

INTRODUCTION TO ARTIFICIAL INTELLIGENCE

SYLLABUS 0.7

SYLLABUS HISTORY

Version	Last Update	Reason
0.2	16 Feb	Introduction, teaming up, topic assignment
0.5	23 Feb	Forming Teams 9-12, Updating Team 1 and Rescheduling all the presentation dates due to the citizen's orientation day at the beginning of the semester.

IT097IU – Introduction to Artificial Intelligence (3, 1)

1. Name of course: Introduction to Artificial Intelligence

2. Course code: IT097IU

3. Course type:

☐ Specialization

☒ Core

☒ Requirement

☐ Elective

4. Number of credits: 4 credits

- Theory: 3 credits

- Practice: 1 credit

5. Prerequisite: None

IT069IU - Object-Oriented Programming

IT072IU - Data Structures and Algorithms

MA020IU - Discrete Mathematics

MA026IU - Probability, Statistic & Random Process

6. Parallel teaching in the course: None

7. Course Description: This course introduces students to the basic knowledge on Artificial intelligence. Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan,

and solve problems autonomously. In this course, student will learn the foundational principles and practice implementing some of these applications including representation, problem solving, and learning methods of artificial intelligence. Accordingly, students should be able to develop intelligent systems by assembling solutions to concrete computational problems; understand the role of knowledge representation, problem solving, and learning in intelligent-system engineering; and appreciate the role of problem solving, vision, and language in understanding human intelligence from a computational perspective.

8. Course objectives:

The main purpose of this course is to provide the most fundamental knowledge to the students so that they can understand what the AI is. Students who become interested in AI may go on to the graduate school for further study. Upon the successful completion of this course students will be able to:

1. Ability to apply knowledge of AI techniques and synthesize solutions to the discipline and ability to develop a range of typical applications using artificial intelligence methods.
2. Ability to represent knowledge corresponding to practical problems, design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs by properly using classical search algorithms, including breadth-first, depth-first, A*, and heuristic search.
3. Ability to produce intelligent applications of machine learning with statistical learning methods (Naïve Bayes), supervised and unsupervised learning models: decision tree, neural networks, single-layer (perceptron) and multilayer networks
4. Ability to communicate effectively with a range of audiences, ability to use current techniques, skills, and tools necessary for computing practice, ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices and ability to apply design and development principles in the construction of software systems of varying complexity.

9. Textbooks and references:

Textbooks:

1. [Luger 2009] George F. Luger (2009), *Artificial Intelligence: Structures and Strategies for Complex Problem Solving*, 6th edition, Pearson.
2. [Han 2016] Jiawei Han, Micheline Kamber, Jian Pei (2016). *Data mining: Concepts and Techniques*. 3rd edition. MK.

References:

3. [Russell 2016] Stuart J. Russell, Peter Norvig (2016): *Artificial intelligence: a modern approach*, 3rd edition. Pearson.
4. [Poole 200x] Poole and Mackworth (200?). *Artificial Intelligence: Foundations of Computational Agents*. ISBN: 9780521519007
5. [Witten 2017] Ian H. Witten, Eibe Frank, Mark A. Hall, Christopher J. Pal (2017). *Data mining: Practical Machine Learning Tools and Techniques*. 4th edition. Elsevier.

Programming Language: Python

Resources: <http://www.tinyurl.com/nhquang-ai>

10. Learning outcomes

	Course Learning outcome	Program Learning outcome
Knowledge	1. Apply knowledge of AI techniques and synthesize solutions to the discipline and ability to develop a range of typical applications using artificial intelligence methods (Program outcome: a, b)	(a) An ability to apply knowledge of mathematics, science, and engineering (b) An ability to design and conduct experiments, as well as to analyze and interpret data.

	<p>2. Represent knowledge corresponding to practical problems, design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs by properly using classical search algorithms, including breadth-first, depth-first, A*, and heuristic search (Program outcome: a, b, c, e)</p>	<p>(a) An ability to apply knowledge of mathematics, science, and engineering</p> <p>(b) An ability to design and conduct experiments, as well as to analyze and interpret data.</p> <p>(c) An ability to design a system, component, or process to meet desired needs</p> <p>(e) An ability to identify, formulate, and solve engineering problems.</p>
Skill	<p>3. Produce intelligent applications of machine learning with statistical learning methods (Naïve Bayes), supervised and unsupervised learning models: decision tree, neural networks, single-layer (perceptron) and multilayer networks (Program outcome: c, d)</p>	<p>(c) An ability to design a system, component, or process to meet desired needs.</p> <p>(d) An ability to function on multi-disciplinary teams</p>
	<p>4. Communicate effectively with a range of audiences, ability to use current techniques, skills, and tools necessary for computing practice, ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices and ability to apply design and development principles in the construction of software systems of varying complexity. (Program outcome: f, g, j, k)</p>	<p>(f) An understanding of professional and ethical responsibility</p> <p>(g) An ability to communicate effectively.</p> <p>(j) A knowledge of contemporary issues</p> <p>(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.</p>

Attitude	5. To develop life-long learning attitude.	(i) a recognition of the need for, and an ability to engage in life-long learning
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11. Course implementation

Time: *Theory*: 15 weeks, 03 periods per week; *Practice*: 8 weeks, 04 periods per week

Teaching and learning activities

- Classroom activities: Lectures/presentations, discussions, exercises/quizzes
- Self-learning: Reading, programming, homework
- Team work: Project assignment
- Lab sessions

12. Course outline

Topic	Topics	Textbooks & Chapters	Presenter	STARTING MONDAY
0	Introduction	N/A	Instructor	11 Feb
	NO CLASS (due to the citizen's orientation week)			18 Feb
1	AI: history and applications	[Luger 2009] Ch1 [Russell 2016] Ch1	Team 6	25 Feb
2	The predicate calculus	[Luger 2009] Ch2	Team 1	4 Mar
3	Structures and strategies for state space search	[Luger 2009] Ch3	Team 4	11 Mar
4	Heuristic search	[Luger 2009] Ch4	Team 3	18 Mar
5	Stochastic methods	[Luger 2009] Ch5	Team 5	25 Mar
6	Building control algorithms for state space search	[Luger 2009] Ch6	Team 2	1 Apr
	MID-TERM EXAM			8 Apr
	MID-TERM EXAM			15 Apr
7	Knowledge representation	[Luger 2009] Ch7	Team 7	22 Apr
8	Strong method problem solving	[Luger 2009] Ch8		29 Apr
9	Reasoning in uncertain situations	[Luger 2009] Ch9	Team 8	6 May
10	Understanding natural language	[Luger 2009] Ch15	Team 12	13 May
11	<i>[Data mining ~ Machine learning]</i> 2. Getting to know your data	[Han2012] Ch2	Team 9	20 May
12	<i>[Data mining ~ Machine learning]</i> Ch3. Data preprocessing	[Han2012] Ch3	Team 10	27 May
13	<i>[Data mining ~ Machine learning: symbol-based]</i> Ch8. Classification: Basic Concepts	[Han2012] Ch8	Team 11	3 Jun
14	<i>[Data mining ~ Machine learning]</i> Ch6. Mining frequent patterns, associations and correlations Revision	[Han 2012] Ch6		10 Jun
	FINAL EXAM			17 Jun

Topic	Topics	Textbooks & Chapters	Presenter	STARTING MONDAY
	FINAL EXAM			24 Jun

STUDENT LIST

STT	Mã sinh viên	Họ lót	Tên	Mã lớp	TEAMS	ĐT liên lạc	Email	Ghi chú
1	ITITIU16065	Nguyễn Thành	An	ITIT16CS1	Team 5			
2	ITITIU14118	Tăng Thế	Anh	ITIT14CS1	Team 4			
3	ITITIU15105	Nguyễn Thái	Bình	ITIT15IU21	Team 10			
4	ITITIU17029	Nguyễn Trương	Đạt	ITIT17IU21	Team 3	0868817287		
5	ITITIU16019	Vũ Tùng	Dương	ITIT16CS1				
6	ITITIU16006	Nguyễn Vũ	Duy	ITIT16CS1	Team 7			
7	ITITIU14025	Ôn Đông	Hải	ITIT14CS1				
8	ITITIU14026	Tô Hoàng	Hải	ITIT14CS1				
9	ITITIU15090	Võ Minh	Hiếu	ITIT15CS1	Team 9			
10	ITITIU16026	Hồ Thanh	Hoài	ITIT16CS1	Team 2			
11	ITITIU15031	Lương Huỳnh Huy	Hoàng	ITIT15CS1	Team 10			
12	ITITIU15082	Trần Quốc	Hùng	ITIT15CS1	Team 12			
13	ITITIU16030	Nguyễn Quốc	Hưng	ITIT16CS1				
14	ITITIU16031	Phạm Giao	Huy	ITIT16CS1	Team 2			
15	ITITIU16032	Võ Hào	Huy	ITIT16CS1				
16	ITITUN17026	Nguyễn Quang	Huy	ITIT17UN11	Team 11			
17	ITITIU16033	Nguyễn Kim	Kha	ITIT16CS1	Team 4			
18	ITITIU16101	Trần Đức	Khoa	ITIT16CS1	Team 6			
19	ITITIU16037	Đỗ Anh	Lâm	ITIT16CS1	Team 1			
20	ITITIU16038	Nguyễn Hoàng	Lâm	ITIT16NE1	Team 2			
21	ITITIU16107	Phạm Quang	Lộc	ITIT16CS1	Team 7			
22	ITITIU13136	Nguyễn Huỳnh Công	Minh	ITIT13CS				
23	ITITIU16043	Nguyễn Trần Hoàng	Nam	ITIT16CS1	Team 5			
24	ITITIU15003	Đặng Nguyễn Khôi	Nguyễn	ITIT15CS1	Team 12			
25	ITITIU15007	Đỗ Minh	Nhật	ITIT15NE1	Team 4			
26	ITITIU16118	Huỳnh Thị Yến	Nhi	ITIT16CS1	Team 3			
27	ITITUN16012	Bùi Nguyễn Minh	Quân	ITIT16UN11	Team 5			
28	ITITIU16050	Nguyễn Tố	Quyên	ITIT16CS1				
29	ITITIU14124	Nguyễn Nhật	Sang	ITIT14IU11	Team 4			
30	ITITIU15047	Nguyễn Minh	Tâm	ITIT15CS1	Team 12			
31	ITITIU16125	Nguyễn Nhựt	Tân	ITIT16CS1	Team 1			
32	ITITIU15015	Lâm Mậu	Thái	ITIT15IU21	Team 9			
33	ITITIU15063	Nguyễn Xuân	Thanh	ITIT15CS1	Team 9			
34	ITITIU16054	Vũ Nhật	Thanh	ITIT16CS1	Team 1			
35	ITITIU15068	Phạm Nguyễn Trường	Thịnh	ITIT15CS1	Team 10			
36	ITITIU16126	Nguyễn Minh	Thông	ITIT16CS1	Team 5			
37	ITITIU16130	Nguyễn Phan Hùng	Thuận	ITIT16CS1	Team 6			
38	ITITIU16058	Hồ Đức	Tín	ITIT16CS1	Team 1			
39	ITITUN16010	Hồ Nguyễn Trung	Tín	ITIT16UN21				

40	ITITIU15059	Nguyễn Thị Ngọc	Trâm	ITIT15CS1				
41	ITITIU16136	Đoàn Tấn	Trung	ITIT16CS1	Team 7			
42	ITITIU16138	Trần Lê Minh	Trung	ITIT16IU21	Team 2			
43	ITITIU16142	Lê	Tuấn	ITIT16CS1	Team 6			
44	ITITIU16061	Tô Bá Thanh	Tùng	ITIT16CS1				
45	ITITIU16144	Nguyễn Thanh Xuân	Tùng	ITIT16CS1	Team 3			
46	ITITIU16062	Đỗ Ngọc Thanh	Tuyền	ITIT16CS1	Team 6			
47	ITITIU16063	Nguyễn Thị Thu	Xuyên	ITIT16CS1	Team 3			
48	ITITUN17015	Lee Young	Hyun		Team 8			

13. Course Assessment:

13.1. Grading:

- One midterm exam: 30%
- One comprehensive final exam: 40%
- In-class presentations, class participation: 10%
- Laboratory/project assignment: 20%

OAA's Term	Total Score	Assessment	Max Score	Subtotal Score	Notes
Mid-term Exam	30%	Mid-term Exam	30	30	- Problem-solving answers - Close book, open notes (two A4 papers with hand-written notes: TBA)
Assignment	30%	Presentation/ Exercise	10	10	- Presentations - Individual or group work - Each member's effort is marked separately
		Project	20	20	- Lab work (5%) - All deliverables - Group assignment (15%)
Final Exam	40%	Final Exam	40	40	- Multiple choice [optional] - Problem-solving answers - Close book, open notes (two A4 papers with hand-written notes: TBA)
Total	100%			100	

Bonus

- A maximum of 05 bonus points will be awarded to the assignment component of the most active student(s) in the class based on the instructor's judgement.

Important Notice

- Students are required to **regularly check** the latest information, especially the updated Class Schedule (Table 3), from the subject's website.
- Should you have any concern regarding to the subject, please feel free to contact the instructor or teaching assistant for consultation via email.
- Students **MUST design their own slides** derived primarily from the textbooks. A score of zero (0) will be awarded if any student has not registered for the presentation or has not presented the assigned topic without accepted permission.

13.2. Assessment Plan

No.	Assessment tasks	Assessment criteria	Level of cognitive Domain												Weight (%)
			Applying			Analyzing			Evaluating			Creating			
			MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	
1	- Midterm exam - Quizzes - Laboratory assignment	Ability to apply knowledge of AI techniques and synthesize solutions to the discipline and ability to develop a range of typical applications using artificial intelligence methods	x	x		x	x		x	x		x	x		27
			x	x		x	x		x	x		x	x		
				x	x		x	x		x	x			x	
2	- Final exam - Quizzes - Laboratory assignment	Represent knowledge corresponding to practical problems, design, implement, and evaluate a computer-based	x	x		x	x		x	x		x	x		26
			x	x		x	x		x	x		x	x		
				x	x		x	x		x	x			x	

No.	Assessment tasks	Assessment criteria	Level of cognitive Domain												Weight (%)
			Applying			Analyzing			Evaluating			Creating			
			MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	
		system, process, component, or program to meet desired needs by properly using classical search algorithms, including breadth-first, depth-first, A*, and heuristic search													
3	- Final exam - Quizzes - Project/ Laboratory assignment	Produce intelligent applications of machine learning with statistical learning methods (Naïve Bayes), supervised and unsupervised learning models: decision tree, neural networks, single-layer (perceptron) and multilayer networks		x			x			x			x		
			x	x		x	x		x	x		x	x		
			x	x	x	x	x	x	x	x	x	x	x	x	37
4	- Laboratory assignment	Communicate effectively with a range of audiences, ability to use current techniques, skills, and tools necessary for computing practice, ability to apply mathematical foundations, algorithmic principles,		x	x		x	x		x	x		x	x	10

No.	Assessment tasks	Assessment criteria	Level of cognitive Domain												Weight (%)
			Applying			Analyzing			Evaluating			Creating			
			MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	MCQ	WQ	P	
		and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices and ability to apply design and development principles in the construction of software systems of varying complexity													
	Total														100

Note: **MCQ:** Multiple choice questions ; **WQ:** Writing questions; **P:** Presentation

14. Student responsibility & Policies:

- *Student responsibility:* Students are expected to spend at least 8 hours per week for self – studying. This time should be made up of reading, working on exercises and problems and group assignment.
- *Attendance:* Regular on-time attendance in this course is expected. It is compulsory that students attend at least 80% of the course to be eligible for the final examination.
- *Missed tests:* Students are not allowed to miss any of the tests (both on-going assessment and final test). There are very few exceptions. (Only with extremely reasonable excuses, e.g. certified paper from doctors, students may re-take the tests.)

Developed by:	Last updated: 12 Feb 2019
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Lab Instructor: Ly Tu Nga, PhD. Email: ltnga@hcmiu.edu.vn

Class Coordinator: TBA

Academic Honesty

The course observes the Academic Honesty Policy: “*Academic honesty is the cornerstone of the academic integrity of the university. It is the foundation upon which the student builds personal integrity and establishes a standard of personal behavior.*” Because honesty and integrity are such important factors, you should be aware that *failure to perform within the bounds of these ethical standards is sufficient grounds to receive a grade “F” and be recommended for suspension.* Please read Section: ‘*Discipline to students, university cadres violating regulation on testing and examination*’, Article 8, Chapter 3, Student’s Handbook, Academic Year 2007-2008). Scores are evaluated in comparison with your classmate's scores, but *the right is reserved to evaluate the final grade.* Curve-up policy is endorsed here.

Email Policy

"When you send email to me, remember to put in field **Subject: course code, your name, student ID, content summary**, and the details in field **Content**. For example:

From: nguyenvana@yahoo.com

To: iu.subjects@gmail.com

Subject: **AI: Nguyen Van A, IDID0001, Your subject is here...**

Content:

Dear Dr. Quang,

I'd like to know about or
What is ? etc.

Regards,
Nguyen Van A

1. If you do not follow this format, **I WILL NOT REPLY.**
2. If I do not understand your email because of **poor** English writing, **I WILL NOT REPLY.**
3. Be professional in email communication. Think and rewrite your sentence carefully and check word spelling before **SENDING OUT.**"

(Courtesy by Dr. Hoang V. Phan)

CALENDAR 2018 - 2019

19	Feb/2019					Mar/2019					April/2019					May/2019					June/2019				
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44			
28	4	11	18	25	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	31			
	9	16	23		9	16	23	30	6	13	20	27		11	18	25		8	15	22	29				
UNDERGRADUATE PROGRAMS																									
					Semester 2																				
←	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	→				