

ANNEX 2 – COURSE DESCRIPTION

Course Title	Logic Programming			
Course Code	ACSC300			
Course Type	Elective			
Level	BSc (Level 1)			
Year / Semester	3rd - 4th, 6th – 8th			
Teacher's Name	Harris Papadopoulos			
ECTS	6	Lectures / week	3	Laboratories/week 0
Course Purpose	The aim of this course is to introduce students to the declarative programming paradigm and to provide students with a good working knowledge of the Prolog programming language.			
Learning Outcomes	<ol style="list-style-type: none"> 1. Describe the differences between the declarative and procedural programming paradigms, discuss the potential applications of the Prolog programming language and identify its strengths and weaknesses. 2. Define and interpret the syntax and semantics of Prolog's core concepts, develop basic Prolog programs and queries, and devise and employ compound terms to represent complex information. 3. Recognise, analyse, explain, develop and illustrate the execution of, recursive predicates and predicates that manipulate lists, arithmetic and structures. 4. Employ Prolog's built-in predicates for obtaining input from the keyboard or a file and for producing output to the screen or a file, explain the outcome that backtracking has for predicates with side effects and use the repeat predicate to achieve repeated execution of input/output predicates. 5. Employ Prolog's built-in predicates for testing the type of terms, constructing and decomposing terms, adding and deleting clauses to/from a program, and collecting all the objects that satisfy some goal into a list (bagof, setof, findall). 6. Demonstrate backtracking, employ Prolog's control facilities (cut and not), identify green and red cuts and explain their difference, illustrate the execution of predicates that contain cuts and analyse the issues associated with negation in goals. 7. Develop and illustrate the execution of a non-trivial Prolog program. 			
Prerequisites	ACSC191	Corequisites	None	
Course Content	<ul style="list-style-type: none"> • Introduction to Logic Programming: The declarative programming paradigm; The Prolog programming language and what it is used for. • Basics of Prolog Programming: Terms, clauses, predicates, facts, 			

	<p>rules and queries; The logical meaning of a Prolog program; Recursion and defining recursive rules.</p> <ul style="list-style-type: none"> • Syntax and Meaning of Prolog Programs: Atoms, variables and structures; Matching; The declarative and the procedural meaning of Prolog programs; Prolog execution and search trees; Backtracking in Prolog. • Arithmetic and Lists: Arithmetic operators; Various kinds of equality and comparison operators; Representation of lists; Defining operations on lists; Sorting lists. • Using Structured Data: Creating a simple database; Retrieving structured information from a database; Data abstraction; Solving logic puzzles with Prolog. • Input and Output: Getting input from the keyboard; Writing output to the screen; File input and output; The repeat predicate. • Controlling Backtracking: Preventing backtracking; Using cut; Green and red cuts; Negative information; Negation as failure; The closed world assumption; Problems with cut and not. • System Predicates: Testing the type of terms; Constructing and decomposing terms; Assert and retract; Control facilities; The bagof, setof and findall predicates.
Teaching Methodology	<p>The course is delivered through three hours of lectures per week, which include presentation of the core structure and concepts of Prolog and examples of their use. A lot of work is done through in-class exercises by defining and experimenting with Prolog predicates and queries. Further exercises are given to students as non-assessed homework. Both in class and home exercises provide the students with the necessary practical experience and skills while they also help in assessing the student level of understanding and providing feedback.</p> <p>All lecture notes and other material is available to students through the course homepage.</p>
Bibliography	<p>(a) <u>Textbook:</u></p> <ul style="list-style-type: none"> • Ivan Bratko, <i>Prolog-Programming for Artificial Intelligence</i>, 4th Edition, Addison Wesley, 2011. <p>(b) <u>References:</u></p> <ul style="list-style-type: none"> • Leon Sterling and Ehud Shapiro, <i>The Art of Prolog</i>, 2nd Edition, MIT Press, 1994. • W. F. Clocksin, C. S. Mellish, <i>Programming in Prolog: Using the Iso Standard</i>, 5th edition, Springer-Verlag, 2003.
Assessment	<p>The Students are assessed via continuous assessment throughout the duration of the Semester, which forms the Coursework grade and the final written exam. The coursework and the final exam grades are weighted 40% and 60%, respectively, and compose the final grade of the course. Various approaches are used for the continuous assessment of the</p>

	<p>students, such as class participation and in class exercises, assignments and tests. The assessment weight, date and time of each type of continuous assessment is being set at the beginning of the semester via the course outline. An indicative weighted continuous assessment of the course is shown below:</p> <ul style="list-style-type: none"> • Participation Activities (4% of total marks for module) • Three assignments (20% of total marks for module) • One closed-book test (16% of total marks for module) • One closed-book, 2-hour exam (60% of total marks for module) <p>Students are prepared for final exam, by revision on the matter taught, problem solving and concept testing and are also trained to be able to deal with time constraints and revision timetable.</p> <p>The criteria considered for the assessment of each type of the continuous assessment and the final exam of the course are: (i) the comprehension of the fundamental concepts and theory of each topic, (ii) the application of the theory in solving related problems and (iii) the ability to apply the above knowledge in complex real-life problems.</p> <p>The final assessment of the students is formative and summative and is assured to comply with the subject's expected learning outcomes and the quality of the course.</p>
Language	English