City University of Hong Kong
Course Syllabus

offered by Department of Linguistics and Translation
with effect from Semester B 2019/20

Part I Course Overview

Course Title:	Machine Translation
Course Code:	LT3222
Course Duration:	One Semester
Credit Units:	3
Level:	B3
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	(i) LT2231 Introduction to Language Technology and (ii) LT2201 Introduction to Linguistics or LT2229 Fundamentals of Linguistics or LT2290 Introduction to Language Studies
Precursors: *(Course Code and Title)*	LT3233 Computational Linguistics
Equivalent Courses: *(Course Code and Title)*	CTL3222 Machine Translation
Exclusive Courses: *(Course Code and Title)*	NIL

Part II Course Details

1. Abstract

(A 150-word description about the course)

The aim of this course is to study the roles of computers and information technology, linguistic knowledge and translation expertise in the automation of translation and examine the possibilities of integrating the best of human and machine intelligence to maximize translation productivity.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick ✓ where appropriate)		
			A1	*A2*	*A3*
1.	Describe the major events in machine translation (MT) technology development	30%	✓	✓	
2.	Apply linguistic knowledge competently and creatively to explore the key tasks of language processing involved in MT	30%	✓	✓	✓
3.	Evaluate machine translation systems competently and creatively in terms of both system implementation and translation quality	20%	✓	✓	✓
4.	Describe the recent trends of MT technology development	20%	✓	✓	
		100%			

** If weighting is assigned to CILOs, they should add up to 100%.*

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4			
1	**Lectures** towards the above outcomes to explain and illustrate the basic issues involved and necessary programming techniques, if applicable, for a practical solution for each of them	✓	✓	✓	✓			
2	**Readings** of lecture notes and selected chapters from textbooks	✓	✓	✓	✓			
3	**Implementing a prototype MT system** for a controlled language	✓	✓	✓	✓			
4	**Tutorials** to help students to resolve their programming problems and perform demos of their programs for the above tasks	✓	✓	✓	✓			

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4				
Continuous Assessment: 50%								
Assignments to design and implement (the kernel part of) the programs for the above tasks;	✓	✓	✓	✓			50%	
Demos of running programs in tutorials;	✓	✓	✓	✓				
Quizzes (optional)	✓	✓	✓	✓				
Examination: 50% (duration: 2 hours) Two-hour examination on basic conceptions and programming know how. (CILO No. 1-4)								

** The weightings should add up to 100%.* 100%

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignments 2. Demos of running programs	Knowledge, attitude, ability, creativity, accomplishment and performance in completing and/or presenting demons and/or assignments	1. Excellent knowledge of major issues, concepts, principles and techniques in various approaches to machine translation. 2. Excellent, creative application of linguistic, computing and programming knowledge to basic language processing subtasks in machine translation. 3. Very active participation and high marks/ performance.	1. Good knowledge of major issues, concepts, principles and techniques in various approaches to machine translation. 2. Good application of linguistic, computing and programming knowledge to basic language processing subtasks in machine translation. 3. Active participation and good marks/ performance.	1. Adequate knowledge of major issues concepts, principles and techniques in various approaches to machine translation. 2. Fair application of linguistic, computing and programming knowledge to basic language processing subtasks in machine translation. 3. Adequate participation and fair marks/ performance.	1. Basic familiarity with the subject matter. 2. Marginal ability to apply basic linguistic, computing and programming knowledge to basic language processing subtasks in machine translation. 3. Marginal participation and marginal marks/ performance.	1. Poor familiarity with the subject matter. 2. Poor ability or fail to apply linguistic, computing and programming knowledge to basic language processing subtasks machine translation. 3. Poor participation and poor marks/ performance.
3. Quizzes	Marks					
4. Examination						

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

History of machine translation. Generations of MT technology. Language analysis, transfer and generation. NLP technologies involved in MT: Sentence splitting/identification, tokenization and word segmentation; lemmatization; part-of-speech tagging; parsing; semantic and discourse analysis; sentence generation.
Text alignment and language resource acquisition. MT evaluation. Recent advances in MT technology: translation memory, example-based machine translation, statistical-based machine translation.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Lecture notes/slides for the course
2.	Selected papers/chapters on topics of machine translation
3.	Selected tutorials on key tasks of programming for system implementation

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Relevant chapters in the recommended reading list
2.	Advanced and/or related topics of programming for system implementation

Recommended Reading:

1. Pushpak Bhattacharyya. 2015. *Machine Translation*. Boca Raton: Taylor & Francis.
2. Philip Williams, Rico Sennrich, Matt Post & Philipp Koehn. 2016. *Syntax-Based Statistical Machine Translation*. San Rafael, California: Morgan & Claypool
3. Joseph Olive, Caitlin Christianson & John McCary (eds.). 2011. *Handbook of Natural Language Processing and Machine Translation*. New York: Springer.
4. Philipp Koehn. 2010. *Statistical Machine Translation*. Cambridge: Cambridge University Press.
5. Yorick Wilks. 2008. Machine translation: its scope and limits. London: Springer.
6. Hutchins, W. J. 2003. Machine translation: general overview. In R. Mitkov (Ed.) *The Oxford Handbook of Computational Linguistics,* pp.501-511. Oxford: University Press.
7. Hutchins, W. J. 2003. ALPAC: The (In)Famous Report. Nirenburg, S., H. Somers, and Y. Wilks. 2003. *Readings in Machine Translation*, pp. 131-136. Cambridge, Mass.: MIT Press
8. M. Nagao. 1984. A framework of a mechanical translation between Japanese and English by analogy principle. In Elithorn, A., and R. Banerji (Eds.) *Artificial and Human Intelligence*, pp. 173-180. Amsterdam: North-Holland.
9. Kay, M. (1980). The proper place of men and machines in language translation. Xerox PARC working paper, 1980. Reprinted in *Machine Translation* 12:3-23, 1997.

Supplementary Reading:

1. Nirenburg, S., H. Somers, and Y. Wilks. 2003. *Readings in Machine Translation*. Cambridge, Mass.: MIT Press.
2. Hutchins, W.J. 2000. *Early Years in Machine translation: Memoirs and biographies of pioneers*. Amsterdam: John Benjamins
3. Arnold, D., et al. 1994. *Machine Translation: An Introductory Guide*. NCC Blackwell.
4. Hutchins, W.J. & H.L. Somers. 1992. *An Introduction to Machine Translation*. London: Academic Press