

# Lesson Plan

**Lesson: \_Computer Processing of English language\_\_\_\_\_ (covered in the senior course Artificial Intelligence)\_ by Tim Lin, Department of Electrical and Computer Engineering, Cal Poly Pomona**

**Timeframe: \_\_\_\_75 minutes\_\_\_\_\_**

**Materials needed: laptop, projector, PowerPoint presentation, dictionary, articles / papers of English essays with examples.**

## **Objectives:**

### *Basic:*

- 1. BO1: Know the concepts of synonyms, antonyms, metonyms, and eponyms in English*
- 2. BO2: Understand Named Entity Recognition*
- 3. BO3: Analyze the structure of an English sentence (Noun + Verb etc.)*

### *Advanced:*

- 1. AO1: Generate / Identify / Process programmatically synonyms, antonyms, etc.*
- 2. AO2: Classify different Named Entity such as Locations, People, Countries, Companies*
- 3. AO3: Analyze simple and compound sentences, with extensions and variations (add adjectives, adverbs etc.).*
- 4. AO4: Generalize and extend concepts to other natural languages such as Spanish.*

## **Background:**

This course Artificial Intelligence is an elective course for ECE students in the senior level. Algorithms, concepts, and implementations are covered.

Natural Language Processing (NLP) is covered as an integral, interesting, and also challenging module in this class. This lesson is a special module of NLP, which is an area covered in the course AI.

Students of this class are engineering major students, and yet in this course, linguistics from CLASS (College of Literature and Social Science) will be covered, and then STEM (Science, Technology, Engineering, and Mathematics) is applied with the algorithms, computer programming languages etc. as a tool to process English texts by computer, hopefully to process big amount of such texts.

## **Introduction to Lesson:**

Write agenda on board or present agenda on screen.

1. Presentation / Summary of objectives for this day.
2. Sharing of students results from their off-line or pre-class study and activity the week before
3. Discussion and evaluation
4. Set new assignments on-the-fly in the class with the students participation
5. Perform some in class grouping activities.
6. Discuss and evaluate the student results for the in-class activities.
7. Conclude and summarize.
8. Future plan

**Procedure [Time needed, include additional steps if needed]:**

***Pre-Class Individual Space Activities and Resources:***

Steps	Purpose	Estimated Time	Learning Objective
<p><b>Step 1:</b></p> <p>Announce that there will be a flip session in the beginning of the team, semester, or quarter. Explain what flip is and the benefit of that.</p>	<p>To let the students know about the concepts and they can make suggestions on what to do</p>	<p>10 minutes</p>	<p>BO1: synonyms etc. BO2: NER, and BO3: sentence structure.</p>
<p><b>Step 2:</b></p> <p>Three weeks before the flip session, remind the students about the plan and show them some preliminary plan.</p>	<p>To refresh the students and also to inspire the students, hoping to get them involved and contribute actively in the class.</p>	<p>20 minutes</p>	<p>Basic Objectives: BO1, BO2, and BO3.  Also, Advanced Objectives: AO1, AO2, AO3, and AO4 briefly</p>
<p><b>Step 3:</b></p> <p>A week before the flip session, give students reading assignments and activity assignments on different learning objectives. Reading assignments can be papers, books, or even internet articles.</p> <p>Activity assignments can involve grouping of students.</p>	<p>To engage the students in active preparation for the class to come.</p>	<p>20 minutes</p>	<p>BO1, 2, and 3</p>

<b>Step 4:</b>			
<b>Step 5:</b>			

***In-Class Group Space Activities and Resources:***

<b>Steps</b>	<b>Purpose</b>	<b>Estimated Time</b>	<b>Learning Objective</b>
<b>Step 1:</b> Simple presentation or summary of what the three basic objectives are, what we want to achieve and what the students can benefit from.	Orient and refresh the students for that lessons' activities.	8 minutes	BO1, BO2, BO3
<b>Step 2:</b> Sharing of (selected or volunteered) student results of BO1 , BO2, and BO3 through their one week preparation.	Let the students show their progress / problems.	15 minutes	BO1, BO2, BO3

Steps	Purpose	Estimated Time	Learning Objective
<p><b>Step 3:</b></p> <p>Discussion and evaluation of these pre-class results. Evaluation can come from the instructors, students' self evaluation, or the other groups' evaluation.</p>	<p>Discussion led by the instructor with occasionally student leader's contribution</p>	<p>15 minutes</p>	<p>BO1, BO2, BO3</p>
<p><b>Step 4:</b></p> <p>New in class assignments with one of the three basic objectives, with the words (BO1), entity (BO2), or sentence (BO3) picked by the instructor or by the students.</p>	<p>An improvement session based on activities before and in class.</p>	<p>25 minutes</p>	<p>One of BO1, BO2, or BO3, but not all.</p>
<p><b>Step 5:</b></p> <p>Discussion and evaluation of this now in class activity.</p>	<p>A quick go around of the results of 25 minutes class activity.</p>	<p>17 minutes</p>	<p>The BO picked in step 4. Also brief discussion of AO1 through AO4.</p>

**Closure/Evaluation: (5 minutes).** Another 5 minutes that could happen right after the lesson of 75 minutes, near the end of that day's 110 minutes session or even happen in another session, to summarize and evaluate the actions, activities etc.

**Analysis:**

This is a great lesson for students to reflect on something they are familiar with or are supposed to be familiar with (the synonyms, antonyms, named entity, sentence structure etc.), but to look at that with a different point of view and also try to see how these can be analyzed or processed using computers, so that the amount of work can be multiplied (say generalizing from manually reading a text of 500 words, to programmatically reading a text of 5,000 words, 50,000 words etc.).

***Post-Class Individual Space Activities:***

1. Assignments for the students to document the activities happening in the class.
2. Assignments for the students to think about ways to generalize, or to do continued, extended work.
3. Assignments for the students to consider the computer processing (the advanced objectives) or extend to other languages like Spanish (French, German etc.).

***Connections to Future Lesson Plan(s):***

A natural future lesson is: investigate the (four) advanced objectives of this lesson, and to lay out the foundation of computer processing code for the English language. There are many applications of this such as resume writer tool, resume reading tool, English composition grading tool (used by ETS) etc.