COURSE TITLE: COMPUTABILITY

REFERENCE SECTOR: INF/01 - INFORMATICA

YEAR OF DEGREE COURSE: I

SEMESTER: I

TEACHER’S NAME: DOMENICO CANTONE

COURSE SYLLABUS
The unlimited register machine (URM). URM-computable functions. Decidable
predicates and problems. Computability on other domains. Generating computable
functions (basic functions, joining programs together, substitution, recursion,
minimalization). Other approaches to computability (partial recursive
functions, primitive recursive functions, Turing-computability, Church’s
thesis). Numbering computable functions (the diagonal method, the s-m-n
theorem). Universal programs and applications. Decidability, undecidability and
partial decidability (halting problem, input and output problems, etc., Rice’s
theorem). Recursive and recursively enumerable sets (various characterizations
of recursively enumerable sets, Rice-Shapiro theorem).

PREREQUISITES
Discrete mathematics, intuitive notion of algorithm, first principles of
mathematical logic.

EDUCATIONAL GOALS
Ability to study arithmetic predicates from the point of view of decidability
and partial decidability, also by applying the reduction technique.

CREDIT TOTAL AMOUNT 6

GLOBAL WORKLOAD (IN HOURS) 150

FOR LECTURES 38

FOR APPLIED ACTIVITIES 8

FOR PROGRESS TESTS 2

FOR INDIVIDUAL WORK 102

REFERENCE TEXTBOOKS
- N.J. Cutland. Computability: an introduction to recursive
textbook)

OTHER COURSE MATERIAL
- Instructor's handouts available at http://www.dmi.unict.it/~cantone/HomeComputabilita-16/itComputabilita.html

TEACHING ACTIVITIES
Lectures. In-class exercises on the most important parts of the syllabus. Students are frequently involved by means of simple questions. Written mid-term and final examination.