



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Computer Science and Electronics

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Doctoral Programme of Computer Science

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Module name : **SENSOR NETWORK**

Module level, if applicable : **DOCTORAL**

Code, if applicable : MII7825

Semester(s) in which the module is taught : I (Odd)

Person responsible for the module : Dr. Agfianto Eko Putra, M.Si.

Lecturer(s) : Dr. Agfianto Eko Putra, M.Si.

Language : Indonesia

Relation to curriculum : Doctorate; elective; 1st or 3rd semester.

Credit points : 3 credits

Type of teaching, contact hours : Doctorate: lectures for < 5 students. Contact hours are lecture hours.

Workload : (1) Lectures and discussion: 3 x 50 = 150 minutes (2.5 hours) per week. (2) Exercises and assignments: 3 x 60 = 180 minutes (3 hours) per week. (3) Independent study: 3 x 60 = 180 minutes (3 hours) per week

Requirements according to the examination regulations : A student must have attended at least 75% of the lectures to sit in the exams.

Recommended prerequisite : -

Module objectives/ intended learning outcomes : Wireless Sensor Networks combine networking sensing , processing over miniaturized embedded devices, and sensor nodes

On completion of the course, student will be able to

CO1: Understanding essential theoretical background and practical skills for the design and development of WSN

CO2: Understanding state of the art techniques for sensing data management

CO3: Have an hands on experience with WSN technological platforms and programming tools

CO4: Develop a research project in a multi-disciplinary field of engineering and science

	CO5: Improve problem solving and presentation skills
Content	<ol style="list-style-type: none"> 1. Introduction to WSN and CS-541 course 2. Protocol stacks, and wireless networks prerequisites 3. Signal Sampling for WSN 4. Data models and data acquisition 5. Network standards for Personal and Body Area networks 6. Radio Duty Cycling for Wireless Sensor Networks 7. Routing for WSN 8. Introduction to WSN programming and Hands-on Sessions 9. Distributed In-Network Processing for WSN 10. Time Series Analysis 11. Machine Learning in WSN 12. Fundamentals of Deep Neural Networks 13. Localization in WSN 14. Big Sensor Data
Study and examination requirements and forms of examination	<p>: Evaluation is done in 3 forms, namely:</p> <ol style="list-style-type: none"> 1. Two examinations, mid-term and final, 2. Homework assignment, and 3. A short review paper on state-of-the-art methods in WSN <p>Assessment is done using benchmark assessment, with the aim of measuring the level of students' understanding related to the target and class rank.</p>
Media employed	: LCD, blackboard, and websites.
Reading List	<ol style="list-style-type: none"> 1. S. Misra, I. Woungang, S. C. Misra, "Guide to Wireless Sensor Networks", 2009, Springer 2. F. Zhao, L. Guibas, "Wireless Sensor Networks: An Information Processing Approach", 2004, Elsevier - Morgan Kaufmann

The Mapping of COs to PLOs

COs	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CO1								
CO2								
CO3								
CO4								
CO5								

The PLO of DP-CS

PLO	Knowledge Area	PLO Description
PLO1	[Values and principles]	A graduate should be devoted to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working around expertise independently.

Managerial Capability		
PLO2	[Professional attitudes]	A graduate should have good interpersonal skills; able to work together within the organization, both as a leader and a member; able to be the initiator; able to manage and delegate tasks; and have a sense of responsibility for their own work as well as take responsibility for the achievement of the organization's work.
PLO3	[Communication skills]	A graduate should be able to communicate effectively and efficiently with stakeholders from various backgrounds; use English well; and able to write and present scientific papers correctly and well.
PLO4	[Life-long learning]	A graduate should be up to date with the state-of-the-art especially in computer science field, able to take parts in the development of computer science field that is engaged in and relate it to other fields throughout life.
Working Capability		
PLO5	[Problem-solving and Scientific skills]	A graduate should be able to analyse science and technology problems in the computer science field, develop alternative solutions through intra disciplinary, interdisciplinary, and trans disciplinary approaches to produce innovative, original, and tested works.
PLO6	[Ability to formulate and do research]	A graduate should be able to formulate research problems through critical, exploratory, and innovative studies both independently and in groups of computer science field that is engaged in and present research results in a scientific paper at regional or international level.
Mastering Knowledge		
PLO7	[Fundamental knowledge]	A graduate should be able to develop knowledge in the field of computer science that is engaged, which includes abstraction, complexity, evolution and philosophy of changes or developments in the field of science.
PLO8	[Applied knowledge]	A graduate should be able to develop theoretical, philosophical, and applied concepts in the field of computer science that is engaged in, and to represent them in a structured and systematic manner.