

<b>Short Title:</b>	Intelligent Software Agents <b>APPROVED</b>
<b>Full Title:</b>	Intelligent Software Agents
<b>Module Code:</b>	MHLT H6020
<b>ECTS credits:</b>	10
<b>NFQ Level:</b>	9
<b>Module Delivered in</b>	<a href="#">1 programme(s)</a>
<b>Module Contributor:</b>	Brian Nolan
<b>Module Description:</b>	The aim of this module is to: Critically analyse the principles of agent program design using object-orientation and present the essential software algorithms used to develop agents that reason, model, and learn to adapt to the world around them in an environment that is dynamic, continuous, non-deterministic and potentially inaccessible. Apply Agent algorithms and techniques to practical "real-world" distributed computing applications using the Internet and TCPIP socket programming. Develop an intelligent agent architecture and use this to construct several agent-enhanced programs.
<b>Learning Outcomes:</b>	
<i>On successful completion of this module the learner will be able to</i>	
<ol style="list-style-type: none"> <li>1. Identify, create and deploy appropriate algorithms and techniques to create intelligent agents in software for use over the Internet.</li> <li>2. Build an intelligent agent framework to support object-oriented, network facing applications for use over the Internet.</li> <li>3. Apply solutions involving complex search and state-based perspectives of an application domain</li> <li>4. Apply appropriate formal knowledge representation techniques based on the Standard Interchange Formats</li> <li>5. Build a domain specific knowledge base and create a reasoning system over that base.</li> <li>6. Design appropriate inter-agent communication architecture</li> </ol>	

**Module Content & Assessment**

<b>Indicative Content</b>
<b>Introducing Agents, Spiders, Aggregators and Bots</b> The need for Intelligent Agents The enabling power of the Internet Intelligent Agent Framework The Internet and Agents Bots, Spiders, Aggregators and Agents TCP/IP, Sockets and URLs – programming a network with Java
<b>Problem Solving Using Search</b> The Search space Search strategies Breadth-First Search Depth-First Search Search Applications
<b>Knowledge Representation</b> Procedural representation Relational Representation Hierarchical representation Predicate Logic Resolution & Unification Frames Semantic Nets Representing Uncertainty Building a Knowledge Base Understanding human language
<b>Reasoning Systems</b> Forward Chaining Backward Chaining Fuzzy Rule Systems Planning
<b>Learning Systems</b> Learning paradigms Neural Networks Backward Propagation Kohonen maps Decision Trees A learning application
<b>Agents and Multi-Agent Systems</b> Transition from artificial intelligence to intelligent agents Multi-agent systems Blackboards The Communications Knowledge Query and Manipulation Language (KQML) Agent Standards FIPA & OMG Co-operating systems Negotiation Agent Engineering issues Formal design of agents behaviours Application of formal logics to agents Characteristics of agency Trends in computing important for agents: ubiquity, interconnection, intelligence, delegation, human-orientation, high-level abstraction
<b>Intelligent Agent Framework</b> Requirements Design Goals Functional Specifications Intelligent Agent Architecture Applications of Agents Java-Based Agent Environments

<b>Indicative Assessment Breakdown</b>	<b>%</b>
Course Work Assessment %	100.00%

<b>Course Work Assessment %</b>				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Practical/Skills Evaluation	Weekly practical work based on material covered in lecture.	1,2,3,5,6	20.00	Every Week
Project	Students must complete an assignment with a research requirement related to current issues in agent technologies. Typically these will involve consideration in areas such as: The evolution of agent technologies on the internet, The use of agent technologies with distributed mobile devices, Applying formal methods to the design and modelling of agent behaviours, Knowledge representation and reasoning with knowledge by an agent, The place of agents in the semantic web.	1,2,3,5,6	40.00	n/a
Project	Students will be required to build agent enhanced programs. These will typically include: A PC management agent, An adaptive internet newsreader that filters articles based on user preferences, an electronic marketplace application where the agents do the buying and selling. A personal agent manager platform is developed. Agents, Spiders and Bots with the ability to find, read and filter web information.	1,2,3,5,6	40.00	n/a

No Final Exam Assessment %
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<b>Indicative Reassessment Requirement</b>
<b>Coursework Only</b> <i>This module is reassessed solely on the basis of re-submitted coursework. There is no repeat written examination.</i>

ITB reserves the right to alter the nature and timings of assessment

**Indicative Module Workload & Resources**

Indicative Workload: Full Time	
Frequency	Indicative Average Weekly Learner Workload
Every Week	28.00
Every Week	28.00
Every Week	56.00

  

Indicative Workload: Part Time	
Frequency	Indicative Average Weekly Learner Workload
Every Week	28.00
Every Week	28.00
Every Week	56.00

Resources
<i>Recommended Book Resources</i>
Diana Perez-Marin (Editor), Ismael Pascual-Nieto (Editor), <i>Conversational Agents and Natural Language Interaction: Techniques and Effective Practices</i> , Information Science Reference [ISBN: 1609606175]
<i>Supplementary Book Resources</i>
Jeff Heaton 2002, <i>Programming spiders, bots, and aggregators in Java</i> , Sybex San Francisco [ISBN: 0782140408]
Jeff Heaton, <i>HTTP Programming Recipes for Java Bots</i> , Heaton Research, Inc. [ISBN: 0977320669]
<i>This module does not have any article/paper resources</i>
<i>This module does not have any other resources</i>

**Module Delivered in**

Programme Code	Programme	Semester	Delivery
BN_KMHLT_R	<a href="#">Master of Science in Computing in Multimodal Human Language Technology</a>	2	Elective