

## Language Engineering

**Course Title:** Language Engineering

**Course Code:** ITF306

**Credit Hours:** 3

**Knowledge Domain:** IT Foundations.

**Prerequisite(s):** Automata Models (CAS205)

### Learning Objectives:

Upon completion of this course, the student will be able to:

1. Present the scope of language engineering applications.
2. Acquire the syntax and semantic concepts and knowledge representation.
3. Identify element of speech act theory.
4. Grasp the basics of machine translation with emphasis on Arabic/English translation.

### Learning Outcomes

1. Acquaintance with the basic elements of language engineering including syntactical and semantical concepts.
2. Grasping the main elements and usage of WordNet.
3. Exposition to the main features of machine translation with access to some commercial packages.

### Overview and Syllabus

Introduction to language engineering. Syntactic processing. Semantic interpretation. Knowledge representation. Belief models and speech acts. Natural language generation. Elements of machine translation.

### Course Outline

	<b>Topic</b>
1	<b><u>Module 01: Introduction to Language Engineering</u></b> Introduction Objectives <b>Lesson 01:</b> Natural language engineering vs. Language processing <b>Lesson 02:</b> Computational Models of Language <b>Lesson 03:</b> English Language Basics <b>Lesson 04:</b> Arabic Language Considerations Summary Assessment

2	<p><b><u>Module 02: Syntax</u></b>  Introduction  Objectives  <b>Lesson 01:</b> Linguistic Background  <b>Lesson 02:</b> Basic Parsing Techniques  <b>Lesson 03:</b> Practical Considerations  <b>Lesson 04:</b> Arabic Language Considerations  Summary  Assessment</p>
3	<p><b><u>Module 03: Knowledge Representation</u></b>  Introduction  Objectives  <b>Lesson 01:</b> Main Issues  <b>Lesson 02:</b> Propositional Logic  <b>Lesson 03:</b> First Order Predicate Calculus  <b>Lesson 04:</b> Object-Oriented Representations  Summary  Assessment</p>
4	<p><b><u>Module 04: Semantics</u></b>  Introduction  Objectives  <b>Lesson 01:</b> Semantic Representation  <b>Lesson 02:</b> Syntax-Driven Semantic Analysis  <b>Lesson 03:</b> Robust Semantic Analysis  <b>Lesson 04:</b> Lexical Semantics  Summary  Assessment</p>
5	<p><b><u>Module 05: Pragmatics</u></b>  Introduction  Objectives  <b>Lesson 01:</b> Reference Phenomena  <b>Lesson 02:</b> Text Coherence and Discourse Structure  <b>Lesson 03:</b> Dialogue and Conversational Agents  <b>Lesson 04:</b> Dialogue Acts and Dialogue Structure  Summary  Assessment</p>
6	<p><b><u>Module 06: Natural Language Generation</u></b>  Introduction  Objectives  <b>Lesson 01:</b> Scope and Architecture for Generation  <b>Lesson 02:</b> Systemic Grammar and Surface Realization  <b>Lesson 03:</b> Discourse Planning and Lexical Selection  Summary  Assessment</p>
7	<p><b><u>Module 07: Machine Translation</u></b>  Introduction</p>

Objectives

**Lesson 01:** Why is Machine Translation So Hard?

**Lesson 02:** Rule-Based Machine Translation

**Lesson 03:** Knowledge-Based Machine Translation

**Lesson 04:** Arabic-English Machine Translation Systems

Summary

Assessment