



University/Academy: Arab Academy for Science and Technology & Maritime Transport
Faculty/Institute: College of Computing and Information Technology
Program: B. Sc. In Computer Science

Course title	Software Agents
Course code	CS461

Form no. (11A) Knowledge and skills matrix for a course

Course content	Week study	Knowledge	Intellectual skills	Professional skills	General skills
Introduction and Intelligent Agents	1	<ul style="list-style-type: none"> Learn an overview of the main trends in computer science and challenging to solve them. Know definitions and concepts of agents and multi agent system and the distinction between agent and similar topics in the literature. Learn examples of current system using agent technology. Know the current frameworks used for developing such systems. 	<ul style="list-style-type: none"> Study examples of agents based systems. Use and compare nine tools for building agents. 	<ul style="list-style-type: none"> Use the JADE system and its framework. 	
Deductive reasoning agents	2	<ul style="list-style-type: none"> List different agents' type and properties. 	<ul style="list-style-type: none"> Compare different types of agents (hardware and 	<ul style="list-style-type: none"> Run a simple program on JADE. 	<ul style="list-style-type: none"> Install and deploy JADE framework.

		<ul style="list-style-type: none"> List environment properties and features. Define abstract architecture of multi-agent system. 	<p>software).</p> <ul style="list-style-type: none"> Solve the tile world example with different algorithms. 	<ul style="list-style-type: none"> Define agent and environment and its features on JADE platform. 	
Practical reasoning agents	3	<ul style="list-style-type: none"> Learn agent architecture and history and designing approaches. Understand symbolic model or reasoning for designing an agent. Understand deductive model or reasoning for designing an agent. Know how to plan an agent model and behavior. Learn the two models AGENT0 and PLACA. 	<ul style="list-style-type: none"> Compare between each design model and its tradeoffs and implementation. Review AGENT0 as one of the programming models developed for building agents systems; it is an extension of LISP. 	<ul style="list-style-type: none"> Build an agent by using deductive reasoning or model in a vacuum world. Plan the agent by building the knowledge representation and search plan. 	
Reactive and Hybrid agents	4	<ul style="list-style-type: none"> Understand different reasoning strategies “Practical reasoning” based on human practical reasoning. Understand that implementation of “Practical reasoning” into agent is based on Beliefs, Desire and Intentions software model. 	<ul style="list-style-type: none"> Show how different strategies implemented in research projects Aero space and Unmanned vehicles. Explore BDI model and how it is implemented in IRMA and HOMER. 	<ul style="list-style-type: none"> Implement different techniques for building software models like IRMA and HOMER. 	
Multiagent interaction and reaching agreement	5	<ul style="list-style-type: none"> Understand reactive model is based on situation and action. Know how Brooks’s language represents the architecture of reactive 	<ul style="list-style-type: none"> Choose the best solution suited for the context of the problem. 	<ul style="list-style-type: none"> Create different solutions for the problem of designing an agent. Use hybrid architecture in some cases. Design and apply agent 	<ul style="list-style-type: none">

		<p>reasoning for an agent.</p> <ul style="list-style-type: none"> List advantages and disadvantages of reactive agents. 		<p>system for problem in hand (book store problem)</p>	
Agent Communication	6	<ul style="list-style-type: none"> Understand the diversity of multi-agent system. Learn the concept of cooperation between agents. 	<ul style="list-style-type: none"> Distinguish between communication in terms of network and communication in multi agent system. 	<ul style="list-style-type: none"> Design a smart negotiation system between agents. 	
7th week Exam	7				
Agent Communication	8	<ul style="list-style-type: none"> Learn the Agent Communication Language (ACL). 		<ul style="list-style-type: none"> Use and identify an ACL message between agents. Construct an ACL message that serves their needs in the system. Use XML Language semantics and syntax. Implement messaging system on JADE platform. 	<ul style="list-style-type: none">
Agent Communication	9	<ul style="list-style-type: none"> Learn aspects of communication (syntax, semantics and pragmatic). Explore speech act theory. Learn different communication protocol levels (low, middle and top levels). 	<ul style="list-style-type: none"> Differentiate between regular message and agent's message as (Act message). 	<ul style="list-style-type: none"> Use performative acts on ACL messages. 	<ul style="list-style-type: none">
Agent Communication	10	<ul style="list-style-type: none"> Learn the two current main languages used in ACL (KQML, KIF). 	<ul style="list-style-type: none"> Differentiate between KQML and KIF. 	<ul style="list-style-type: none"> Build a dialogue between agents. 	

		<ul style="list-style-type: none"> • Explain the difference of ACL and FIPA-ACL as ACL is implementation of FIPA communication language. • Explain the message structure and how it is syntactically written in KQML. • Explain the ontology and its usage in communication. 		<ul style="list-style-type: none"> • Use KQML as message's language. 	
Working Together	11	<ul style="list-style-type: none"> • Understand the concept of cooperation and coordination between agents. • Understand cooperation between agents in task sharing and problem decomposition. 		<ul style="list-style-type: none"> • Build a fully functional multi agent system. • Design a scheme for coordination between agents. • Decompose the problem between agents. 	<ul style="list-style-type: none"> • Use of computing facilities to build fully functional agent system.
12th week Exam	12				
Student Paper Presentations'	13	<ul style="list-style-type: none"> • Learn an application of agent technology and introduce problem-solving techniques to build this application. 	<ul style="list-style-type: none"> • Evaluate different multi agent systems. 	<ul style="list-style-type: none"> • Use JADE library with java programming language to build a multi agent system inspired from research. 	<ul style="list-style-type: none"> • Use the Library to search for research papers and design models. • Acquire Research and reading skills.
Student Paper Presentations'	14				
Student Paper Presentations'	15				

Course Instructor

Name:

Signature:

Head of Department

Name:

Signature: