

Master Mathématiques et Applications

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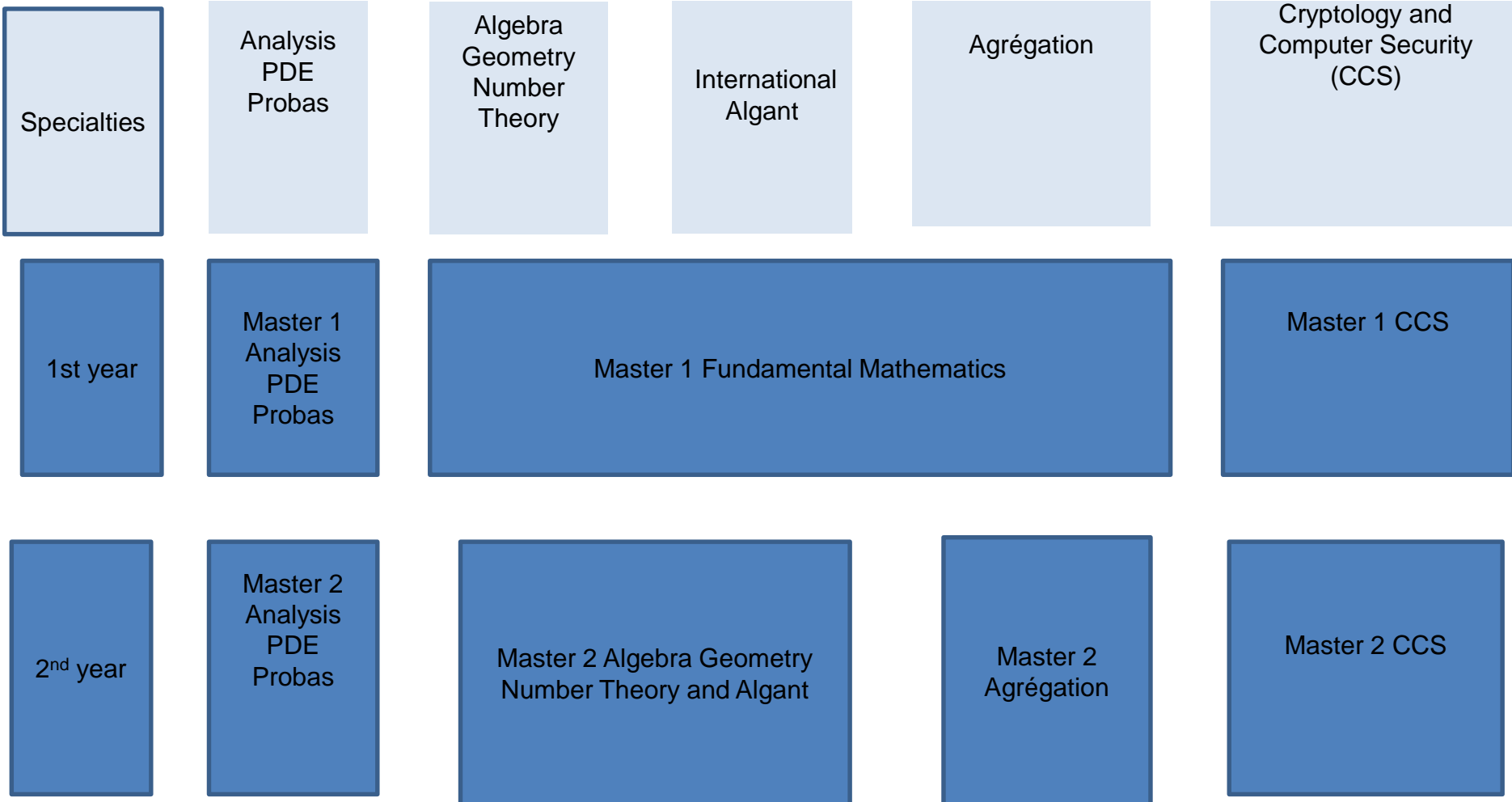
COLLÈGE SCIENCES ET TECHNOLOGIES

université
de **BORDEAUX**

Objectives and strengths

- Training researchers and engineers in fundamental mathematics, cryptology and computer security
- Training teachers
- Bridging the gap between fundamental and applied mathematics
- Training that focuses on international opportunities

Architecture of the Master

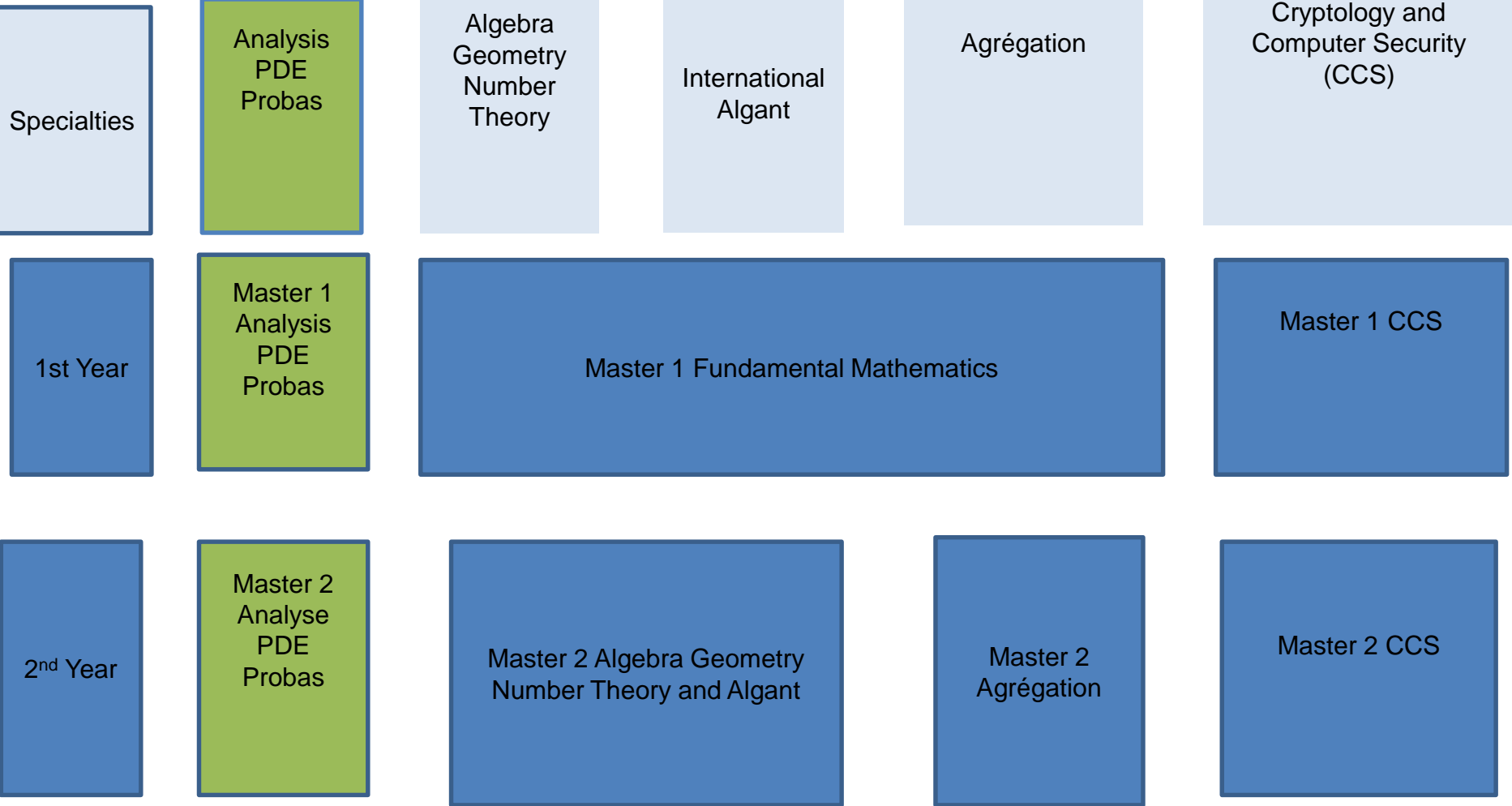


Afterwards...

- Mathematics teacher, « Professeur Agrégé »
- PhD in Mathematics
- Researcher, Professor
- Engineer in Cryptology and Computer Security
- Position in Industry

Specialty Analysis PDE Probas

Marius Tucsnak



Goals

- Build a solid understanding of the basics of Analysis, PDE's and probability followed by a choice of courses such as numerical analysis; Geometry...
- You are encouraged to branch out into several specialties
- All second year courses are taught in English
- To be followed by a PhD (at a university or in industry) or work as a research or production engineer in an industrial setting

Semester 1

3 required courses 6 ECTS

- Functional Analysis
- Complex Analysis
- PDE 1

1 course to choose between 6 ECTS

- Continuous Optimization
- Approximation of PDE 1

2 required courses 3 ECTS

- English
- Professional opening

Semestre 2

3 required courses 6 ECTS

- Probability and Statistics
- PDE 2
- Hilbertian tools

1 course to choose between 6 ECTS

- Stochastic Simulation and Bayesian methods for signal processing
- Approximation of PDE 2

2 required courses 3 ECTS

- Professional opening
- Spectral Analysis

Semester 1

5 courses to choose between 6 ECTS

- Stochastic Calculus and Markov Processes
- Dynamical Systems, probabilistic tools for PDE
- Analysis and control in infinite dimension
- Harmonic Analysis, Complex Analysis, Operator and Function Theory
- Analysis tools for PDEs
- Spectral analysis for mathematical physics

Semester 2

1 course to choose between 3 ECTS

- English
- Project

Internship 27 ECTS

Specialty Algebra Geometry and Number Theory

Christine Bachoc

Specialties

Analysis
PDE
Probas

Algebra
Geometry
Number
theory

Parcours
international
Algant

Agrégation

Cryptology and
Computer Security
(CCS)

1st year

Master 1
Analysis
PDE
Probas

Master 1 Fundamental Mathematics

Master 1 CCS

2nd year

Master 2
Analysis
PDE
Probas

Master 2 Algebra
Geometry
Number theory

Master 2
Agrégation

Master 2 CCS

Objectives

- Training in the essentials of algebra, geometry or number theory
- Preparation for entering a PhD program
- Possible specialization in the applications of mathematics in Cryptography
- Second year courses in English

Master 1 Fundamental Mathematics Philippe Jaming

Semester 1

4 required courses 6 ECTS

- Functional Analysis
- Complex Analysis
- Modulus and quadratic spaces
- Groups Theory

1 course to chose between 6 ECTS

- Information Theory
- PDEs
- Advanced Mathematics

Semester 2

2 courses to choose between 9 ECTS

- Spectral Analysis, Distributions
- Geometry
- Number theory
- Hilbertian tools + project

1 course to choose between 6 ECTS

- Hilbertian tools
- Algebra and formal calculus
- Probability and Statistics

2 required courses 3 ECTS

- English
- Professional opening



Semester 1

2 courses to choose between 9 ECTS

- Number Theory
- Algebraic Geometry
- Geometry

1 course to choose between 6 ECTS

- Advanced course 1
- Arithmetical Algorithmic

2 courses to choos between 3 ECTS

- English
- Project
- Project

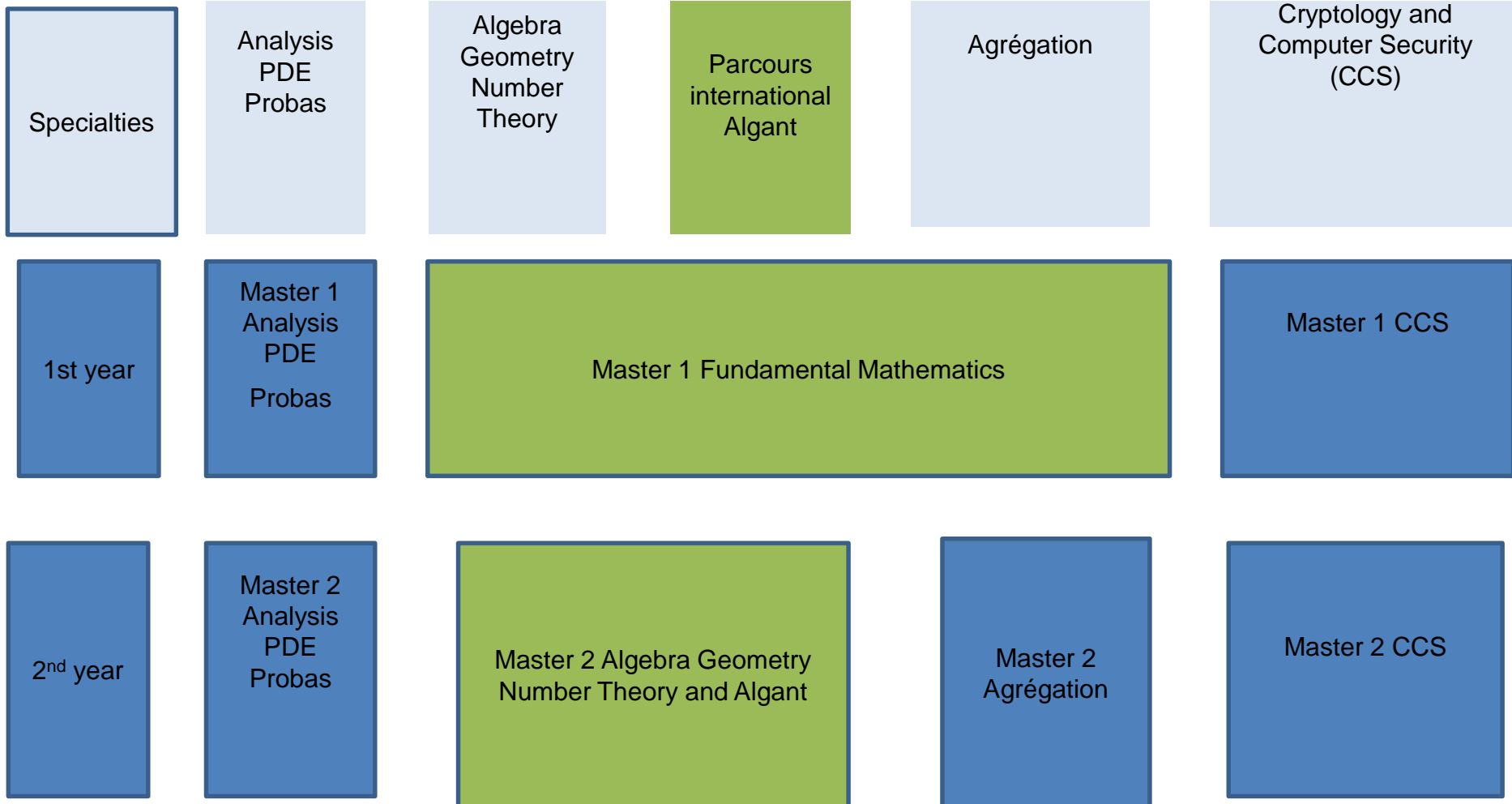
Semester 2

1 course to choose between 6 ECTS

- Advanced course 2
- Advanced course 3

Internship, 24 ECTS

Parcours International ALGANT Christine Bachoc



Algebra, Geometry And Number Theory

- An International Master specialized in Algebra, geometry and Number Theory

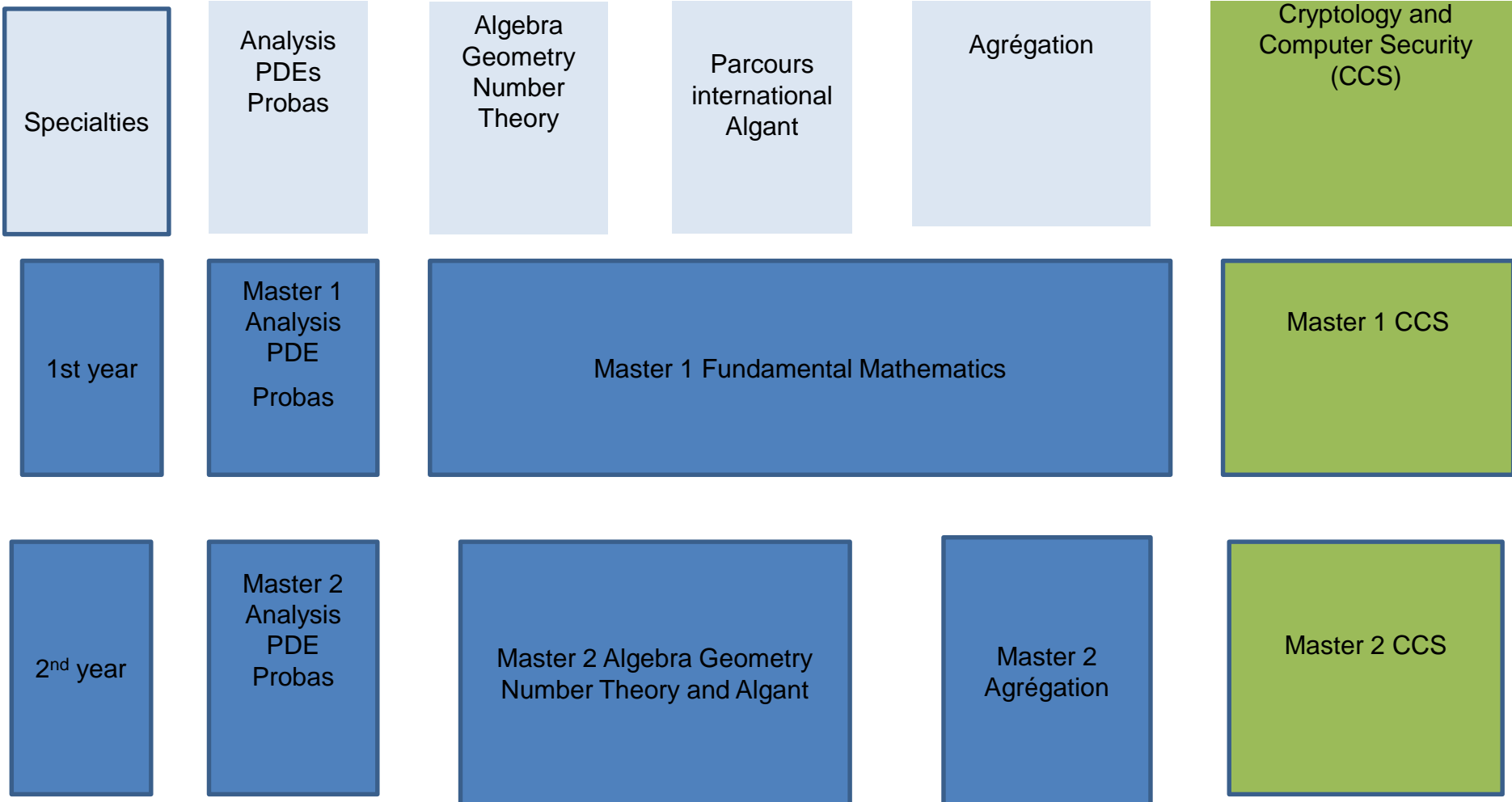
A program created in collaboration with 10 other universities (France, Italie, Pays-Bas, Allemagne, Canada, Afrique du Sud, Inde)

- More than 150 graduates coming from 30 different countries

Organisation of studies

- Selection of students in February
- The first and second years spent in 2 different universities from the coalition
- Either a double or a joint diploma
- The ALGANT program in Bordeaux is the same as the usual program in
 - Algèbre, Géométrie et Théorie des Nombres
- Taught in english, personalised programs
- Support of mobility through the International Relations Department and the teaching team
- Opportunities : pursuing doctoral studies (85% of graduate) ; ALGANT network offers
 - numbers of opportunities
- Scholarship opportunities (ALGANT, FIDEX)

Specialty Cryptology and Computer Security Gilles Zémor



Goal : training Engineers in cryptology and computer security

Courses in mathematics and computer science

This specialty also trains researchers

Jobs, opportunities

- Engineer, specialist in cryptology and computer security
- Development of smart cards, e-commerce, mobile phones, weapons, software security, safety of networks
- Pursuing doctoral studies (10 to 20 %)

Semester 1

4 required courses 6 ECTS

- Information theory
- Complexity theory
- Programmation
- Arithmetics

1 course to choose 6 ECTS

- Analysis, classification, indexation of datas
- Operating systems

2 UEs au choix à 3 ECTS

- Communication and occupational integration
- Course to choose in another specialty

Semester 2

3 required courses 6 ECTS

- Formal calculus
- Software security
- Cryptology

1 course to choose 6 ECTS

- Combinatorial optimization
- Programming parallel architectures
- Hilbertian tools
- Introduction to verification
- Networks administration

2 required courses 3 ECTS

- English
- Internship or Course to choose in another specialty

Semester 1

5 required courses 6 ECTS

- Software verification
- Smart card
- Arithmetical Algorithmic
- Elliptic curves
- Cryptanalysis
- Advanced cryptology
- Sécurité of systems
- Sécurité of networks

Semester 2

1 required course 3 ECTS

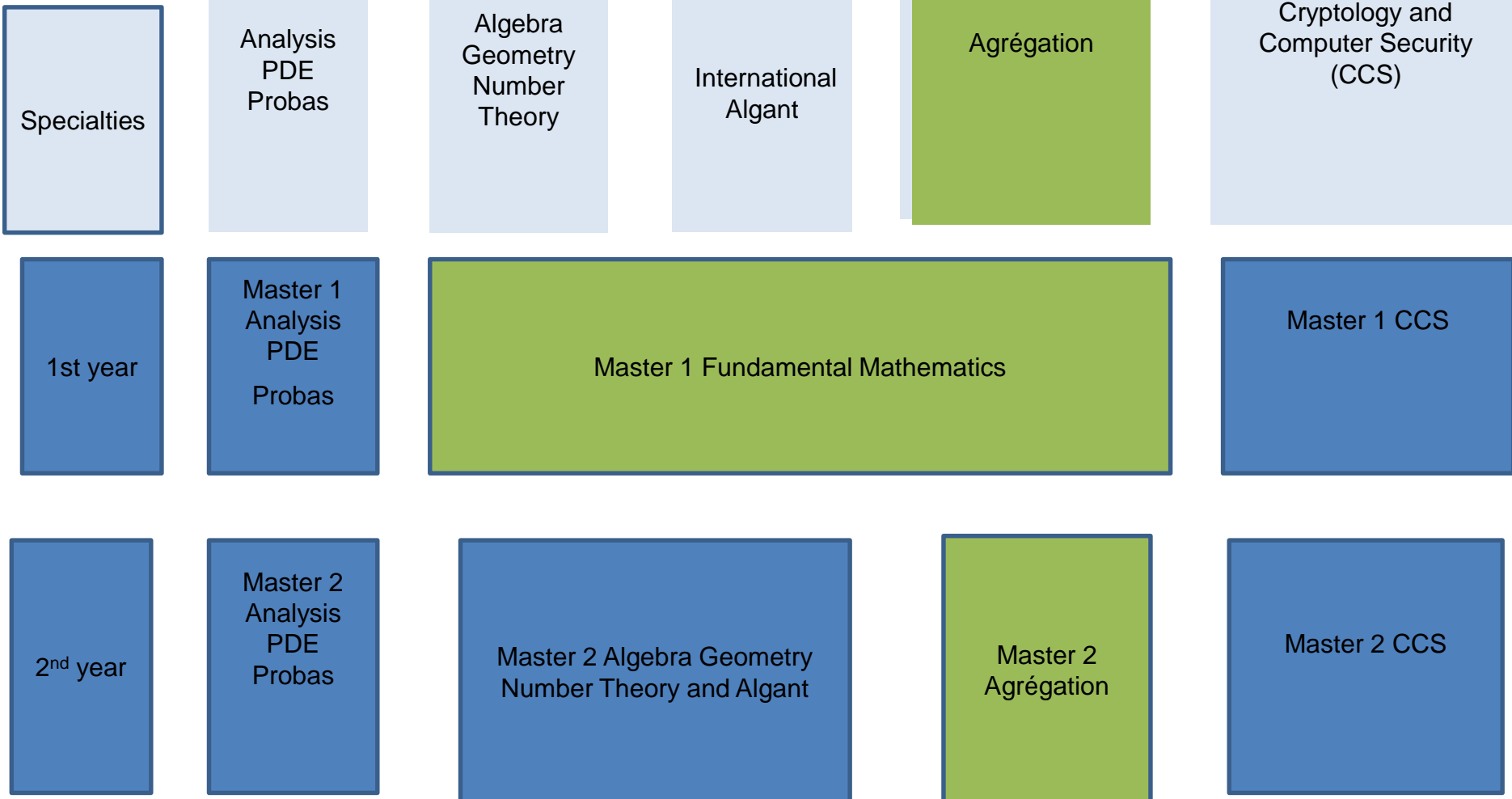
-Project

1 course to choose 3 ECTS

- Project
- English

Internship 24 ECTS

Specialty Agrégation



Objectif : préparer au concours de l'agrégation externe de mathématiques. Au parcours Agrégation s'ajoute en deuxième année une préparation à l'agrégation. Chaque étudiant suit en 2ème année environ 640 h de formation, auxquelles s'ajoutent un stage et un mémoire.

Débouchés

- Professeur du secondaire
- Poursuite en master recherche puis en doctorat : l'agrégation est un plus pour obtenir un poste de Maître de Conférences à l'université
- Professeur de classes préparatoires : après doctorat

Semestre 1

4 UEs obligatoire à 6 ECTS

- Analyse Fonctionnelle
- Analyse Complexe
- Modules et Espaces quadratiques
- Théorie des Groupes

1 UE au choix à 6 ECTS

- Théorie de l'information
- EDP
- Mathématiques avancées

Semestre 2

2 UEs au choix à 9 ECTS

- Analyse spectrale , distributions
- Géométrie
- Théorie des nombres
- Outils hilbertiens + projet

1 UE au choix à 6 ECTS

- Outils hilbertiens
- Algèbre et Calcul formel
- Probabilités et Statistiques

2 UEs obligatoire à 3 ECTS

- Anglais
- Ouverture professionnelle



Semestre 1

2 UEs obligatoires à 9 ECTS

- Techniques d'analyse et de probabilités approfondies 1
- Techniques d'algèbre et de géométrie approfondies 1

1 UE obligatoire à 12 ECTS

- Projet tuteuré

Semestre 2

2 UEs obligatoires à 9 ECTS

- Techniques d'analyse et de probabilités approfondies 2
- Techniques d'algèbre et de géométrie approfondies 2

Stage en laboratoire, 6 ECTS

1 UE au choix à 6 ECTS

- Probabilités et Statistiques
- Algèbre et calcul formel

Cette préparation vient s'ajouter au programme de Master 2 Agrégation

L'écrit

- Remise à niveau sur 7 semaines – 7 compositions de 2h en Mathématiques Générales et Analyse-Probabilités
- Stage libre en lycée d'une semaine
- 6 compositions de 6 heures en Mathématiques Générales et Analyse-Probabilités
- Mémoire

L'oral

- Leçons d'algèbre et de géométrie
- Leçons d'analyse et probabilités
- Préparation sur l'année à l'épreuve orale optionnelle : Algèbre et Calcul Formel ou Probabilités et Statistiques
- Oraux blancs