## *NEW COURSE PROPOSAL (Boğaziçi Linguistics)*

1. COURSE CODE, TITLE AND CREDIT:

Ling587: Mathematics and Philosophy in Linguistics

1. CATALOG DESCRIPTION: Mathematics of linguistic description and grammar. Computational infrastructure of linguistic description. Formal grammars in relation to natural grammars. Philosophy of linguistics and grammar, including nominalism, psychologism, realism, mathematicism and computationalism, in the realms of extension-intension.
2. FACULTY MEMBERS WHO CAN TEACH THE COURSE: Prof.dr. Cem Bozşahin
3. BACKGROUND REQUIREMENT(S): Third-year standing, including first courses in general linguistics, phonology, syntax, morphology and logic. Knowledge of programming is a plus, but not a requirement. There is no programming in the course.
4. COURSE IN RELATION TO THE PROGRAMS: This course is intended as an undergraduate level elective in Linguistics. Some material, for example 7.II and 7.III below, are covered in computer science departments from a different perspective; we will cover them from the perspective of linguistics, which is novel to this course. Space permitting, the course can also be taken by students of other departments who have sufficient interest and background.
5. COURSE OBJECTIVES: Students are expected to: (a) be able to formalize linguistic description, (b) understand its evaluation, (c) situate description in the realm of schools of philosophy.
6. COURSE OUTLINE:

I. Introduction: A brief history of mathematics and philosophy in linguistics (1 week)

II. Theory of description: Formal language theory (3 weeks)

III. Theory of execution: Automata theory (3 weeks)

IV. Theory of evaluation: Lambda calculus (3 weeks)

v. Theory of environment: Basic systems theory (2 weeks)

VI. Theory of uncertainty: Basic probability theory (2 weeks)

Schools of philosophy covered in the description are discussed throughout the term.

1. TEXTBOOK: There is no textbook. The course is supported by lecture notes.
2. REFERENCE MATERIAL:

For II and III: Lewis, H., Papadimitriou (1998). *Elements of the Theory of Computation*. Prentice hall. 2nd edition. First three chapters.

For IV: Hankin, Chris (2004). *An Introduction to Lambda Calculi for Computer Scientists*. King's College Publications. First three chapters.

For V: Flood, R.L., Carson E.W. (1993). Dealing with Complexity. 2nd edition. Plenum Press. First four chapters.

For Philosophy: Katz, Jerrold J. (1985). An Outline of Platonist Grammar. In *The Philosophy of Linguistics*, Katz (ed.), pp.172-203. Oxford University Press.

For Philosophy: Papineau, David (2002). Philosophy of Science. In *The Blackwell Companion to Philosophy*, eds. Nicholas Bunnin, E. P. Tsui-James.

1. COURSE CONDUCT: 13 weeks of two-hour lectures, one-hour in-class or take-home quiz per week, one midterm exam, in class.
2. GRADING: Midterm exam (25%), Final exam (%30), quizzes (%45 total, %5 per quiz, best 9 out of 10 count toward grade).
3. EFFECTIVE DATE: September-October 2024.
4. FREQUENCY: On demand.