



MASTER OF SCIENCE
IN ENGINEERING

MSE Redesign

KickOff Phase 2

Zürich, 15.02.2019

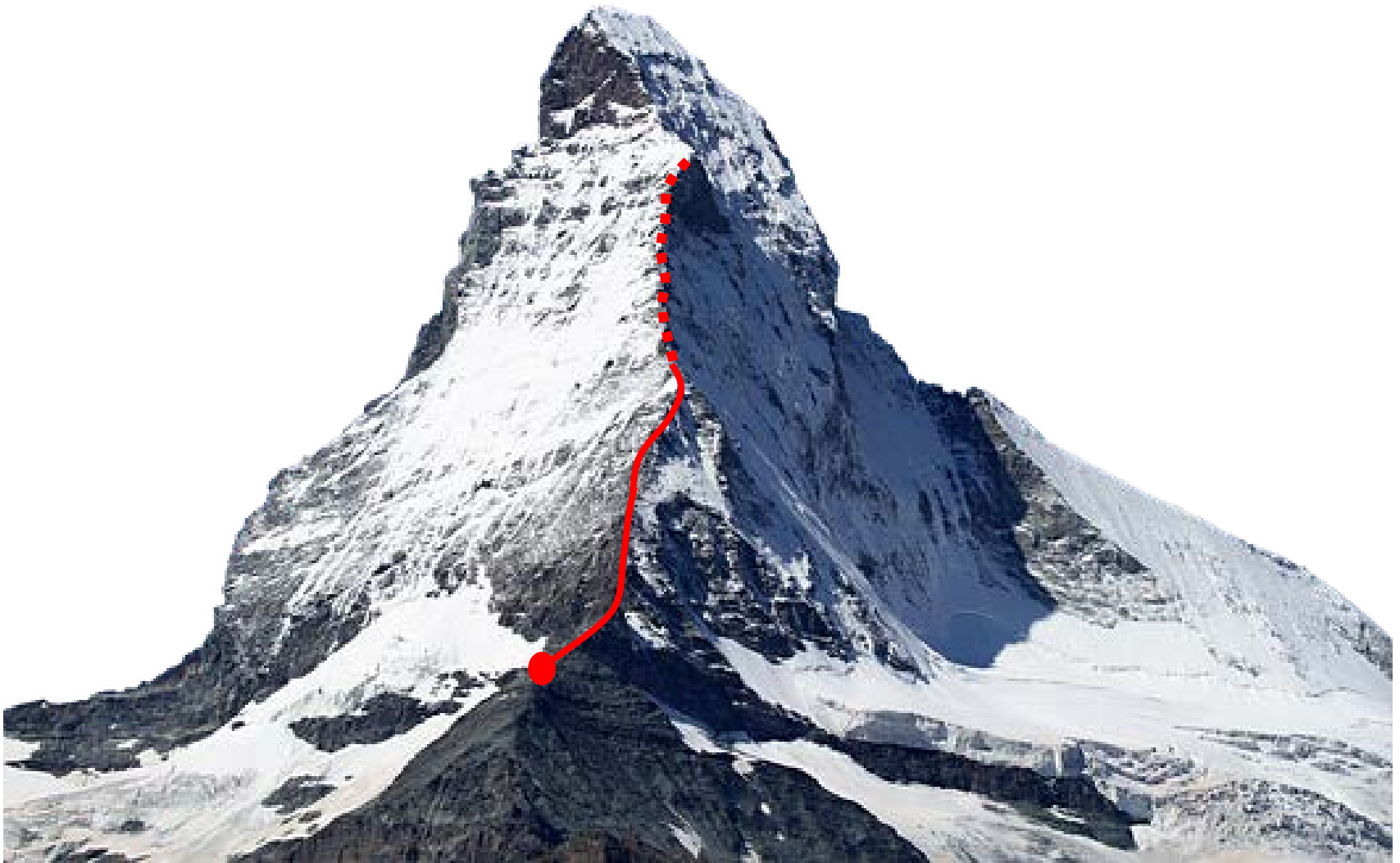
1. Aims

- Information about the decisions made by the Board (LA) regarding to the Profile Descriptions
- Information about the next steps of the Profile Descriptions
- Knowledge of the assignment (task, general conditions, procedure)
- Clarification of open questions

1. Agenda

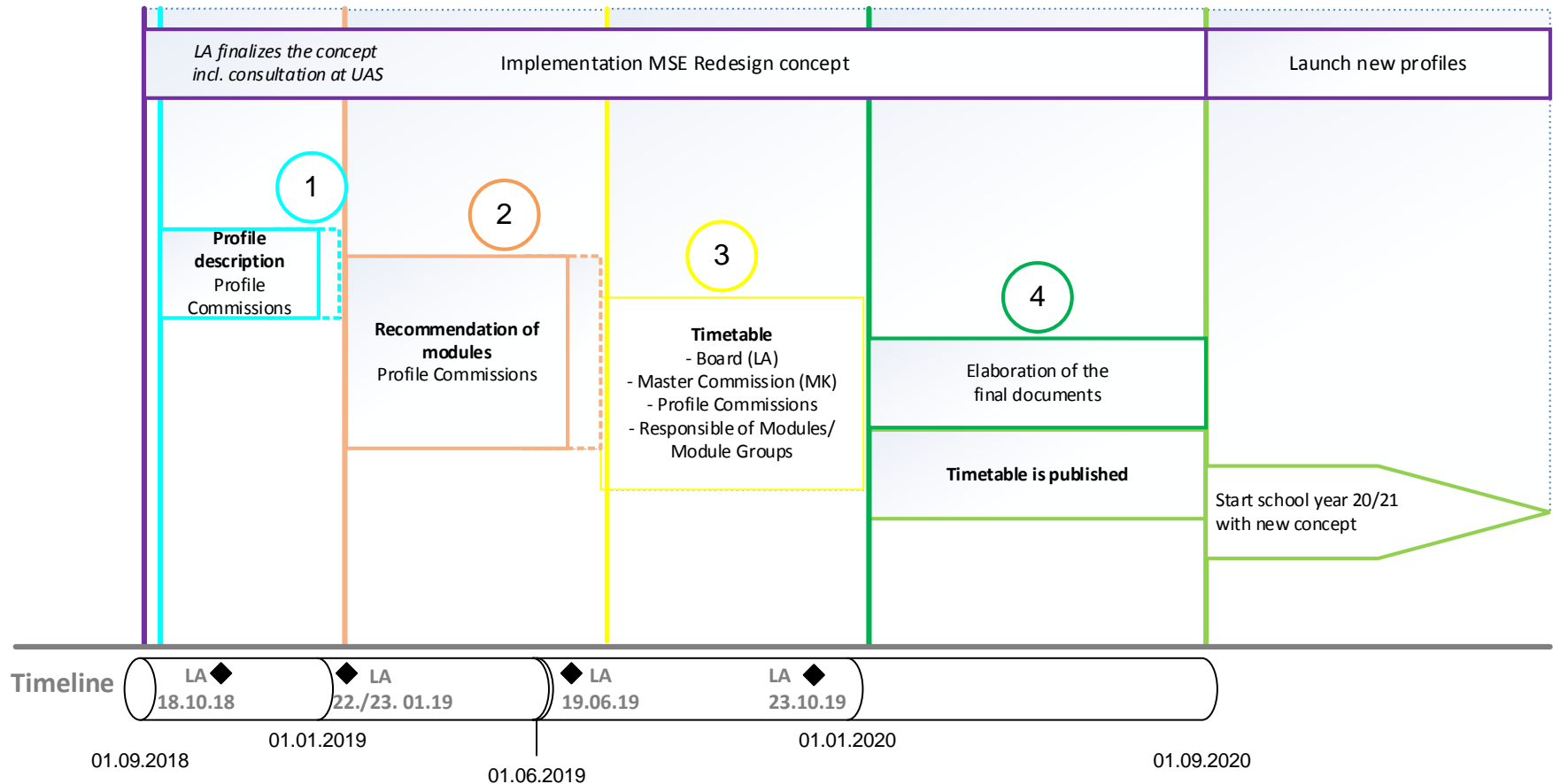
1. Welcome and introduction
2. Orientation
3. Assignment
 - Task
 - Procedure
 - Maximum amount of central Theory Modules
 - Framework conditions
 - Documents and results
 - Deadlines and submissions
 - Update «weighted votes»
4. Clarification of questions
5. Further action
6. AOB, Thanks

2. Orientation



2. Orientation

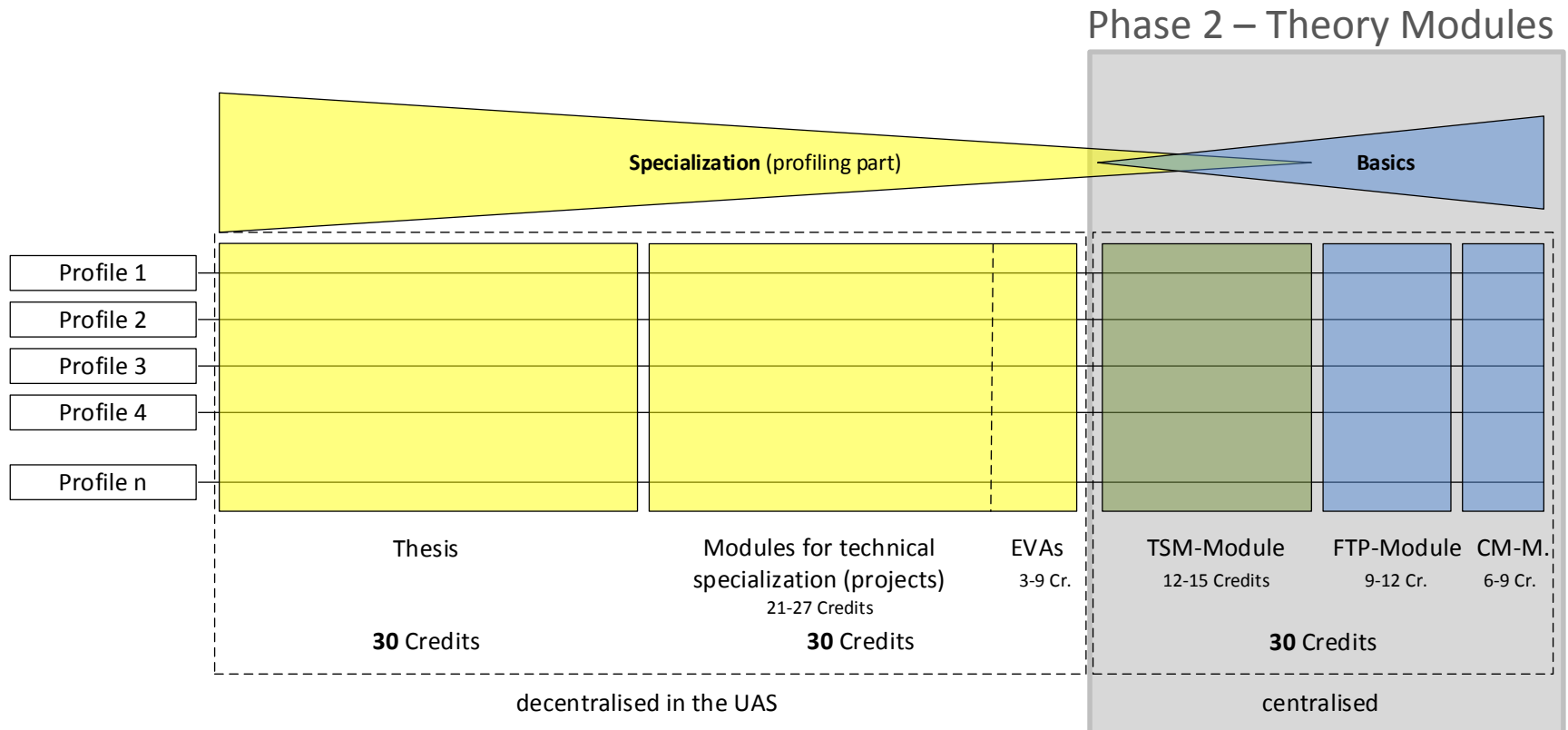
■ Implementation process: 4 phases



2. Orientation

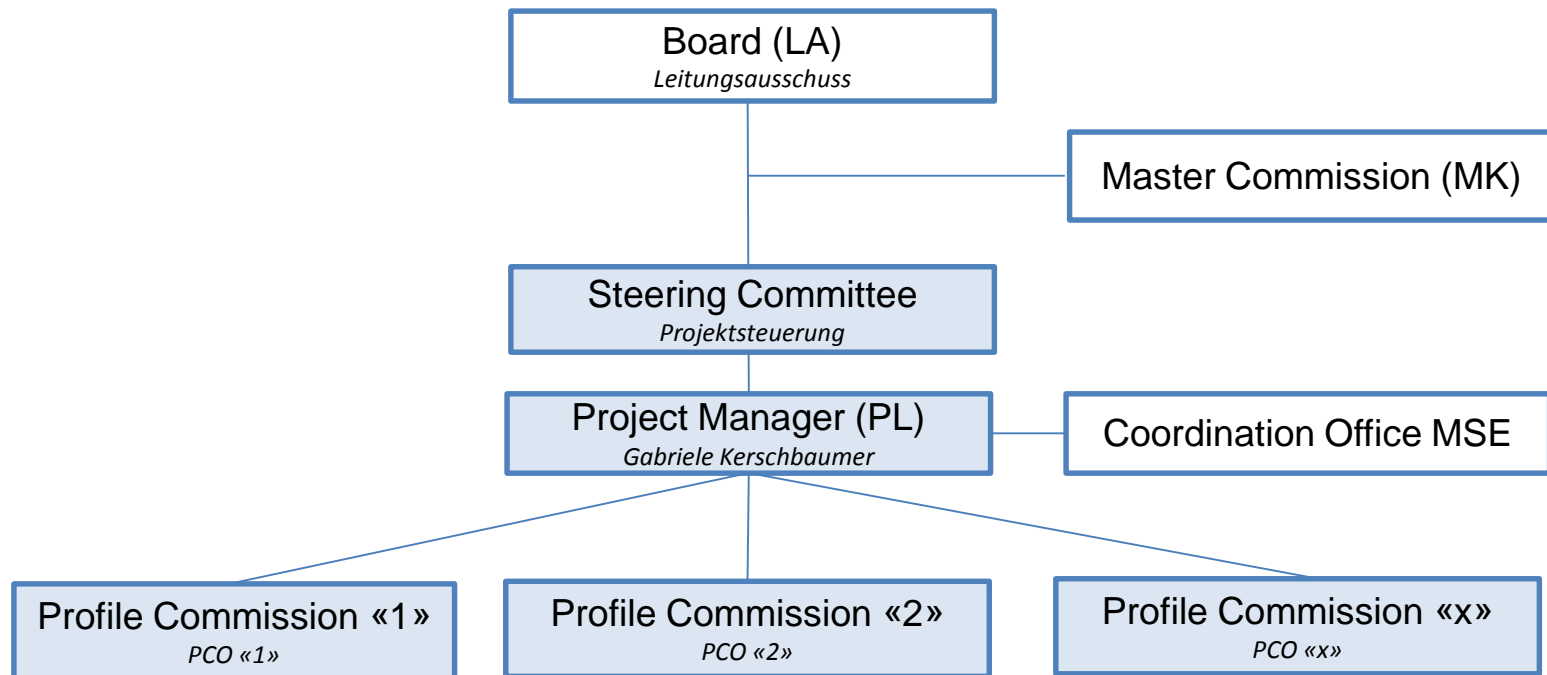
■ MSE structure

- Phase 1: Profile Description covers centralised & decentralised part of MSE
- Phase 2: Compilation Theory Modules covers centralised part



2. Orientation

- Project team remains unchanged



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Monday (morning), Tuesday, Friday

2. Orientation – Decisions LA Profile Descriptions

- 14 Profile Descriptions have been approved (incl. Profile names)
 - Application Profile «Aviation» has been approved => new PCO
 - Remove “conditions of admission” from the Profile Description
=> Grade A & B will be regulated through the MSE guideline “conditions of admissions”
=> List of illustrative BSc degrees will remain in the Profile Descriptions

3 Eingangskompetenzen

Zum Masterstudium zugelassen werden Hochschulabsolventinnen und –absolventen, deren Leistungen einem ECTS-Grade A oder B entsprechen. Die Hochschulen werden zusätzlich eine Eignungsabklärung durchführen.

Auflagenfrei aufgenommen werden Absolventinnen und Absolventen, welche einen Bachelorabschluss in den folgenden Studienrichtungen vorweisen können:

Fachgebiet Business Engineering and Production BEP

Wirtschaftsingenieurwesen, Aviatik, Transportation

Fachgebiet Energy and Environment EE

Maschinentechnik, Elektrotechnik, Bauingenieurwesen, Automobiltechnik, Umwelttechnik, Gebäudetechnik, Geotechnik, Verfahrenstechnik, Chemieingenieurwesen, Systemtechnik

Fachgebiet Industrial Technologies INT

Automobiltechnik, Elektrotechnik, Maschinentechnik, Mikrotechnik, Systemtechnik, Ingenieur-Designer, Telekommunikation

Fachgebiet Information and Communication Technologies ICT

Informatik, Medieningenieurwesen, Telekommunikation, Geomatik FHNW

Fachgebiet Public Planning, Construction and Building Technology PPCBT

Raumplanung, Städtebau, Architektur, Landschaftsarchitektur, Bauingenieurwesen, Gebäudetechnik, Geomatik HES-SO

Studierende mit einem Abschluss in einer anderen Studienrichtung können sur dossier aufgenommen werden.

Extract MSE Guideline R3 «Fachgebiete»,
28. June 2010, page 3

2. Orientation – Decisions LA Profile Descriptions

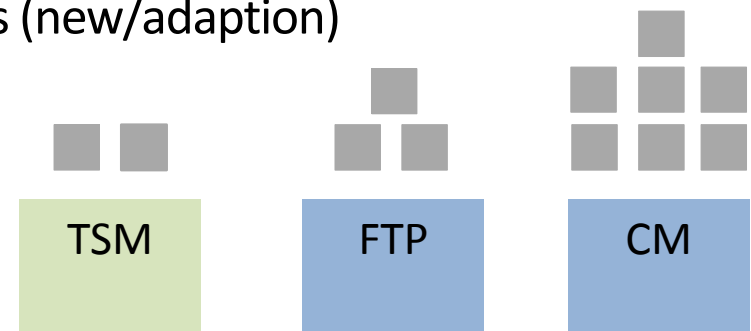
■ Overview Profiles participating in second Phase

Profile	Coordinator	UAS
Business Engineering (BE)	Jürg Hosang	ZHAW
Civil Engineering (CE)	Albin Kenel	HSLU
Computer Science (CS)	Hans-Peter Hutter	ZHAW
Data Science (DS)	Jean Hennebert	HES-SO
Electrical Engineering (EIE)	Hans Doran	ZHAW
Energy & Environment (EnE)	Benno Bucher	FHO
Mechanical Engineering (ME)	Gregor Burkhard	FHNW
Mechatronics & Automation (MA)	Roberto Bucher	SUPSI
Medical Engineering (MEn)	Eric Rosset	HES-SO
Aviation (Avi) seit 22.01.2019	Michel Guillaume	ZHAW
Building Technologies (BT)	Adrian Altenburger	HSLU
Geomatics (Geo)	Susanne Bleisch	FHNW
Photonics (Pho) seit 18.10.2018	Valerio Romano	BFH
Raumentwicklung und Landschaftsarchitektur (RELA)	Markus Gasser	FHO

➤ Confirmation of profile participation by UAS (until 15.03.2019)

3. Assignment - Task

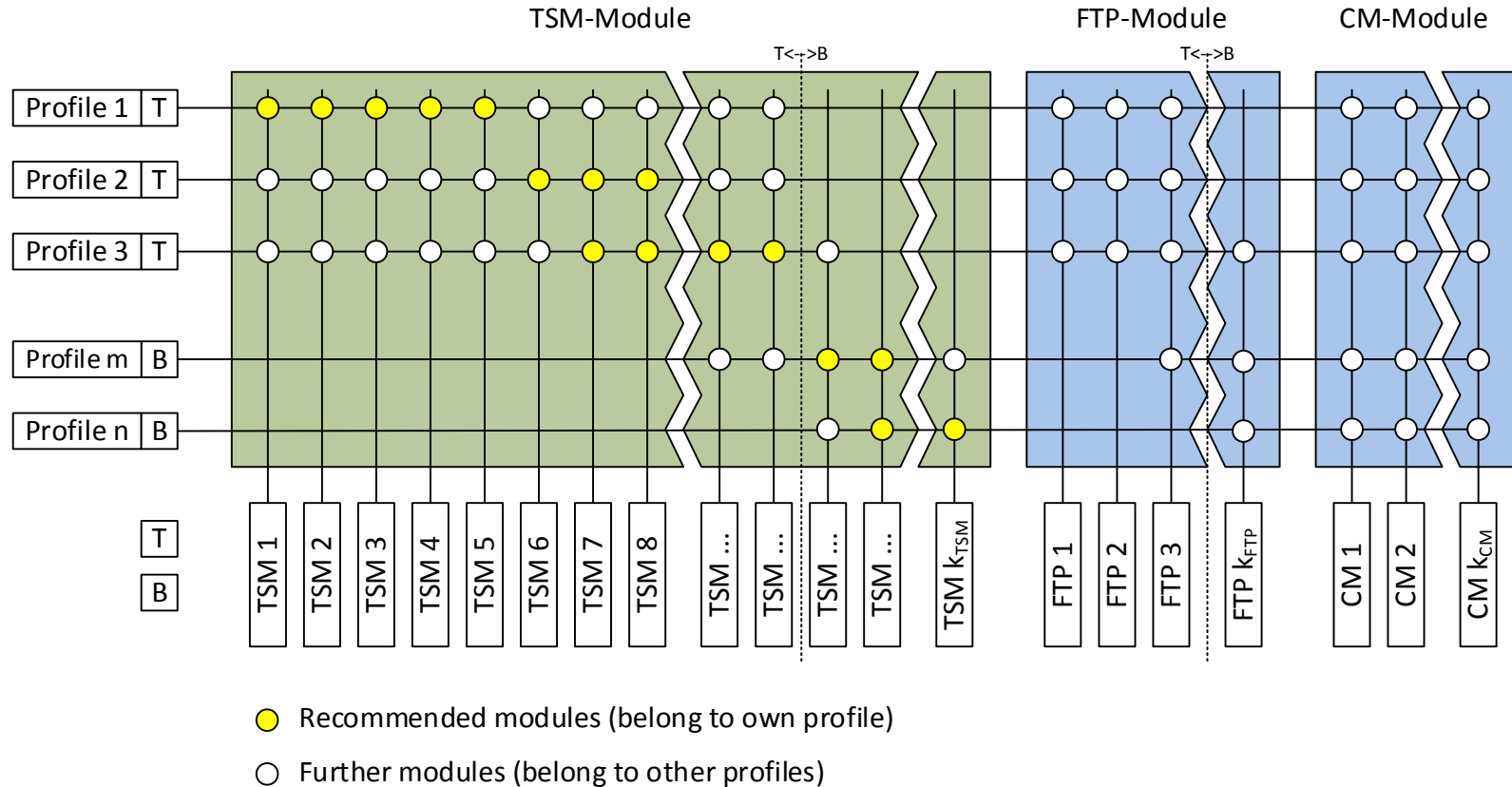
- Definition of Theory Modules (TSM, FTP, CM) for own Profile
 - Compilation of modules to be offered for one's own Profile
 - Basis => current offer
 - Triage: retain, adapt, new
 - Check exploitation of synergies with other Profiles
 - TSM: technical specialisation; one or few Profiles
 - FTP: theoretical knowledge; min. for 3 Profiles
 - CM: additional competencies; large number of Profile
 - Formulation of the module specifications (new/adaption)
 - see template



Relation Profiles to module categories: Exploitation of synergies

3. Assignment - Task

■ Basic principle of the link between Profile and modules

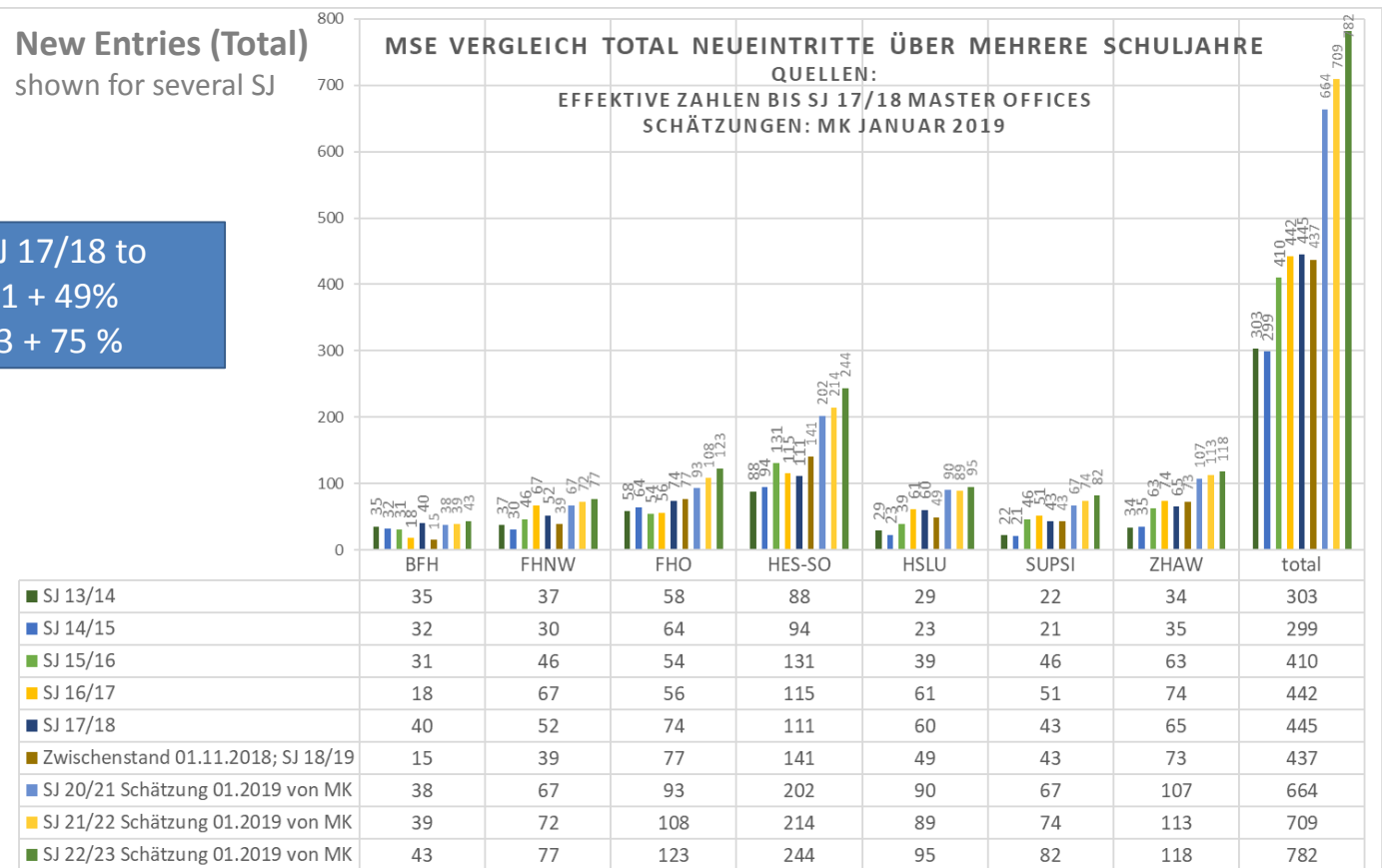


Source: Concept MSE Redesign, Chap. 4, Page 5

3. Assignment – Number of Theory Modules

- The Board (LA) has decided on the maximum amount of modules
 - TSM- Modules:
 - Number of estimated students per Profile are the basis for the calculation for the number of modules (concept, p.5)
 - MK estimated number of students on the basis of the Profile Descriptions (Jan. '19)

Increase SJ 17/18 to
 - SJ 20/21 + 49%
 - SJ 22/23 + 75 %



3. Assignment – Number of Theory Modules

- Calculation for each Profile has been done at strategy workshopME

Mechanical Engineering	BFH	FHNW	FHO	HES-SO	HSLU	SUPSI	ZHAW	TOTAL	TOTAL		
Teilnahme FH								Durchschnitt	SJ 20/21	SJ 21/22	SJ 22/23
A) Studierendenzahlen FH	Köpfe pro Profil Durchschnitt Schätzungen über SJ20/21 bis SJ22/23							Köpfe pro Profil	Köpfe pro Profil		
Bern	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lausanne	0.0	0.0	0.0	27.0	0.0	0.0	0.0	27.0	26.0	27.0	28.0
Lugano	0.0	0.0	0.0	0.0	0.0	11.0	0.0	11.0	10.0	11.0	12.0
Zürich	1.0	11.0	11.3	0.0	7.0	0.0	15.0	45.3	41.0	45.0	50.0
A) TOTAL alle Standorte	1.0	11.0	11.3	27.0	7.0	11.0	15.0	83.3			

Computer Science	BFH	FHNW	FHO	HES-SO	HSLU	SUPSI	ZHAW	TOTAL	TOTAL		
Teilnahme FH								Durchschnitt	SJ 20/21	SJ 21/22	SJ 22/23
A) Studierendenzahlen FH	Köpfe pro Profil Durchschnitt Schätzungen über SJ20/21 bis SJ22/23							Köpfe pro Profil	Köpfe pro Profil		
Bern	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lausanne	1.0	0.0	0.0	52.0	0.0	0.0	0.0	53.0	51.0	53.0	55.0
Lugano	0.0	0.0	0.0	0.0	0.0	21.0	0.0	21.0	20.0	21.0	22.0
Zürich	4.0	5.7	14.3	0.0	15.7	0.0	14.0	53.7	52.0	52.0	57.0
A) TOTAL alle Standorte	5.0	5.7	14.3	52.0	15.7	21.0	14.0	127.7			

Entscheid LA Durchführung Standort durchführen	ja	nein	check
Handeingabe			
0	0	1	OK
4	1	0	OK
0	0	1	OK
6	1	0	OK

3. Assignment – Number of Theory Modules

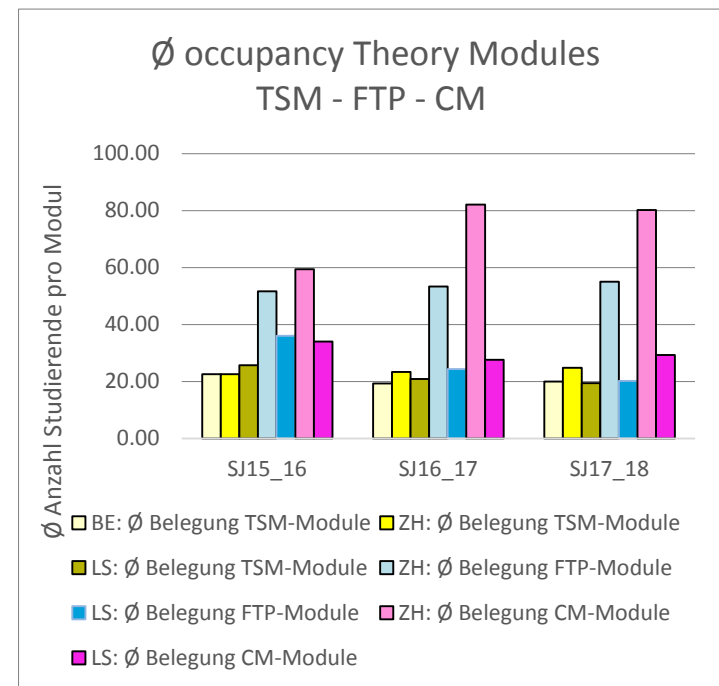
- Number of TSM Module per Profile and (central) location

Profile	Actual TSM Module	NEW TSM Module	Bern	Lausanne	Lugano	Zurich	tbd
Business Engineering (BE)	10	6	0	4 SJ22/23	0	6	
Civil Engineering (CE)	5	5	0	4	0	5	
Computer Science (CS)	10	7	0	7	4	7	
Data Science (DS)	5	6	0	4	0	6	
Electrical Engineering (EIE) *	5	7	0	4	0	7	
Energy & Environment (EnE) */**	12	8	0	4	0	8	
Mechanical Engineering (ME) *	5	7	0	4	0	7	
Mechatronics & Automation (MA)	5	5	0	4	0	5	
Medical Engineering (MEn)	0	4	0	4	0	4	
Aviation (Avi) seit 22.01.2019	0	4	0				4
Building Technologies (BT)	0	4	0				4
Geomatics (Geo)	5	4	0				4
Photonics (Pho) seit 18.10.2018	0	4	0				4
Raumentwicklung & Landschaftsarchitektur (RELA)	5	4	0				4

➤ Maximum 73 Theory Modules (today: 67)

3. Assignment – Number of Theory Modules

- The Board (LA) has decided on the maximum amount of modules
 - TSM Modules: slides before and see Annex E
 - FTP - Modules: **19 Modules**
 - status quo: 16 Module
 - same modules for all locations
 - needs-oriented (Input PCO)
 - recommendation of at least 3 Profiles
 - CM - Modules: **10 Modules**
 - status quo: 12 Module
 - same modules for all locations
 - needs-oriented (Input PCO)
 - suitable for many profiles



3. Assignment – Framework Conditions

- Same TSM – Modules for a Profile

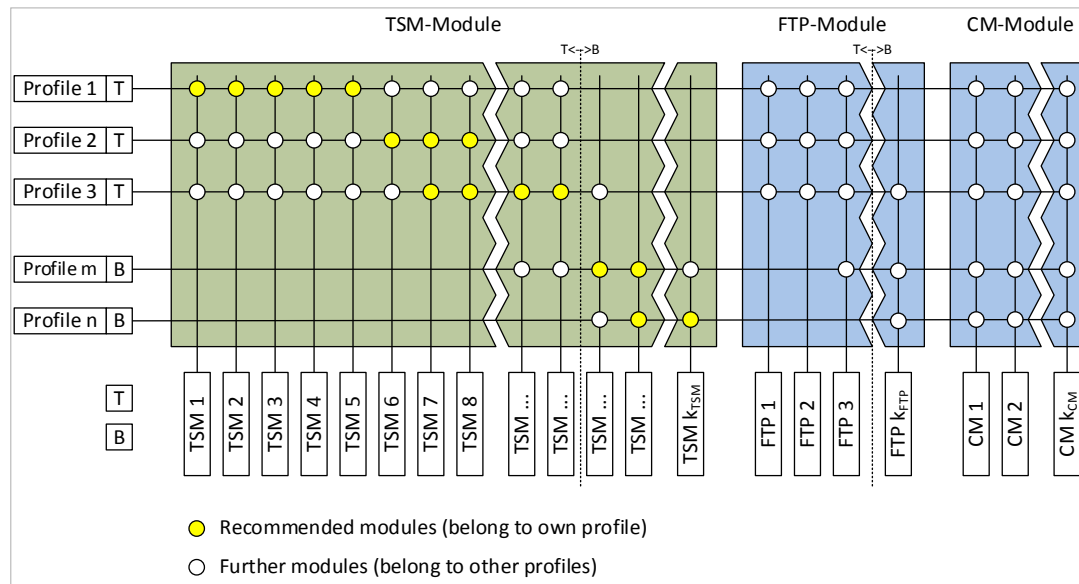
At least 4 Modules must be identical to all locations

- FTP Modules

FTP Modules can be distinguished for the 2 fields of study «Engineering & IT» and «Construction & Planning»

- Language

«Profile language» regarding to the location should be proposed by the PCOs (template)



Source: Concept MSE Redesign, Chap. 4, Page 5

3. Assignment – Framework Conditions

■ Conceptual specifications for central Theory Modules

■ Theory Modules

- aim to broaden knowledge
- are not interdependent
- are taught at central locations (except Small Profiles)
- belong to a category (TSM, FTP, CM)
- count 3 ECTS each
- exist of 2 lecture periods and 1 tutorial period each*
- are held in regular classrooms
- can be taught by 2 lecturers each

* Lecture periods are unlimited regarding the size of class; tutorial periods have a limited size of up to 35

3. Assignment – Documents and results

■ Documents

- List of Responsibles of a Profile (Annex A)
- Existed Theory Modules offered (Annex B)
- Current Module Description (Annex C)
- Module Specifications - Template (Annex D)
- Maximum Number of Theory Modules (Annex E)
- Selection Theory Module – Template (Handout, Switch)
- Proposal Profile Language (Handout, Switch)
- Proposed changes to module group TSM (Annex F)

Annex E – Maximum number of TSM-, FTP- and CM-Modules

The Board (Leitungsausschuss LA) has approved the following number of Theory Modules:

Profiles	TSM Modules		Central Locations	
	Maximum number of Modules	Zürich	Lausar	X (ab)
Business Engineering (BE)	6	x		
Civil Engineering (CE)	5	x		
Computer Science (CS)	7	x		
Data Science (DS)	6	x		
Electrical Engineering (EE) *	6 +0.5	x		
Energy & Environment (E&E) ***	6 +0.5 +0.5	x		
Mechanical Engineering (ME) *	6 +0.5	x		
Mechatronics & Automation (MA)	5	x		
Medical Engineering (Med)	4	x		
Total (maximum)	51 +2			
Aviation (Av) ****	4			
Building Technologies (BT) ****	4			
Geomatics (Geo) ****	4			
Photonics (Pho) ****	4			
Raumentwicklung & Landschaftsbau (REL) ****	4			

* Each of the 3 profiles has the right to define 6 modules according to Theory Modules can be created under the condition that these 6 modules must be in the field of Electrical Engineering and Energy & Environment (+1) and better environment (+1). The maximum number of Theory Modules for the profiles is 6.

** Two modules have to address the topic "environment".

*** At this location the minimum number of 4 TSM Modules are required.

**** If requested 4 TSM Modules can be considered in the time slot.

Module category	Maximum number of Modules
FTP Modules*	19
CM Modules*	10

* same modules for all locations

MSE profile commissions (PCO)

Profile	Commission	Chair	Member	Chair	Member	Chair	Member
Business Engineering	BE-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Civil Engineering	CE-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Computer Science	CS-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Data Science	DS-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Electrical Engineering	EE-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Energy & Environment	E&E-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Mechanical Engineering	ME-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Mechatronics & Automation	MA-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Medical Engineering	Med-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Aviation	Av-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Building Technologies	BT-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Geomatics	Geo-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Photonics	Pho-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...
Raumentwicklung & Landschaftsbau	REL-01	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...	Prof. Dr. ...

Module Description

Advanced Control

General Information

Number of ECTS Credits: 9

Abbreviation: TSM_AdvCont

Version: 2. Jul. February 2019

Inspector of module: Jörg Keller, PhD

Language: English

	Lausanne	Rein	Zürich
Instruction	□ F □ F	□ F □ F	□ F □ F
Documentation	□ F □ F	□ F □ F	□ F □ F
Operation	□ F □ F	□ F □ F	□ F □ F

Module category:

□ Fundamental theoretical principles

□ Technological specialization module

□ Control module

Lectures: 32 x 2 lecture periods and 1 tutorial period per week

32 x 2 lecture periods per week

32 x 2 lecture periods per week

Module-based controller design is a key technology to control systems with complex dynamics. Many innovations in the last decade. In this module, the key elements of the development process for controller design are covered: design and controller implementation. Since there is always more to learn and with an introduction to robust controller design.

Aims, content, methods

Learning objectives and acquired competences

- The student is able to:
 - develop a model-based, model-based control law, including modeling, parameter estimation, system analysis, controller design and controller implementation
 - design a robust H_∞ optimal controller
 - design a model-based controller with an introduction to robust controller design
- LQR/LQG-Controller design: 5%

State space models and their properties, linearization, singular values, realization theory, basic state feedback control, Observer design

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Instruction	□ F □ F	□ F □ F	□ F □ F
Documentation	□ F □ F	□ F □ F	□ F □ F
Operation	□ F □ F	□ F □ F	□ F □ F

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4. Assignment – Documents and results

Results

Selection Theory Module per Profile (.xls, see switch)

- 1) Selection of Modules (TSM according to the max. number by LA; TSM/CM => 5 modules).
 - Distinguish between modules maintained (E), adopted (A) and new modules (N).
 - Further Modules you are interested in mark with an X.

			Fields of education															
			E		C		E		E		E		E		E		C	
			Business Engineering (BE)		Civil Engineering (CE)		Computer Science (CS)		Data Science (DS)		Electrical Engineering (EIE)		Energy & Environment (EnE)		Mechanical Engineering (ME)		Mechatronics & Automation (MA)	
			Medical Engineering (Med)		Aviation (Avi)		Building Technologies (BT)		Geomatics (Geo)		Photonics (Pho)		Raumentwicklung & Landschaftsarchitektur (RELA)					
			Priority	Usage	Priority	Usage	Priority	Usage	Priority	Usage	Priority	Usage	Priority	Usage	Priority	Usage	Priority	Usage
Existing Modules	Nr.	Code	Name															
	76	CM_ComplPro	Management of Complex Processes															
	77	CM_CorpCom	Kommunikation in Unternehmen	A														
	78	CM_Entrepr	Unternehmensführung und Entrepreneurship															
	79	CM_Ethics	Ethik und Unternehmensverantwortung															
	80	CM_GlobMark	Global Markets and Intercultural Competence	E														
	81	CM_InnChang	Innovations- und Changemanagement															
	82	CM_PrivLaw	Privacy and Law															
	83	CM_QRM	Quality and Risk Management	E														
	IX	CM_AdvProjMgmt	Advanced Project Management															
	X	CM_InnoLEAN	Innovation and Lean															
	XI	CM_IntSust	Integrated Sustainable Management of production systems	E														
New Modules	XII	CM_QualMgmtSyst	Quality Management Systems	N														

4. Assignment – Documents and results

■ Results

- Selection Theory Module per Profile (.xls, see switch)

2) Priorisation of selected Modules

- Priorise the Modules for your profile:
 - 1 - very important
 - 2 - important
 - 3 - less important
- Priorisation is an important information if profile is taught at different locations (4 TSM)

Select TSM modules for your own profile according to the number determined by the LA and prioritise them.						
Date:						
Nr.	Code	Name	Profiles / Small Profiles	E	C	E
				Business Engineering (BE)	Civil Engineering (CE)	Computer Science (CS)
					Data Science (DS)	Electrical Engineering (EE)
98	TSM_InnoDes	Novel Innovation and Design Principles	Priority Usage			
99	TSM_MarkFor	Market Analysis and Forecasting				
100	TSM_ServMan	Servitization of Manufacturing				
101	TSM_TechMgmt	Technology Management				

3. Assignment – Documents and results

■ Results

- Module specifications for adapted modules / new modules (.doc)

- Name
- Category
- Planned location
- Pre-requisites
- Aims
- Content (keywords)
- Proposals member module group (new) or lecturers

- Module Description will be elaborated by module group

MSE | MASTER OF SCIENCE
IN ENGINEERING

MSE Redesign - Assignment Phase 2
Annex D –Template «Modules specifications»

Module name: Please insert the (planned) name of the module
Module code (if applicable): Insert abbreviation of module if there exists
Adaptation of existing Theory Module: ☐
New Theory Module: ☐

Category Theory Module
TSM-Module ☐ FTP-Module ☐ CM-Module ☐

Planned Central Location for Theory Module
Zurich ☐ Lugano ☐ Lausanne ☐
Bern ☐ Others (e.g. local profiles): Insert the name of the location where the module might be taught.

Pre-requisites
List pre-requisites if needed.

Aims
Explain the aims of the module.

Content (keywords)
What is the content of the module? Describe in a view words.

Proposal for members for the module group (voluntary)
If you already know somebody who can teach in this module, please list the full name and E-mail adress.

PCO: Choose your PCO
Date: current date.

3. Assignment – Documents and results

■ Results

■ Proposal Profile Language (.xls, see switch)

MSE Redesign Phase 2
Profile Language

A "profile language" needs to be defined. Please propose a language for your Profile regarding to the location.
In according to the concept, the table has already been filled out for Zurich and Lugano. Please add your proposal.









Name Profiles		Field of study	Central locations												Decentral locations			
			Zurich			Lausanne			Lugano			Bern						
			En	F	G	En	F	G	En	F	G	En	F	G	En	F	G	name of location
Profiles	Business Engineering	E	x															
	Civil Engineering	C																
	Computer Science	E	x						x									
	Data Science	E	x															
	Electrical Engineering	E	x															
	Energy & Environment	E	x															
	Mechanical Engineering	E	x															
	Mechatronics & Automation	E	x															
	Medical Engineering	E	x															
Small Profiles	Aviation	E	x															
	Building Technologies	C																
	Geomatics	C																
	Photonics	E	x															
	Raumentwicklung & Landschaftsarchitektur	C																

Field of study:
C = Construction & planning
E = Engineering & IT

Language:
En = English
F = French
G = German
x = according to the MSE-Redesign concept

3. Assignment – deadlines and submissions

- Dates (from today's perspective)

Date	Subject	Participants	Aim	Lead
CW 7 15.02.2019 	Kick-Off	C-PCOs R-PCOs	assignment	PL
CW 10 	Feedback work status	C-CPOs	current status	C-PCO
CW 11 12.03.2019 	Intermediate submission .xls File Selection Modules	C-PCOs	preparation consolidation meeting dispatch to MK	C-PCO
CW 12 22.03.2019 	1. Consolidation meeting	C-PCOs	first approach Theory Modules / Profile	PL
CW 15 19.04.2019 	Intermediate submission	C-PCOs	preparation consolidation meeting	C-PCO
CW 18 30.04.2019 	2. Consolidation meeting	C-PCOs	Clarification & confirmation Theory Modules; questions/applications MK	PL
CW 18/19 tbd	MK	MK	Information	PL
CW 21 tbd 	3. Consolidation meeting	C-PCOs	Consolidation Theory Modules Module «constellations»	PL
CW 23 03.06.2019 	Deadline Final Submission			C-PCO
CW25 19.06.2019	Board (LA) Final decision	LA		PL

3. Assignment – Update «weighted votes»

- The «weighted votes» have been updated by taking into account the new estimated number of students per Profile (MK Jan. '19)

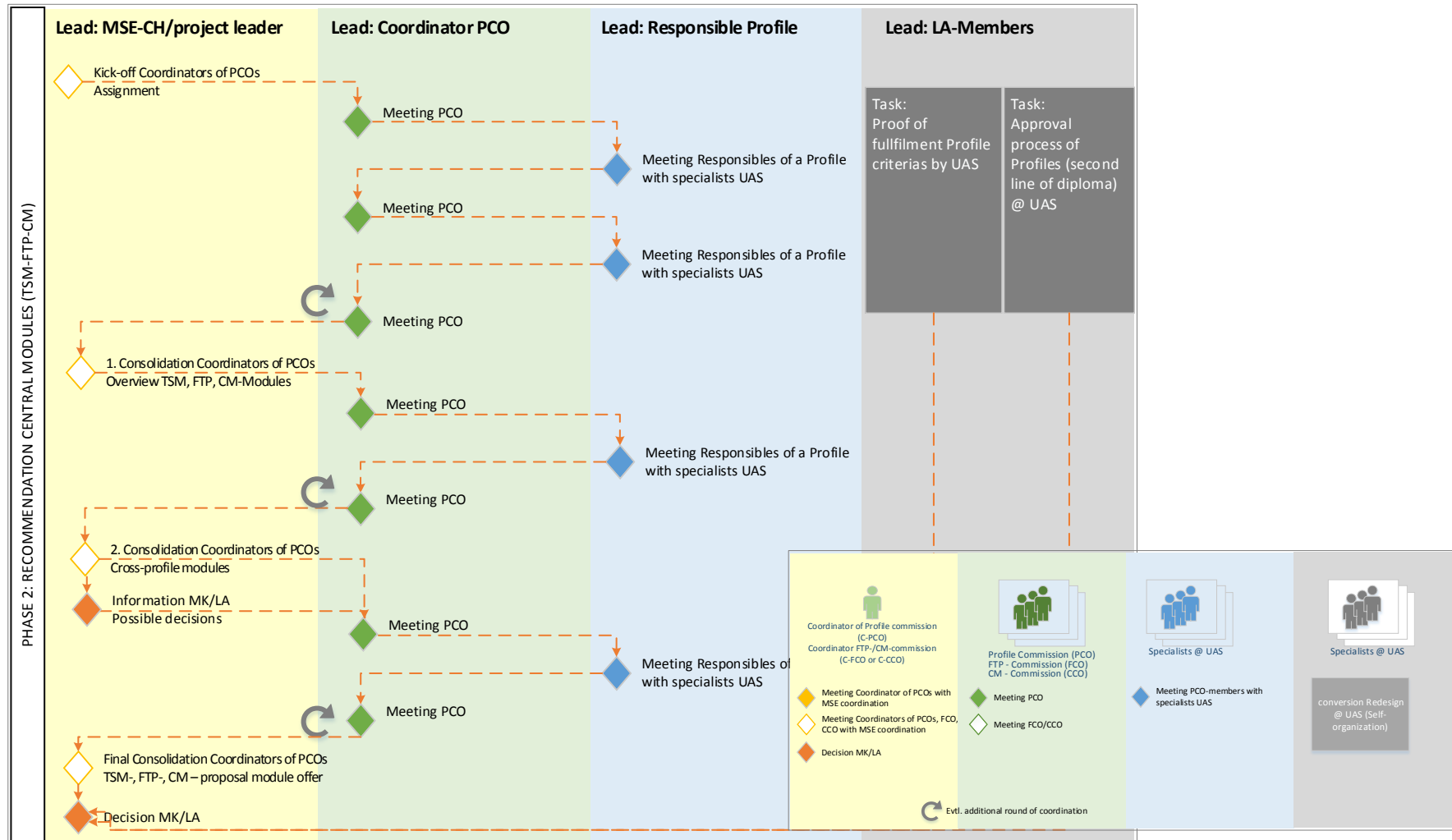
➤ **Coordinators per Email**

4. Clarification of questionsw



5. Further action

■ Procedure remains unchanged



5. Further action

- PCOs are defining the «Theory Modules» for their own's profile
- Intermediate submission: **12.03.2019**
 - filled out .xls
 - mse-redsign@hsr.ch
- 1. Consolidation meeting: **22.03.2019**
 - C-PCOs

Depending on the results of the first Consolidation meeting, the further dates may have to be adjusted.

6. AOB, Thanks

- Any other business?
- Thank you very much for your attention!