CS-605 (Advanced Artificial Intelligence)

Second Semester

Course Description

Course code number	CS- 605 Second Semester	Course Title	Advanced Artificial Intelligence
Semester hours	3 hours	Credit Units	3
Prerequisite		Course Coordinator	Dr. Win Lelt Lelt Phyu Faculty of Computer Science

Course Aims

The main purpose of this course is to introduce the student to the concept of multi-agent system. In addition, the students can learn the main issues surrounding the design of multi-agent systems, the approaches and techniques for communication, cooperation, automated decision making and the applications for which they are appropriate in such systems.

Learning Outcomes

Upon successful completion of the course the student will be able to

1. know the notions of the agent, intelligent agent and multi-agent system
2. understand how agents are distinct from other software paradigms (e.g., objects), and the key issues associated with constructing agents capable of intelligent autonomous action, and the main approaches taken to developing such agents
3. familiar with the key issues and approaches to high-level communication in multi-agent systems;
4. understand the key issues in designing societies of agents that can effectively cooperate in order to solve problems, including an understanding of the key types of multi-agent interactions possible in such systems
5. understand the main application areas of agent-based solutions

Course Contents

Multi-agent systems have emerged as one of the most important areas of research and development in information technology. In this course students will learn

1. Introduction to multi-agent system.
2. Intelligent agent and its environments, Abstract Architectures for agents, Agents and Objects and Agents and Expert Systems.
3. Practical Reasoning Agents and Reactive and Hybrid Agents.
4. Interaction languages and protocols: speech acts, KQML/KIF and FIPA
5. Ontologies for Agent Communication.
6. Applications for agents.

Lecture Plan (2019-2020)

Course Organization

The expected learning outcomes for the course will be assessed through six forms of activity:

1. Attending the lectures
2. Preparing for and participating in the recitations.
3. Assignments/ Tutorials
4. Reading the text/ Presentation
5. Quiz/ Moodle Test
6. Exams

Reference Materials:

1. An Introduction to Multi-agent Systems by Michael Wooldridge

Exam Assessment

Exam Paper	50%
Tutorials	10%
Class participation	10%
Quiz / Moodle Test	10%
Assignment	10%
Presentation	10%

Lecture Plan

CS-605 :   Advanced Artificial Intelligence   Second Semester
Periods :   45 Periods for 15 weeks (50 minutes for 1 period)

No	Chapter	Page	Period	Detail Lecture Plan
1.	**Chapter 1** **Introduction**		**2**	
	1.2 The vision thing	5-7		General
	1.2 Some views of the Field	7-8		General
	1.3 Objections to multi-agent System	8-11		General
2.	**Chapter 2** **Intelligent Agents**		**10**	
	2.1 Environments	17-23		General
	2.2 Intelligent Agents	23-25		Detail
	2.3 Agents and Objects	25-27		Detail
	2.4 Agents and Expert Systems	27-28		Detail
	2.5 Agent s and Intentional System			Detail
	2.6 Abstract Architectures for Intelligent Agent	28-29		Detail
	2.7 How to tell an agent What to do? 2.8 Synthesizing Agents	29-31		General
3.	**Chapter 4** **Practical Reasoning Agents**		**10**	Detail
	4.1 Practical Reasoning Equals Deliberation Plus Means-Ends Reasoning	65-70		Detail
	4.2 Means- Ends Reasoning	70-75		Detail
	4.3 Implementing a Practical Reasoning Agents	75-80		Detail

	4.4 HOMER: An Agent that plans	80-82		Detail
	4.5 The procedural Reasoning System	82-84		Detail
4.	**Chapter 5** **Reactive and Hybrid Agents**		**7**	
	5.1 Brooks and Subsumption Architecture	90-96		Detail
	5.2 The limitations of Reactive Agents	97		Detail
	5.3 Hybrid Agents	97-112		Detail
5.	**Chapter 8 Communication**		**6**	
	8.1 Speech Acts 8.2 Agents Communication Languages	164-180		Detail
	8.3 Ontologies for Agent Communication	180-183		Detail
	8.4 Coordination Language			Detail
6.	**Chapter 11 Applications**		**4**	
	11.2 Agents for Distributed Sensing	248-254		General
	11.3 Agents for Information Retrieval and Management	254-258		General
	11.4 Agents for Electronic Commerce	258-259		General
	11.5 Agents for Human-Computer Interface 11.6 Agents for Virtual Environments	259-263		General
	11.7 Agent for Social Simulation 11.8 Agent for X	263-264		General
7.	Tutorials		2	
8.	Presentations		4	