

REPIC

Renewable Energy
Energy - & Resource Efficiency
Promotion in
International
Cooperation



Zürich University
of Applied Sciences



**School of
Management and Law**

COLOMBIA WASTEWATER TRAINING PROGRAM

Content, schedules and further reading

Center for Business in the Americas

13.11.2018

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Zürcher Hochschule
für Angewandte Wissenschaften



**Life Sciences und
Facility Management**

eawag
aquatic research ooo



Stadt Zürich

Entsorgung + Recycling

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1. Schedule Overview

April 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

July 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

August 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

September 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

October 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

November 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	


December 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

March 2019						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

 E-kick-off

 Study Trip to Switzerland

 Module 1: Wastewater Fundamentals 1 (MOOC)

 Module 4: Business


 Kickoff in Colombia

 Module 5: Case Study

 Module 1: Wastewater Fundamentals 1 (Experts)

 Conference in Colombia

 Module 2: Wastewater Fundamentals 2 (Wabag)

 Refresher: March/April 2019

2. E-Kickoff

2.1 Date

9 April 2018, 15:00-17:30 CET

2.2 Goals

- Meet & Greet between EAWAG (to be confirmed), ZHAW-CBA, CNPML trainees, and Wabag
- Present the overall Training Program
- Present the EAWAG-MOOC online access and its rationale
- Present the Adobe Connect tool for live distance learning
- Enrollment in ZHAW DAS-Program

2.3 Responsible

Matthew Webber: weem@zhaw.ch

2.4 Invitees

External Lecturers	ZHAW-CBA	CNPML	Wabag
Christoph Lüthi (CL) Abhishek Narayan (AN) Simone Bützer (SB) Jürgen Ebert (CL) Thomas Schmidt (TS) Fabian Suter (FF) Niccole Jordan (NJ) Markus Alder (MA) Khaldoun Dia-Eddine (KE) Pia Furchheim (PF) Chris Graf (CG)	Peter Qvist-Sørensen (PQS) Ronny Siev (RS) Grégoire Meylan (GM) Matthew Webber (WM)	Carlos Cadavid (CC) Carlos Toro (CT) Juan Sebastian Estrada (JSE) Gloria Restrepo (GR) Camilo Ortiz (CO)	Thomas Kimmenauer (TK)

2.5 Schedule

Topic	Speaker	15:00-15:30	15:30-16:00	16:00-16:30	16:30-17:00	17:30-18:00
Meet & Greet	All					
Training Program	PQS					
MOOC	CL					
Distance Learning	MW					
Dates & Open Issues	CC, PQS					

3. Module 1.1: Wastewater Fundamentals 1– EAWAG-MOOC (Online Course)

3.1 Date

9 April to 4 May 2018, 30 hours in total spread over four weeks

3.2 Goals

- Learn basics of wastewater treatment in emerging economies and developing countries (covering part of the gap analysis)
- Bring all trainees to the same level
- Identify remaining gaps among trainees

3.3 Responsible

Matthew Webber: weem@zhaw.ch

3.4 Attendees

CNPML
Carlos Cadavid (CC)
Carlos Toro (CT)
Juán Sebastian Estrada (JSE)
Gloria Restrepo (GR)
Camilo Ortiz (CO)

3.5 Course Formalities & Instructions

Please register for Coursera by April 16, 2018, at <https://www.coursera.org/learn/sanitation?action=enroll>

Please download: [Compendio de Sistemas y Tecnologías de Saneamiento](#)

Please watch Case study Brazil video:

https://www.youtube.com/watch?v=wJsOESZmkTY&list=PLa16GBkPGYKv4n_a0BcKB_hUYMdiQVH55&index=7

3.6 Exam

Please complete the exam by May 4th, 2018 and send a copy of the email confirmation to Matthew Webber (weem@zhaw.ch)

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3.7 Schedule MOOC Course (Online)

Topics	Speaker	April 18														May 18				
		9	10	11	12	13	16	17	18	19	20	23	24	25	26	27	30	2	3	4
Introduction to Sanitation Planning & Systems Approach	Overview of the Course	MOOC																		
	City Sanitation Planning (Guest lecture)	MOOC																		
	City-wide Sanitation Diagnostic Tools and Planning Frameworks	MOOC																		
	Local Level Sanitation Planning & Summary	MOOC																		
Sanitation Systems & Technologies I	Introduction to the Compendium	MOOC																		
	Sanitation Products	MOOC																		
	Functional Groups	MOOC																		
	User Interface Technologies	MOOC																		
	Collection and Storage/Treatment	MOOC																		
	Conveyance & Summary	MOOC																		
Sanitation Systems & Technologies II	Centralized Treatment	MOOC																		
	Use and/or Disposal	MOOC																		
	Emerging Sanitation Technologies	MOOC																		
	Waterless Pit-based Systems	MOOC																		
	Decentralized Water-based Systems	MOOC																		
	Black Water Transport Systems & Summary	MOOC																		
Urban Sanitation Solutions - Case Studies	Case study Nala, Nepal	MOOC																		
	Case study Erdos, China	MOOC																		
	Case study Indonesia	MOOC																		
	Case study Lusaka, Zambia	MOOC																		
	Case study Brazil (See link on page 6)	MOOC																		
Urban Sanitation Tools	Overview Urban Sanitation	MOOC																		
	Shit Flow Diagrams	MOOC																		
	Decision-making Support for Urban Sanitation	MOOC																		
	Introduction to Sanitation Safety Planning	MOOC																		
	Tools for Institutional and Political Economy Analysis for Sanitation Solutions	MOOC																		
	Sanitation from a Gender Perspective	MOOC																		
	Behaviour Change in Urban Sanitation	MOOC																		
	Institutional and Financial Options for Sanitation Service Delivery	MOOC																		
	Results-based Financing to Deliver Urban Sanitation Services	MOOC																		
	Working within the Project Cycle	MOOC																		
Quiz/exam	MOOC																			

4. Kick-off Week in Colombia

4.1 Date

7 to 11 May 2018

4.2 Goal

- Meet & Greet between three case study companies (PIMSA, EPM, Postobón, Emerald) and project partners (ZHAW-CBA, CNPML trainees, Wabag)
- Present the remaining program phases with a focus on Case Studies
- Understand the expectations of each company and partner
- Acquire experiential knowledge by visiting company facilities

4.3 Responsible

Matthew Webber: weem@zhaw.ch

4.4 Attendees

Case Study Companies	ZHAW-CBA	CNPML	Wabag
EM (Emerald) EP (EPM) PB (Postobon) PI (PIMSA)	Peter Qvist-Sørensen (PQS) Grégoire Meylan (GM)	Carlos Cadavid (CC) Carlos Toro (CT) Juán Sebastian Estrada (JSE) Gloria Restrepo (GR) Camilo Ortiz (CO)	Thomas Kimmenauer (TK)

4.5 Further reading

None

4.6 Deadline

Finalized on April 27, 2018

Colombia Wastewater Training Program

4.7 Schedule

Time & Location	7 May 2018 Meet & Greet (Medellín)	8 May 2018 Municipal Wastewater & Food and Beverages (Medellín)	9 May 2018 Municipal Wastewater & Food and Beverages (Barranquilla)	10 May 2018 Municipal Wastewater & Food and Beverages (Barranquilla)	11 May 2018 Wrap-up (Bogota)
9:00-9:30	Presentation of ZHAW-CBA	Visit EPM (San Fernando facilities): Presentation of EPM, Visit wastewater treatment plant, interchanges about general consideration for the case study	Flights from Medellín to Bogota, from Bogota to Barranquilla	Visit EPM Malambo facilities: interchanges about the general considerations for the case study in connection with Postón	Debriefing of Site Visits & planning of the case studies Meeting with Emerald
9:30-10:00	Training Program (goals, scope, schedule)				
10:00-10:30	Coffee break				
10:30-11:00					
11:00-11:30	Presentation of Wabag	Lunch	Lunch	Lunch	Lunch
11:30-12:00	Expectations of Wabag				
12:00-12:30					
12:30-13:00	Lunch	Lunch	Lunch	Lunch	Lunch
13:00-13:30					
13:30-14:00		Lunch	Lunch	Lunch	Lunch
14:00-14:30	Presentation CNPMLTA. CNPMLTA expectation				
14:30-15:00		Visit Colcafé facilities: Presentation of Colcafé, wastewater treatment plant, interchanges about the general considerations for the case study	Visit PIMSA facilities: Presentation of PIMSA, visit wastewater treatment plant, interchanges about the general considerations for the case study	Flights from Barranquilla to Bogota	
15:00-15:30	A general overview of Colombia wastewater challenges, legal requirements. Comments and considerations				
15:30-16:00					
16:00-16:30					
16:30-17:00					
17:00-17:30				Dinner with CH Embassy/ SECO Representative/ ANDI Representative	Flights to Switzerland
17:30-18:00					
18:00-18:30					
18:30-19:00				Dinner with CH Embassy/ SECO Representative/ ANDI Representative	
19:00-19:30	Informal Joint Dinner – until done				
19:30-20:00					

 Case Study Companies

 ZHAW-CBA

 CNPML

 WABAG

 Plenum

5. Module 1.2: Wastewater Fundamentals 1– Experts (Distance Learning)

5.1 Date

15 to 31 May 2018, from 15:00 CET, duration according to the topic and indicated in the schedule below (Section 5.6)

5.2 Goal

- Meeting specific needs of Colombian industries and CNPML. Those needs have been defined in the gap analysis
- Receiving practical and theoretical know-how on key topics in Colombia

5.3 Responsible

Matthew Webber: weem@zhaw.ch

5.4 Lecturers and Attendees

Input Lecturers	CNPML	External Students
Christoph Lüthi (CL) Abishek Narayan (AN) Jürgen Ebert (JE) Simone Bützer (SB) Thomas Schmidt (TS)	Carlos Cadavid (CC) Carlos Toro (CT) Juán Sebastian Estrada (JSE) Gloria Restrepo (GR) Camilo Ortiz (CO)	Hugo Santamaría (CC) Maria Del Pilar Abad (CC) Alfonso López Castillo (PIM) John Monsalva Osorio (PIM) Alfonso Camargo (PB) Juan Sebastián Callejas (EPM)

5.5 Further reading

Major, D. C. et al. (2011): Climate change, water, and wastewater in cities. Climate Change and Cities: First Assessment Report of the Urban Climate Change Research Network, C. Rosenzweig, W. D. Solecki, S. A. Hammer, S. Mehrotra, Eds., Cambridge University Press, Cambridge, Uk, pp. 113-143.

5.6 Schedule (the numbers indicate the duration of the lectures in hours)

Topics	Speaker	May 2018										
		15	16	17	18	22	24	25	28	29	30	31
Urbanization and Wastewater	CL	4										
Climate Change and Wastewater I	AN		1.5									
Wastewater Governance	SB			1.5								
Energy Efficiency (Municipal)	SB				1.5							
Maintenance/ Networks	SB				1.5							
Energy Efficiency & Minimization (Industrial) Part I	TS					5						
Energy Efficiency & Minimization (Industrial) Part II	TS						5					
Reuse (Municipal)	JE							5				
Reuse (Industrial)	JE								5			

6. Module 2: Wastewater Fundamentals 2 – Wabag (Distance Learning)

6.1 Date

1 to 30 June 2018. Classes start at 3pm CET

6.2 Goal

- Understand processes and technicalities of Wabags technologies for minimization, reuse, recycling and downcycling
- Meet Wabags product champions
- Learn from Wabags practical experience in other emerging countries

6.3 Responsible

Matthew Webber: weem@zhaw.ch

6.4 Lecturers and Attendees

WABAG	CNPML	External Students
Thomas Kimmenauer (TK) Kim Sørensen (KS) Wabag Product Champions	Carlos Cadavid (CC) Carlos Toro (CT) Júan Sebastian Estrada (JSE) Gloria Restrepo (GR) Camilo Ortiz (CO)	Hugo Santamaría (CC) Maria Del Pilar Abad (CC) Alfonso López Castillo (PIM) John Monsalva Osorio (PIM) Alfonso Camargo (PB) Juan Sebastián Callejas (EPM) CC = Colcafé EPM = Empresas Públicas de Medellín PB = Postobón PIM = PIMSA

6.5 Further reading

To be completed by WABAG

6.6 Schedule (the numbers indicate the duration of the lectures in hours). For full document please see appendix

Topics		Speaker	June 2018											
			1	4	5	7	11	12	14	18	19	21		
Introduction	Introduction	WABCH, TK		1										
	Introduction	WABCH, TK		0.5										
Pre-treatment	Design Prerequisites	1)Influent characterisations (hydraulics, contaminants) 2) Effluent requirements and sampling 3) Load cases: Design, Max, Min 4) Design criteria: CAPEX, OPEX, Redundancy 5) Others (Footprint, automation grade: High/Low) 6) Importance of simulation in Design (BioWin)	WABCH, TK or RP		1.5									
	Pre-treatment	Flow equalization, grit treatment, degreasing, flocculation, Micropur	WABGroup, AP		1									
	Requirements	Neutralization tank (pH, redox) calamity tanks, nutrients balancing	WABGroup, AP			2								
	Oil Separation	CPI DAF (Dissolved Air Flotation)	WABGroup, KS			1								
	OPUR® Lamella Separator		WABGroup, KS			0.5								
Food & Beverage	UASB Technology	Anaerobic Digestion, Fluopur®, Biopur	WABGroup, kS WABCH, RP WABCH, CL				1							
	MBBR	FLUOOPUR®	WABCH, RP,					1						
	Biofiltration for compact design	BIOPUR							1					
	CYCLOPUR®								1					
	NEREDA® Technologie								1					
	Single and Dual Media Filtration		WABCH/CL- RHDHWABCH/CL-RHDH						2					
Effluent, Compact Footprint	Membrane Technologies MBR	WABCH, RP							2					
Gas & Oil	Membrane Technologies	MBR, UF, NF, RO	WABGroup, KS								1			
	Biological Treatment	FLUOPUR, trickling filters, activated sludge, mbr	WABAGroup, KS								1			
	Odor Treatment		WABAGroup, Ks								1			
Municipal	Activated Carbon Filtration	PAC (Power Activated Carbon) GAC (Grain AC)	WABCH, CL									1		
	UV Disinfection		WABGroup, AP									1		
	Ozonation		WABCH, RP									1		
Sludge Treatment	Flocculation as basic for sludge dewatering	Flocculation	WABGroup, AP										1	
	Anaerobic Vs. Aerobic	Stabilization	WABGroup, KS										1	
	Dewatering	Gravity dewatering, Presses, Decanters	WABGroup, AP										1	
	Drying		WABGroup, KS											1
	Reuse of Biogas: Heat & Electrical power	Cogeneration												1

7. Module 3: Study Trip to Switzerland

7.1 Date

2 to 6 July 2018

7.2 Goal

- A practical visit to a municipal facility
- Understand Swiss maintenance culture
- Practical visit in an Oil & Gas Facility (refinery)
- Visit in a Food & Beverage Facility
- Meet some lecturers in person
- Visit EAWAG with technical facilities
- Present the remaining program phases with a focus on case studies

7.3 Responsible

Matthew Webber: weem@zhaw.ch

7.4 Attendees

Companies to be visited	ZHAW-CBA	CNPML	Wabag
Wabag ERZ EAWAG Refinery Food and Beverage facility	Peter Qvist-Sørensen (PQS) Ronny Siev (RS) Grégoire Meylan (GM) Matthew Webber (MW)	Carlos Cadavid (CC) Carlos Toro (CT) Júán Sebastian Estrada (JSE) Gloria Restrepo (GR) Camilo Ortiz (CO)	Thomas Kimmenauer (TK) Arnold Gmünder (AG)

7.5 Further reading

Company site documentation (to be completed)

To do:

Companies

EAWAG

ERZ

7.6 Deadline

Finalized on May 18, 2018

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7.7 Schedule (Finalized on May 18, 2018)

Time	29 June 2018	30 June 2018	1 July 2018	2 July 2018	3 July	4 July 2018	5 July	6 July 2018	7 July 2018			
9:00-9:30				Coach bus to the location	Showing Wabag is a partner for BOOT	ERZ Water Governance Tour	Limeco (Wastewater treatment plant)	EAWAG site visit Debriefing of Site Visits				
9:30-10:00									Limeco (Wastewater treatment plant)	Coffee break		
10:00-10:30												
10:30-11:00												
11:00-11:30			Flight to Bucharest	Pepsi Dragomiresti (Food & Beverage)			Coffee break	Small meeting (Wabag)	Site Visit Findings			
11:30-12:00							Visit Network Maintenance	Travel time				
12:00-12:30												
12:30-13:00				Lunch	Lunch	Lunch	Lunch	Lunch				
13:00-13:30									Flights back to Colombia			
13:30-14:00				Coach bus to the location	Showing Wabag is a partner for BOOT	Werdhölzli Site Visit	Travel time	Planning of Case Studies				
14:00-14:30												
14:30-15:00												
15:00-15:30				Raffinerie of Petrobrazi (Petrochemical)								
15:30-16:00						Coffee break	Coffee break	Coffee break	Coffee break			
16:00-16:30	Flight to Zurich		Arrival in Bucharest			Flights to Zurich	Discussion with ERZ Management	Dinner with Peter Qvist-Sorensen (National Restaurant – Winterthur – 6:30 pm)	Next Steps			
16:30-17:00		Arrival in Zurich				Arrival in Zurich						

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Switzerland Study Trip Cost

	Location	Flights	Total		Location	Hotel	Total
CNPML Cost	Colombia-Zurich round trip	1,805 CHF * 2	3,610 CHF	CNPML Cost	Zurich Airport 1 night	160 CHF * 2	320 CHF
CNPML Cost	Zurich-Bucharest round trip	245 CHF * 2	490 CHF	CNPML Cost	Bucharest 2 nights	125 CHF * 2	500 CHF
CBA Cost	Zurich-Bucharest round trip	245 CHF * 2	490 CHF	CBA Cost	Bucharest 2 nights	125 CHF * 2	500 CHF
				CNPML Cost	Winterthur 4 nights	160 CHF * 2	1280 CHF
Total			4,590 CHF	Total			2,600 CHF
Swiss Study Trip Grand Total: 7,190 CHF	Wabag's Participation: -1,000 CHF		New Grand Total: 6,190 CHF				

8. Module 4: Business Module

8.1 Date

3 to 28 September 2018, 15:00 CET

8.2 Goal

- Acquire practical business and managerial knowledge
- Understand how to address the local business needs
- Receive necessary tools to reach competitive presence in the Colombian market
- Understand the expectations of each company and partner

8.3 Responsible

Matthew Webber: weem@zhaw.ch

8.4 Lecturers and Attendees

ZHAW SML	CNPML	Wabag	External Students
Nicole Jordan (NJ)	Carlos Cadavid (CC)	Thomas	Hugo Santamaría (CC)
Markus Alder (MA)	Carlos Toro (CT)	Kimmenauer (TK)	Maria Del Pilar Abad (CC)
Khaldoun Dia-Eddine (KD)	Juán Sebastian Estrada (JSE)		Alfonso López Castillo (PIM)
Pia Furchheim (PF)	Gloria Restrepo (GR)		John Monsalva Osorio (PIM)
Chris Graf (CG)	Camilo Ortiz (CO)		Alfonso Camargo (PB)
Ronny Siev (RS)			Juan Sebastián Callejas (EPM)
Peter Qvist-Sørensen (PQ)			
Grégoire Meylan (GM)			

8.5 Further reading

To be completed

8.6 Deadline

To be finalized by July 31, 2018

8.7 Schedule (the numbers indicate the duration of the lectures in hours)

Topics	Speaker	September 2018										
		3	4	6	7	11	17	18	20	25	26	27
Introduction to Module	PQ	1.5										
Introduction to Business	PQ	1.5										
Public Speaking	MA		3									
Corporate Strategy	PQ			3								
Marketing (B2B)	PF				3							
Accounting	NJ					3						
Tailor Financing Schemes & Project ROI Calculation	TK						3					
Project Management	CG							3				
Procurement	GM								3			
Negotiation (B2B)	KD									3		
Evaluation												
Buffer Day 1												
Buffer Day 2												

9. Module 5: Case Study

9.1 Date

November 8 – December 5, 2018 (Mentoring and contact hours will be based on needs)

9.2 Goal

Applying theoretical knowledge in a real-world setting

9.3 Responsible

Dr. Grégoire Meylan

9.4 Lecturers and Attendees

Wabag	ZHAW-CBA	CNPML	External Students
	Grégoire Meylan Matthew	Carlos Cadavid (CC) Carlos Toro (CT) Júan Sebastian Estrada (JSE) Gloria Restrepo (GR) Camilo Ortiz (CO)	Hugo Santamaría (CC) Maria Del Pilar Abad (CC) Alfonso López Castillo (PIM) John Monsalva Osorio (PIM) Alfonso Camargo (PB) Juan Sebastián Callejas (EPM)

9.5 Further reading

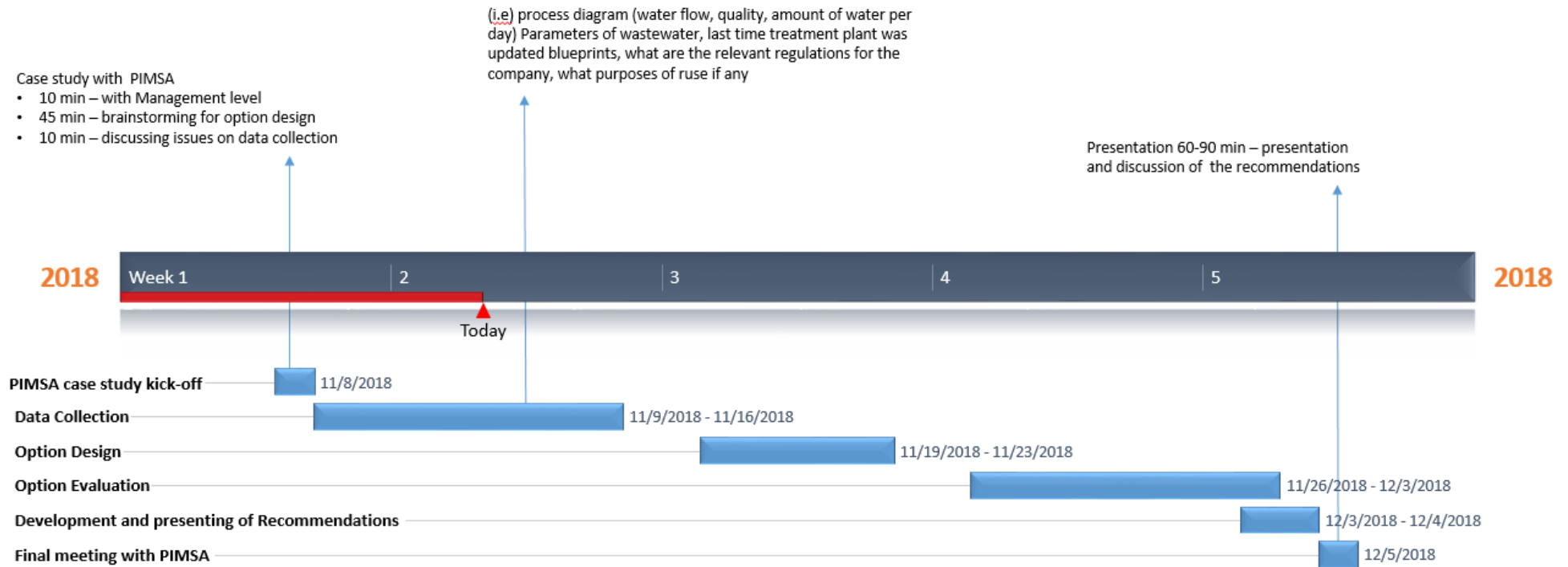
To be completed

9.6 Deadline

To be finalized by July 31, 2018

9.7 Schedule

October				
Week 1	Week 2	Week 3	Week 4	Week 5
8.11 – .10.2018	8.10-12.10.2018	15.10-19.10.2018	22.10-26.10.2018	29.10-31.10.2018
<ul style="list-style-type: none"> • Introduction • Defining Subject • Scope • Meeting 	<ul style="list-style-type: none"> • Discussion 	<ul style="list-style-type: none"> • Modeling • Calculations 	<ul style="list-style-type: none"> • Summary • Report writing 	<ul style="list-style-type: none"> • Presentation preparation • Meeting



* All Information above is not definite and subject to change

10. Conference in Colombia

10.1 Date

March 2019

10.2 Goal

- Host a successful conference in Bogota, Colombia
- Colombian companies learn about the newly acquired capabilities of CNPML regarding Industrial and Municipal Wastewater
- Present the reached in the training program to industries and companies
- Networking CNPML - WABAG - local companies – water footprint – meat production

10.3 Responsible

Grégoire Meylan: Gregoire.meylan@zhaw.ch

10.4 Attendees

Case Study Companies	ZHAW-CBA	CNPML	Wabag	Invitees
Emerald EP (EPM) PB (Postobon)	Peter Qvist-Sørensen (PQS) Ronny Siev (RS) Grégoire Meylan (GM)	Carlos Cadavid (CC) Carlos Toro (CT) Juán Sebastian Estrada (JSE) Gloria Restrepo (GR) Camilo Ortiz (CO)	Thomas Kimmenauer (TK) Arnold Gmünder	ANDI Local Industries Local Government

10.5 Further reading

Company site documentation (to be completed)

Carlos Toro will check with ANDI ASAP

10.6 Deadline

To be finalized and a submitted detailed program by August 31, 2018.

(ANDI can host) Los Andes

Colombia Wastewater Training Program

10.7 Schedule (to be finalized by August 31, 2018)

Time	26 November 2018 Case Study Feedback	27 November 2018 Conference	28 November 2018	29 November 2018 Food & Beverages	30 November 2018 Wrap-up
9:00-9:30	Meet and Greet CNPML Companies CBA Wabag	Welcome	WABAG Day	Meeting with Municipality	Wrap-up
9:30-10:00					
10:00-10:30	Coffee break	Presentations of Project CNPML Presentation	WABAG Day	Meeting with Municipality	Coffee break
10:30-11:00	Presentation Case Studies				
11:00-11:30		Coffee break	Coffee break	Coffee break	Wrap-up
11:30-12:00	Feedback	Case Study Presentation	WABAG Day		
12:00-12:30					
12:30-13:00	Lunch	Lunch	Lunch	Lunch	Lunch
13:00-13:30					
13:30-14:00	Presentation Case Study 2	Municipality Presentation	WABAG Day	Government	Refresher
14:00-14:30					
14:30-15:00	Feedback	Wabag Presentation	WABAG Day	Government	Next Steps
15:00-15:30					
15:30-16:00	Coffee break	Coffee break	WABAG Day	Coffee break	Coffee break
16:00-16:30	Presentation of Case Study 3	Company Presentation 1		WABAG Day	Government
16:30-17:00					
17:00-17:30	Feedback	Company Presentation 2	WABAG Day	Government	Flight to Switzerland
17:30-18:00					
18:00-18:30	Informal Joint Dinner	Apéro	WABAG Day	Government	Flight to Switzerland
18:30-19:00					

11. Refresher

11.1 Date

To be defined

11.2 Goal

To be defined

11.3 Responsible

Matthew Webber: weem@zhaw.ch

11.4 Lecturers and Attendees

ZHAW SML	ZHAW-CBA	CNPML	Wabag

11.5 Schedule (the numbers indicate the duration of the lectures in hours)

Topics	Speaker	Month & Year											
		■											
		■											
			■										
				■									
					■								
						■							
							■						
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11.6 Deadline

To be finalized by December 14, 2018

Appendix

Appendix 1

Module	Code	Topics	Subtopics	Speaker	Duration (h)	Course Material (File Name)	June 2018																		
							1	4	5	7	11	12	14	18	19	21	25	26	27	28	29				
INTRduction	INTR1	Introduction	Presentation WABAG Products, Technologies & Services	WABCH, TK	1	INTR1_WABCH general WWTP CNPML_20180502.ppt		1																	
	INTR2	Introduction	Introduction to the topics: G&O	WABCH, TK	0.5	INTR2_Oil_and_Gas_Presentation_WABAG 2017_R6.pptx		1																	
PREATreatment	INTR3	DESIGN Prerequisites	Compulsory basic specifications for design: 1) Influent characterisations (hydraulics, contaminants) 2) Effluent requirements and sampling 3) Load cases: Design, Max, Min 4) Design criteria: CAPEX, OPEX, Redundancy 5) Others (Footprint, automation grade: High/Low) 6) Importance of simulation in Design (BioWin)	WABCH, TK or RP	1.5	INTR3_Budgetary proposal-Client questionnaire 20180410.docx																			
	PREAT1	Pretreatment	Importance of pretreatment in municipal and industrial Applications: flow equalization, grit treatment, Degreasing, Precipitation/Flocculation, screening, MICROPUR	WABGroup, AP	1	PREAT1_WABAG Technologies _ MICROPUR.pptx to be completed by teacher																			
	PREAT2		Additional and specific requirements related with industrial applications: neutralization tank (pH, redox...), Calamity tanks, Nutrient balancing	WABGroup, KS	1	to be completed by teacher until 2018.05.11		2																	
	PREAT3		Oil Separation: CPI DAF (Dissolved Air Flotation):	WABGroup, AP	1	to be completed by teacher until 2018.05.11																			
	PREAT4		OPUR® Lamella Separator	WABGroup, KS	0.5	PREAT4_WABAG Technologies _ OPUR Lamella separators.pptx																			
Food&Beverage	F&B1	Anaerobic Digestion	UASB Technology	WABGroup, KS	1				3																
	F&B2	FLUOPUR®	IFAS, MBBR for Specific treatment of retrofit purposes	WABCH, RP	1	F&B2_WABAG Technologies _ FLUOPUR.pptx																			
	F&B3	BIOPUR	Biofiltration for compact design	WABCH, CL	1																				
	F&B4	CYCLOPUR®		WABCH, RP	1	F&B4_WABAG Technologies_CYCLOPUR_SBR.pptx: Check if this Presentation is complete enough?																			
	F&B5	NEREDA® Technologie		WABCH/CL-RHDHV	1	to be completed by teacher until 2018.05.11																			
	F&B6	Media Filtration	Single and Dual Media Filtration	WABCH, TK-VES	2	F&B6_WABAG Technologies _ GranularMediaFiltration April_2017																			
	F&B7	Membrane Technologies MBR	For high quality effluent, compact footprint	WABCH, RP	2	F&B7_WABAG Technologies_MARAPUR - MBR.pptx																			
Gas&Oil	G&O1	Membrane Technologies	Beyond MBR and UF: NF; RO...	WABGroup, KS	1	to be completed by teacher until 2018.05.11					3														
	G&O2	Biological treatment	FLUOPUR, Trickling Filters, Activated Sludge, MBR	WABGroup, KS	1	to be completed by teacher until 2018.05.11																			
	G&O3	Odor Treatment		WABGroup, KS	1	to be completed by teacher until 2018.05.11										3									
MUNicipal	MUN1	Activated Carbon Filtration	PAC (Powder Activated Carbon), GAC (Grain AC)	WABCH, CL	1	to be completed by teacher until 2018.05.11													3						

	MUN2	UV disinfection		WABGroup, AP	1	to be completed by teacher until 2018.05.11														
	MUN3	Ozonation		WABCH, RP	1	to be completed by teacher until 2018.05.11													3	
SLUDge Treatment	SLUD1	Flocculation	Flocculation as basic for sludge dewatering	WABGroup, AP	1	to be completed by teacher until 2018.05.11														
	SLUD2	Stabilization	Anaerobic vs. Aerobic	WABGroup, KS	1	to be completed by teacher until 2018.05.11														
	SLUD3	Dewatering	Gravity dewatering, Presses, Decanters	WABGroup, AP	1	to be completed by teacher until 2018.05.11														
	SLUD4	Drying		WABGroup, KS	1	to be completed by teacher until 2018.05.11														
	SLUD5	Cogeneration	Reuse of Biogas: Heat, Electrical power	WABGroup, KS	1	to be completed by teacher until 2018.05.11														