Title (Units):	**COMP7470 Health Information Privacy (3,3,0)**

Course Aims:	This course covers legal, ethical, technical and economic aspects of health information privacy. The main topics include conceptions and legal foundations of health information privacy, security primitives, different privacy models, different anonymization algorithms for diverse health data sharing scenarios, privacy technologies for biometrics, and economics of health information privacy. Students will explore cutting-edge privacy solutions and learn how to apply privacy technologies to real-life applications.

Prerequisite:	Postgraduate Student Standing

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Describe the conceptions and legal foundations of health information privacy
2	Explain security primitives for health information privacy
3	Compare different privacy models and anonymization algorithms for different data sharing scenarios
4	Explain the economics of health information privacy
	Professional Skill
5	Identify proper privacy models and suitable algorithms for different health data sharing scenarios
6	Implement a set of existing anonymization algorithms

Calendar Description:	This course introduces health information privacy from legal, ethical, technical and economic aspects. Students will learn conceptions and legal foundations of health information privacy, security primitives, different privacy models, different anonymization algorithms, privacy technologies for biometrics, and privacy solutions for extended health data sharing scenarios. Students will also learn the economics of health information privacy. This course provides opportunities to explore cutting-edge privacy solutions in the context of health information and apply privacy technologies to real-life applications.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1-5	Students will acquire the knowledge on different aspects of health information privacy through lectures, paper reading, assignments, and class discussion.
1-6	Students will learn how to analyze, design, and implement privacy protection solutions in an exploratory project. Students will have the opportunity to present their project results in class.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessment	50%	1-6	Reading assignments, in-class discussion and projects are designed to evaluate students' mastery of concepts and privacy techniques of health information privacy. Critical thinking and exploratory studying are emphasized in continuous assessments.
2	Examination	50%	1-5	Final examination questions are designed to assess how well students understand and utilize the knowledge acquired.

Assessment Rubrics:

	Excellent (A)	Good (B)	Satisfactory (C)	Fail (F)
Describe the conceptions and legal foundations of health information privacy	Fully understand privacy concepts, policies, laws and the status quo	Understand most of privacy concepts, policies, laws and the status quo	Have a basic understanding of privacy concepts, policies, laws and the status quo	Do not understand privacy concepts, policies, laws and the status quo
Explain security primitives for health information privacy	Fully understand access control and secure multiparty computation; know well how to apply security primitives in practice	Understand access control and secure multiparty computation; know how to apply security primitives in practice	Have a basic understanding of access control and secure multiparty computation	Do not understand access control and secure multiparty computation
Describe different privacy models and anonymization algorithms for different data sharing scenarios	Fully understand all privacy models, anonymization algorithms in different data sharing scenarios; know well how to identify proper privacy models and anonymization algorithms in practice; know how to correctly implement a set of existing anonymization algorithms	Understand most of privacy models, anonymization algorithms in basic data sharing scenarios; know how to identify proper privacy models and anonymization algorithms in practice; know how to implement some basic anonymization algorithms	Have a basic understanding of privacy models, anonymization algorithms; know the general idea of implementing some basic anonymization algorithms	Do not understand privacy models and anonymization algorithms
Explain the economics of health information privacy	Fully understand the relationship between economy, marketing and health information privacy; know well cost-benefit analysis of health information privacy	Understand the relationship between economy, marketing and health information privacy; know cost-benefit analysis of health information privacy	Have a basic understanding of the relationship between economy, marketing and health information privacy; know the basic cost factors of health information privacy	Do not understand the relationship between economy, marketing and health information privacy; do not know the costs and benefits of health information privacy

Course Content and CILOs Mapping:

	Content	CILO No.
I	Introduction to Health Information Privacy	1,5
II	Security Primitives for Health Information Privacy	2,5
III	Privacy Protection Techniques	3,5,6
IV	Economics of Heath Information Privacy	4,5
V	Case Studies and Applications	1-5

References:
- B. C. M. Fung, K. Wang, A. W.-C. Fu, and P. S. Yu. Introduction to Privacy-Preserving Data Publishing: Concepts and Techniques, Chapman & Hall/CRC, 2010.

- B.-C. Chen, D. Kifer, K. LeFevre, and A. Machanavajjhala. Privacy-Preserving Data Publishing, Now, 2009.
- D. J. Solove and P. M. Schwartz. Privacy Law Fundamentals. 3rd Edition, IAPP, 2015.
- L. Rinehart-Thompson. Introduction to Health Information Privacy and Security. American Health Information Management Association, 2013.
- S. Murphy. Healthcare Information Security and Privacy. McGraw-Hill, 2015.

Course Content:

Topic

I. Introduction to Health Information Privacy
    A. Conceptions of privacy
    B. Status quo of health information privacy
    C. Legal foundations of health information privacy

II. Security Primitives for Health Information Privacy
    A. Privacy attacks and disclosure risks
    B. Access control
    C. Secure multiparty computation

III. Privacy Protection Techniques
    A. K-anonymity
    B. Privacy models beyond K-anonymity
    C. Differential privacy
    D. Extended health data sharing scenarios
    E. Privacy in biometrics

IV. Economics of Heath Information Privacy
    A. Economy, marketing and health information privacy
    B. Cost-benefit analysis of health information privacy

V. Case Studies and Applications