ESIROI
ÉCOLE D'INGÉNIEURS
UNIVERSITÉ DE LA RÉUNION

DEPARTMENT : *IT*
SEMESTER : *S5*

IDENTIFICATION

Course code : SEC501
ECTS : 2

DURATION

Lectures :	8
Tutorial classes :	16
Labs :	0
Total :	24

Project :
Personnal work :

ASSESSMENT

Continuous assessment : two written evaluations

TEACHING MATERIALS

Slides and guided-work worksheets.

LANGUAGE

English

CONTACT

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UE : UE5-CYBER

COURSE : Discrete Mathematics Fundamentals for Computer Science

SCOPE OF THE COURSE

OBJECTIVES

Provide engineering students with the essential foundations of discrete mathematics required to solve common problems across all fields of computer science.

COMPETENCE AND SKILLS

- Select cryptographic tools suited to the requirements of a specification document
- Implement, from design to production deployment, a company's IT network while integrating QoS and security considerations
- Conduct exploratory data analysis

PROGRAM

- Reminders : fundamentals of set theory, propositional logic, proofs
- Equivalence relations and order relations, quotient set
- Algebraic structures : groups, rings, fields
- Basic arithmetic : Euclidean division, GCD, prime numbers, Bézout's theorem, Euler's totient function
- Structure of the set Z/nZ and operations in this set
- Arithmetic theorems : Fermat-Euler, Chinese remainder theorem
- The ring K[X] of polynomials, arithmetic in K[X]

BIBLIOGRAPHY

- Richard Hammack - *Book of Proofs* - Available for download : http ://www.people.vcu (Creative Commons license)
- Jacques Vélu - *Mathematical Methods for Computer Science* - Dunod Éditions, *Sciences Sup* collection
- J.P. Ramis and A. Warusfel (edited by) - *Mathematics : All-in-One for the Bachelor's Degree, Level L1* - Dunod Éditions

REQUIREMENTS

Discrete Mathematics learned in high school then in CPGE/L1-L3/IUT/BTS