

**UNIVERSITÀ degli STUDI di PADOVA**  
**Dipartimento di Matematica "Tullio Levi-Civita" - DM**  
**MASTER in MATHEMATICS - Classe: LM-40 - Matematica**

| Structure of the Study Plan:               | courses:  | term | credits: |    |
|--|---|------|----------|----|
| <b>1. ALGEBRA: one course among:</b>       | INTRODUCTION TO RING THEORY   | I    | 8        |    |
|  | INTRODUCTION TO GROUP THEORY  | I    | 8        |    |
|  | RINGS AND MODULES   | II   | 6        |    |
|  | REPRESENTATION THEORY OF GROUPS   | II   | 6        |    |
| <b>2. GEOMETRY: one course among:</b>      | DIFFERENTIAL GEOMETRY   | I    | 8        |    |
|  | COMMUTATIVE ALGEBRA   | I    | 8        |    |
|  | ALGEBRAIC GEOMETRY 1  | II   | 8        |    |
|  | TOPOLOGY 2  | I    | 6        |    |
|  | ALGEBRAIC GEOMETRY 2  | II   | 6        |    |
|  | HOMOLOGY AND COHOMOLOGY   | II   | 6        |    |
| <b>3. ANALYSIS: two courses among:</b>     | INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS  | I    | 8        |    |
|  | FUNCTIONS THEORY  | I    | 8        |    |
|  | ADVANCED ANALYSIS   | II   | 8        |    |
|  | CALCULUS OF VARIATIONS  | II   | 8        |    |
|  | HARMONIC ANALYSIS   | I    | 6        |    |
|  | COMPLEX ANALYSIS  | I    | 6        |    |
|  | FUNCTIONS OF SEVERAL COMPLEX VARIABLES  | I    | 6        |    |
|  | DIFFERENTIAL EQUATIONS  | II   | 6        |    |
| <b>4. PROBABILITY: one course among:</b>   | INTRODUCTION TO STOCHASTIC PROCESSES  | I    | 8        |    |
|  | STOCHASTIC ANALYSIS   | I    | 7        |    |
| <b>5. MATH.PHYSICS: one course among:</b>  | DYNAMICAL SYSTEMS   | I    | 7        |    |
|  | SYMPLECTIC MECHANICS  | II   | 6        |    |
|  | HAMILTONIAN MECHANICS   | II   | 6        |    |
| <b>6. three to four courses among:</b>     | <b>the previous ones not already chosen, or</b>   |      |          |    |
|  | MATHEMATICAL LOGIC 2  | I    | 6        |    |
|  | NUMBER THEORY 1   | I    | 8        |    |
|  | NUMBER THEORY 2   | II   | 6        |    |
|  | ADVANCED STOCHASTIC PROCESSES   | II   | 7        |    |
|  | STOCHASTIC METHODS FOR FINANCE  | II   | 7        |    |
|  | HIGH DIMENSIONAL PROBABILITY FOR DATA SCIENCE   | I    | 6        |    |
|  | NUMERICAL LINEAR ALGEBRA AND LEARNING FROM DATA   | I    | 7        |    |
|  | NUMERICAL METHODS FOR DIFFERENTIAL EQUATIONS  | II   | 7        |    |
|  | OPERATIONS RESEARCH   | I    | 8        |    |
|  | OPTIMIZATION  | II   | 6        |    |
|  | CRYPTOGRAPHY  | I    | 6        |    |
|  | MODERN PHYSICS  | II   | 8        |    |
| <b>7. one or two free courses among:</b>   | <b>the previous ones not already chosen, or</b>   |      |          |    |
|  | from the pool of courses available in the whole University                                      |      |          |    |
| <b>for at least 80 credits of courses.</b> |   |      |          |    |
| <b>8. compulsory:</b>                      | SEMINAR ACTIVITIES or LINGUISTIC SKILLS   |      | 4        | 4  |
|  | FINAL EXAMINATION (MASTER THESIS)   |      | 36       | 36 |
| <b>in total at least 120 credits.</b>      |   |      |          |    |
| <b>NOTES:</b>                              | some courses may not be activated every year; there are further courses taught in Italian.      |      |          |    |
|  | free courses must be chosen consistently with the curriculum, credits must amount from 8 to 16. |      |          |    |
|  | the study plan must contain no more than 12 courses.  |      |          |    |
|  | terms: I (approx October-January), II (approx March-June).                                      |      |          |    |