SUBJECT TEACHING GUIDE

345 - Symbolic Computation

Master's Degree in Mathematics and Computing

Academic year 2026 - 2027

1. IDENTIFYING DATA					
Degree	Master's Degree in Mathematics and Computing			Type and Year	Compulsory. Year 1
Faculty	Faculty of Sciences				
Discipline					
Course unit title and code	345 - Symbolic Computation				
Number of ECTS credits allocated	3	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION
Name of lecturer	LUIS FELIPE TABERA ALONSO
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Other lecturers	

3.1 LEARNING OUTCOMES
Choose among several algorithms the most adequate for a specific instance.
Program and compare some mathematical algorithms
To know some open problems in symbolic computation
Basic methods to manipulate integers, polynomials and matrices in a context of symbolic computation.

4. OBJECTIVES
Give an overview of common algorithms to manipulate integers, matrices and polynomials
Compare several algorithms for the same problem in order to detect the strengths and weaknesses either from a theoretical or experimental point of view.

6. COURSE ORGANIZATION	
CONTENTS	
1	Representation of mathematical objects: integers, rationals, algebraic elements, finite fields and matrices. Efficient algorithms.
2	Symbolic manipulation of polynomials. Greatest common divisor, factorization, Grobner Basis.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessment	%
Individual project	Written exam	No	Yes	50,00
final exam	Written exam	Yes	Yes	50,00
TOTAL				100,00
Observations				
Observations for part-time students				
Part-time students will have the same evaluation assignement as regular students.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Joachim von zur Gathen, Jürgen Gerhard. Modern computer algebra Cambridge : Cambridge University Press, 2003