Attend this course and learn:

- What are multi-agent systems and how can they be applied in practice;
- How to capture and exploit expertise when designing multi-agent systems;
- How to design, document, and evaluate multi-agent system architectures;
- How to design and exploit middleware for multi-agent systems;
- How to manage the introduction of multi-agent systems in a concrete business setting.

**Systems of the future will increasingly have the characteristics of the autonomous systems studied in this course: they are simultaneously becoming more interconnected and more autonomous. The course will introduce the principles and practices of such systems, called multi-agent systems, in a simple way.**

The course will use a concrete case of a Logistic System with Automatic Guided Vehicles (AGV) to demonstrate how the methods work in practice. No prior knowledge of any design languages or techniques is required. The methods used in this course have been extensively tested in practice.

Throughout the course, participants will have the opportunity to apply techniques in concrete design tasks. Participants are expected to bring their own laptops for the practical sessions.

**Jointly Presented by**

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**2-Day Intensive and Practical Course on**

**ARCHITECTURE-BASED DESIGN OF MULTI-AGENT SYSTEMS**

with Real-life Case Study and Practical Design Exercises

**BY PROFESSOR DANNY WEYNS**
Head of the AdaptWise Research Group
Linnaeus University in Sweden

**Kuala Lumpur: 14 & 15 Sep 2015**
Ramada Plaza Hotel Kuala Lumpur

**Singapore: 17 & 18 Sep 2015**
Hotel Grand Pacific Singapore

This course is based on Professor Weyns’ book: ‘Architecture Based Design of Multi-Agent Systems’, Springer, 2014. A complimentary copy of this 224-page reference book will be given to each participant.

“Weyns puts the development of multi-agent systems into a larger perspective with traditional software engineering approaches. With this, he opens up opportunities to exploit the body of knowledge developed in the multi-agent systems community to tackle some of the difficult challenges of modern-day software systems, such as decentralized control, location-awareness, self-adaption, and large-scale. Thus his book is of interest for both researchers and industrial software engineers who develop applications in areas such as distributed control systems and mobile applications where such requirements are of crucial importance.” Book Review.
INTRODUCTION/OBJECTIVES

The main objective of this course is to acquaint participants with foundational principles for designing multi-agent systems and provide them with working knowledge for applying the principles to concrete systems in practice.

Participants will not only benefit from understanding principles, approaches, and methods for engineering multi-agent systems, but also acquire access to the state-of-the-art in multi-agent systems.

COURSE OUTLINE

Day 1:

Topic 1 INTRODUCTION & OVERVIEW
- Multi-agent systems
- Agent-oriented methodologies
- Architectural design steps
- Middleware for autonomous systems
- From architecture to downstream design
- Summary

Topic 2 CAPTURING EXPERTISE IN MULTI-AGENT SYSTEM ENGINEERING
- Families of multi-agent systems
- Patterns for multi-agent systems
- Situated multi-agent systems
- Pattern language for situated multi-agent systems
- Summary and exercises

Topic 3 ARCHITECTURAL DESIGN
- Architecture in the development life-cycle
- Case study: AGV Transportation System
- Quality attributes
- Designing multi-agent architectures
- Multi-view documentation architectures for multi-agent systems
- Summary and Exercises

Topic 4 MIDDLEWARE FOR DISTRIBUTED MULTI-AGENT SYSTEMS
- Introduction to middleware
- Case study: scope and requirements
- Middleware architecture
- ObjectPlaces, Views and Roles
- Collision avoidance AGV System
- Summary and exercises

DAY 2:

Topic 5 TASK ASSIGNMENT IN MULTI-AGENT SYSTEMS
- Schedule-based task assignment
- Protocol-based task assignment
- Stigmergic (field-based) task assignment
- Evaluation and tradeoff analysis
- Summary

Topic 6 ARCHITECTURE EVALUATION
- Evaluating architecture with ATAM
- Evaluation process
- Evaluation AGV System architecture
- Demonstrator AGV System
- Summary and exercises

Topic 7 ARCHITECTURE-BASED DESIGN IN PRACTICE
- Reflection on AGV transportation system
- Will it work for me?
- How to integrate multi-agent systems in my environment?
- What will be the impact on adopting multi-agent systems?
- Summary

The course includes practical, hands-on sessions where participants are given the opportunity to apply in practice the theory they have learnt.
WHO WILL BENEFIT FROM THIS COURSE

This course is aimed at a large professional audience: engineers and scientists, managers and businessmen, architects, developers, educators and students – everyone who faces challenging problems with engineering systems that involve interconnectivity, large scale and autonomy and cannot solve them by using traditional approaches; everyone who wants to understand the foundational principles of multi-agent systems and the application of these principles in the field.

The course will help to develop a practical understanding of what multi-agent systems can and cannot do, discover which architectural approaches are most relevant for your task and, finally, how to use these approaches in your practice.

COURSE LEADER

Professor Danny Weyns

Professor Danny Weyns is Head of the AdaptWise Research Group at Linnaeus University in Sweden. From October 2015 onwards, he will take up a professor position at the Katholieke University in Leuven Belgium, where he will join the DistriNet research group. He is well known for his work in the field multi-agent systems, more specific, for contributions to software architecture and middleware for situated multi-agent systems. His current research focus is self-adaptation in decentralized systems where he applies formalisms both at design time and runtime to realize and assure self-adaptation under uncertainty. He empirically validates his research results in the domain of smart homes and multi-robot systems. He has published over 150 articles and edited 15 books. His research has generated substantial impact (current h-index 31).

Danny Weyns has been an invited speaker at many renowned universities, including: George Mason University USA, PUC Rio, Brazil, York University UK, Groningen University The Netherlands. University of Milan Italy; Utrecht University The Netherlands, Delft University of Technology The Netherlands, Laboratoire Informatique de Paris 6 France, University of Rostock Germany. He has been invited speaker at numerous international events and schools, including Infrastructures and Tools for Multiagent Systems at AAMAS Toronto Canada, Engineering Societies in the Agents World, Dublin Ireland, CREST at the University College London UK, the 8th and 10th European Agent Systems Summer School, the SERENE Autumn School Kharkiv Ukraine, the Almende Summer School Rotterdam The Netherlands, the Software Engineering and Technology Symposium at Eindhoven University The Netherlands, the European AgentLink Technical Forum Lisbon Portugal.

He managed several national and international projects. Currently he leads a Marie Curie project funded by EU on foundations for self-adaptive systems, a project on assurances for decentralized self-adaptive systems from the Swedish Research Council, and two applied projects on smart homes for elderly care.

He is Associated Editor for the Journal on Autonomous Agents and Multiagent Systems, member of the Steering Committee of Multiagent Systems (EMAS), Associated Editor of the International Journal on Agent-Oriented Software Engineering and member of the Editorial Board of the International Journal on Multiagent and Grid Systems. In 2015 he serves as Program Chair for European Conference on Software Architecture and the Vision Track Chair for International Conference on Software Product Lines.

The lectures included in this course are part of Professor Weyns’ book entitled Architecture-Based Design of Multi-Agent Systems, Springer 2010.
COURSE ON ARCHITECTURE-BASED DESIGN OF MULTI-AGENT SYSTEMS
Presented by Professor Danny Weyns

Register Now:
By phone: (65)-6877 9275
By email: tekbac@singnet.com.sg
Enquiry: Please contact Cynthia on the phone or email.

REGISTRATION FEES

<table>
<thead>
<tr>
<th>Course Fee</th>
<th>Singapore (SS) [No GST]+</th>
<th>Kuala Lumpur (RM) [No GST]+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Fee</td>
<td>990.00</td>
<td>1,990.00</td>
</tr>
<tr>
<td>Group Fee*</td>
<td>890.00</td>
<td>1,890.00</td>
</tr>
</tbody>
</table>

* Register three or more delegates from the same organisation at the same time and each delegate is entitled to this group fee.

+ We are not GST-registered.

Registration fee includes lunch, refreshments, full training documentation and book by Professor Danny Weyns. The fee does not include hotel accommodation and car parking.

Payment terms: Fee must be paid before the event.

Methods of Payment

Singapore event:
Please make payment in Singapore dollars using crossed cheque in favour of TEKBAC Singapore Pte Ltd

Malaysia event:
Please make payment in Malaysia Ringgit using crossed cheque in favour of TEKBAC (M) Sdn Bhd. We accept Local Order in lieu of prior payment.

CANCELLATION POLICY
All cancellations must be made in writing by fax, email or post. If you are unable to attend,

• A substitute delegate is welcomed at no additional charge.
• Your registration fee paid can be credited to a future event.
• You will receive a full refund less 10% administration charge if cancellation is received in writing more than 14 days before the event.

No cancellations will be accepted within 14 days of the date of event. Full documentation will, however, be sent to the delegate.

DISCLAIMER
TEKBAC is not liable for any claims should the course/workshop be cancelled or postponed due to circumstances beyond its control.

Time Schedule
The course starts at 9.00 am and ends at 5.00 pm daily. Please arrive at 8.30 am on day one to allow time for registration and collection of documentation. Lunch is from 12.30 pm to 1.45 pm. There will be two refreshment breaks at 10.30 am and 3.30 pm.

CERTIFICATE OF ATTENDANCE
This training programme is designed to meet your continuing professional development. A Certificate of Attendance indicating the no. of training hours will be awarded at the end of the programme. This serves as evidence of your commitment to your career.

REGISTRATION FORM
COURSE ON ARCHITECTURE-BASED DESIGN OF MULTI-AGENT SYSTEMS BY PROFESSOR DANNY WEYNS
☐ 14 & 15 Sep 2015 Kuala Lumpur  ☐ 17 & 18 Sep 2015 Singapore

Contact Person:
Name: Dr/Mr/Mrs/Ms* ______________________________
Job title: _______________________________________
Organisation: ____________________________________
Dept: ___________________________________________
Address: ________________________________________
Tel: __________________ Fax:_____________________
Email: _________________________________________

Delegate 1:
Name: Dr/Mr/Mrs/Ms* ______________________________
Job title: _______________________________________
Dept: ___________________________________________
Email: _________________________________________

Delegate 2:
Name: Dr/Mr/Mrs/Ms* ______________________________
Job title: _______________________________________
Dept: ___________________________________________
Email: _________________________________________

Delegate 3:
Name: Dr/Mr/Mrs/Ms* ______________________________
Job title: _______________________________________
Dept: ___________________________________________
Email: _________________________________________

Please email completed registration form to tekbac@singnet.com.sg