University: **Alexandria**
Faculty: **Science**
Program: **Computer Science**

Form no. (12)
Course Specification

1- Course Data

Course Code:	**Course Title:**	**Academic Year/Level:**
CS 306	***Logic and Automated Reasoning***	Third level (Second semester)
Specialization: Computer Science	**No. of Instructional Units:** **Lecture** 2 **Lab** 1	

2- Course Aim	• This course is designed to encourage in students a sense of interest for Logic concept and its application in different contexts • Provide a solid foundation in the major areas of automated reasoning • Provide education and training of high quality in automated reasoning
3- Intended Learning Outcome	
a- Knowledge and Understanding	a1. Describe the main concepts, definitions of Automated Reasoning a2. Review theories and concepts used in logic a3. Identify an understanding of the contribution and impacts of logic in scientific, social, economic, environmental, political and cultural terms. a4. logic and first order logic a5. logic systems and reasoning algorithms and first order logic a6. Prolog system

b- Intellectual Skills	b1. Manipulate and apply appropriate theories, principles and concepts relevant to logic b2. Critically assess and evaluate the literature within the field of logic b3 Deduce and interpret information from a variety of sources relevant logic
c- Professional Skills	**c1.** Plan, design and execute practical activities using techniques and procedures Appropriate to logic **c2.** Execute a piece of independent research using logic**,** computer media and techniques;
d- General Skills	**d1.** Develop appropriate effective written and oral communication skills relevant to the specific course of automated reasoning **d2.** Demonstrate the ability to work effectively as part of a group **d3.** Solve problems relevant to logic using ideas and techniques some of which are at the forefront of the discipline. **d4.** Solve problems relevant to **applications in real life** in computer science using old and new languages some of which are at the forefront of the discipline;
4- Course Content	• Elementary set theory, Propositional logic, Propositional logic reasoning using resolution, Normal forms, Clauses, Resolution, First-order/predicate logic introduction, Quantifiers, First order models, • Validity and satisfiability, First-order reasoning using unrestricted resolution, Skolemization, Unification, Resolution, • Simplification techniques, Orderings, Well-founded orderings, Lexicographic combinations of orderings, Multi-sets, Multi-set orderings, Lexicographic path orderings, • Lifting principle, Saturation, Refutational completeness, Herbrand's theorem, Löwenheim-Skolem theorem, • Saturation-based framework of resolution calculi, Ordered resolution with selection, lifting, • Craig interpolation, Redundancy concept, Saturation up to redundancy, • Practical model of a resolution prover, Fairness, Refinements of resolution, Hyperresolution, Neuman-stubblebine key exchange protocol, • Semantic tableaux semantic tableau for propositional logic, • Decidability, Free-variable tableau, • Logic programming. • Horn clauses, • Prolog.

5- Teaching and Learning Methods	Lecturers – Home works - Oral discussion - Quizzes
6- Teaching and Learning Methods for Students with Special Needs	NONE
7- Student Assessment:	
a- Procedures used:	Lecturers – tutorials- homework – oral discussion - Quizzes
b- Schedule:	Mid-Term exam… …. Week 10 Final exam ……. Week 17
c- Weighing of Assessment:	Term work (exam + home works) 20% Oral exam 10% Final exam 70%
8- List of References:	Logic: A modern approach
a- Course Notes	Course notes provided by the Faculty member of Computer Science Division, Math department, to be handled at the beginning of the semester.

b- Required Books (Textbooks)	
c- Recommended Books	
d- Periodicals, Web Sites, ..., etc.	

Course Instructor: Dr. Yasser Fouad
Head of Department: Prof. Dr. Mahmoud El-Alem.
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