. The ratio of S is not greater than 15% of registered students. The ratio of S and A is not greater 50% of registered students.

■ ■ Practical experience and utilization for classes

■ ■ Condition of tasking the subject

■ ■ Textbooks

References will be introduced in the lecture.

■ ■ Reading List

■ ■ Websites

■ ■ Website of Laboratory

<https://csw.ist.hokudai.ac.jp/>

■ ■ Additional Information

Recommended Course (Course highly recommended to be taken together with this course):

1. Introduction to Wireless Sensor Networks and IoT
2. Cyber Security Fundamentals
3. Cyber Security

■ ■ Update

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