

**Università di Palermo**

Dipartimento di Ingegneria Civile,  
Ambientale, Aerospaziale, dei Materiali  
(DICAM)



# 1<sup>st</sup> Advanced Course on Innovative Wastewater Treatment and Mathematical Modelling

## Lecture Programme

Palermo, 7-9 May 2015

	<b>Thursday 7 May 2015</b>	
	Theme: Fundamentals of activated sludge and biofilm operations	
<b>8:00</b>	Registration	
<b>9:00</b>	Welcome: outline of the course	Giorgio Mannina
<b>9:10</b>	Biochemical principles of removal of C, N and P compounds from wastewater (types of organic substrates, processes like nitrification, denitrification, nitritation and anammox process, enhanced bio-P removal, chemical P precipitation)	Jiri Wanner
<b>11:00</b>	Coffe break	
<b>11:30</b>	Biofilm systems	Hallvard Ødegaard
<b>13:20</b>	Lunch	
<b>14:20</b>	Fundamentals of mathematical modelling for wastewater treatment and the Activated sludge models (ASM)	Gustaf Olsson
<b>16:00</b>	Coffe break	
<b>16:20</b>	Microbiology and microbial ecology of activated sludge (principal microorganisms, identification techniques, microbial ecology (population dynamics, growth forms, use of the knowledge in design and operation of activated sludge systems)	Jiri Wanner
<b>17:10</b>	Fundamentals of mathematical modelling for wastewater treatment and the Activated sludge models (ASM)	Gustaf Olsson
<b>18:00</b>	End of session	
	<b>Friday 8 May 2015</b>	
	Theme: MBR and BF-MBR systems. Mathematical models	
<b>9:00</b>	The moving bed biofilm reactor	Hallvard ødegaard
<b>10:00</b>	As it is now: ICA	Gustaf Olsson
<b>11:00</b>	Coffe break	
<b>11:30</b>	ICA applications in wastewater treatment systems	Gustaf Olsson
<b>13:20</b>	Lunch	
<b>14:20</b>	ICA applications in wastewater treatment systems	Gustaf Olsson
<b>15:20</b>	Membrane bioreactors: key elements and basics of models	Jiri Wanner
<b>16:20</b>	Small coffe break	
<b>16:40</b>	Calibration, sensitivity analysis and calibartion protocols	Giorgio Mannina
<b>18:00</b>	End of session	
<b>19:30</b>	Social dinner	

	<b>Saturday 9 May 2015</b>	
	Theme: MBR and BF-MBR systems. Mathematical models	
<b>9:00</b>	Pro's and con's of MBR systems	Hallvard ødegaard
<b>10:00</b>	Membrane bioreactors: key elements and basics of models	Jiri Wanner
<b>11:20</b>	Coffe break	
<b>11:30</b>	Hybrid systems (IFAS)	Hallvard ødegaard
<b>13:20</b>	Lunch	
<b>14:20</b>	Membrane bioreactors: model applications	Giorgio Mannina
<b>16:00</b>	Small coffe break	
<b>16:20</b>	WEST demonstrations	Enrico Remigi
<b>18:00</b>	End of session	