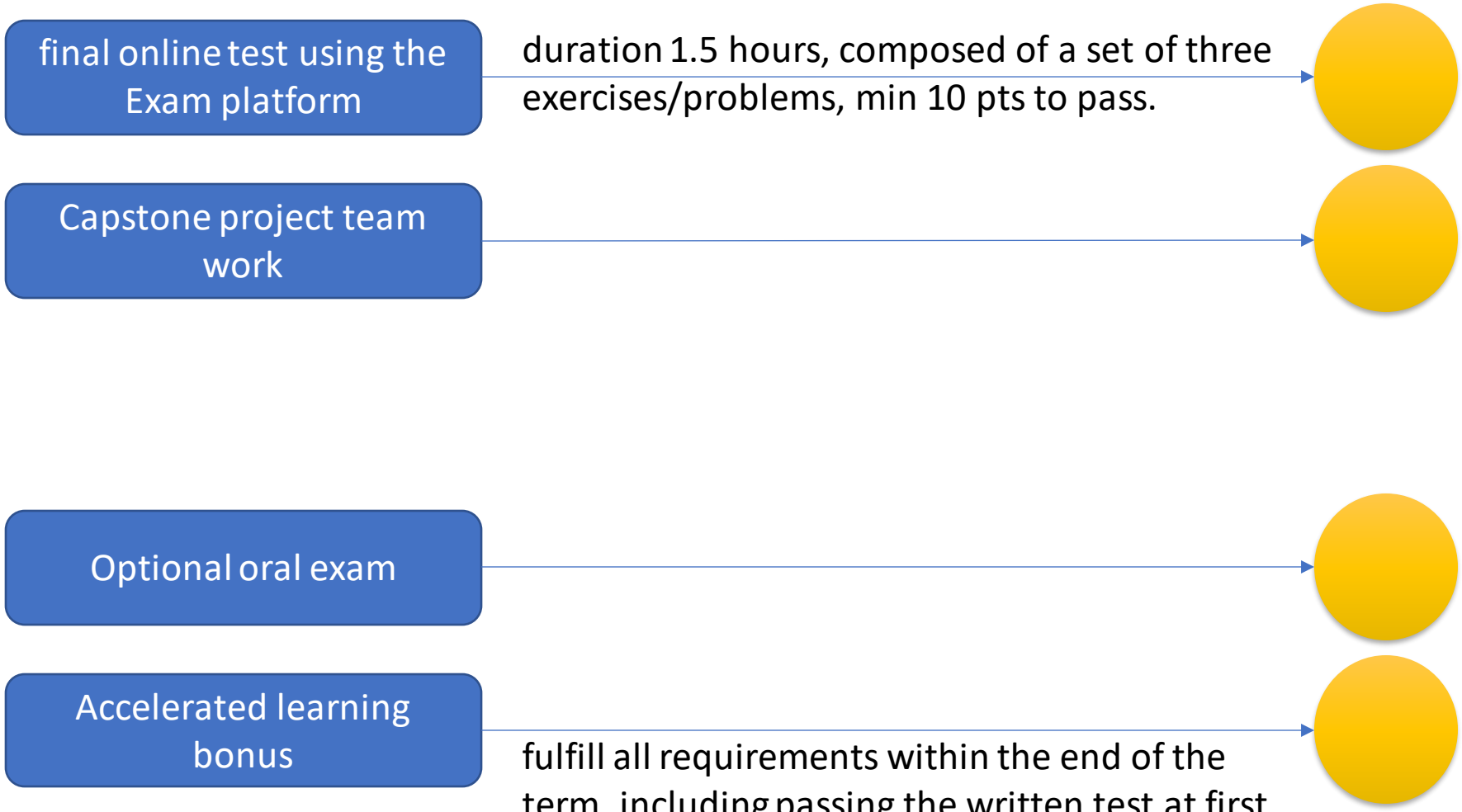
Closing the CPM course

Preparing for the written exam

Context – Course grading



Context – Online test

- Why? Validate achievement of learning outcomes: Students to demonstrate that they can:
  - Select and implement traditional techniques to manage a project
  - Prove ability in business evaluation and project financing
  - Develop a project charter and business case
  - Plan scope, cost and resources.
  - Prepare and track a project detailed schedule using both deterministic and probabilistic techniques and related professional project planning software tools
  - Track progress, monitor and control successful accomplishment of project's objectives of time, cost and quality.
  - Use rigorous managerial methods for decision making in complex case scenarios. Identify, assess and respond to project risks
- What? a set of three exercises/problems with open-ended questions or multiple-choice questions

Context – Test

- How? To be defined
- When? See portal

Context – Online test

- How-much? how do we grade exercise and questions?
  - Exercise are open ended: we do evaluate methods rather than final numerical results - Please detail the logical steps you take to reach the solution
  - Questions are close ended: we do evaluate right answers.

Sample Ex. – Outline

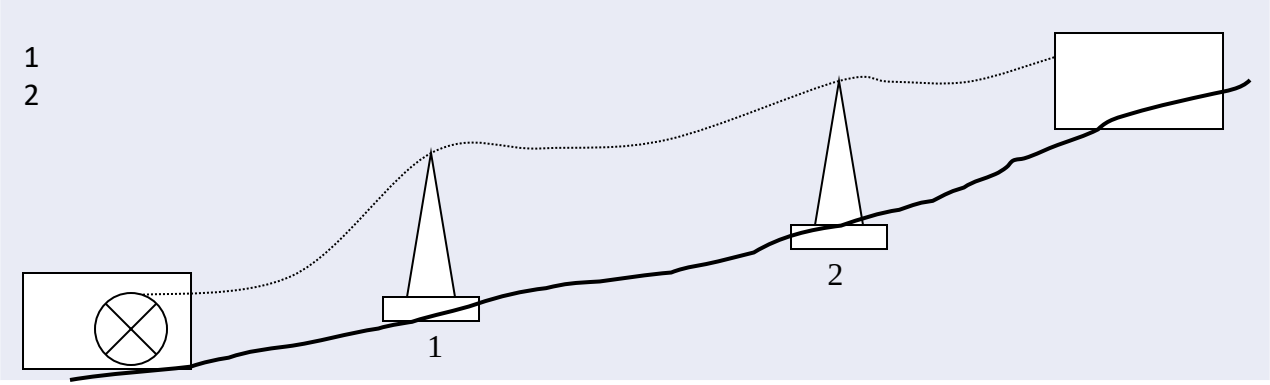
1. Select and implement traditional management techniques to manage a project
2. Prove ability in business evaluation and project financing
3. Develop a project charter and business case
4. Plan scope, cost and resources.
5. Prepare and track a project detailed schedule using both deterministic and probabilistic techniques and related professional project planning software tools
6. Track progress, monitor and control successful accomplishment of project's objectives of time, cost and quality.
7. Use rigorous managerial methods for decision making in complex case scenarios. Identify, assess and respond to project risks

Sample Ex. – Develop a project charter and a project plan

Pretend to be working as a Project Manager for a construction company. You won a contract to build a cableway facility for a ski resort managing company. You are asked to prepare a Project Charter including a project plan created using a Project Planning software tool such as MSProject, ProjectLibre or another suitable package. Please make your educated guess to provide information included in all sections of the Project Charter.

The facility will be composed of the following parts:

- A bottom departure station,
- an arrival station at the top of the hill,
- two piles erected in top of the corresponding foundations, numbered as 1 and 2;
- the engine system installed after the departure station is complete,
- the cable, which is laid down at the end after all components are installed.



Sample Ex. – Develop a project charter and a project plan

Below are the durations of each individual task, when performed by one team. You have no more than 3 teams that can be used (maximum available units). All tasks can be performed by 1 or more teams (if you make use of more than 1 team to perform a single task, please consider a no loss of productivity, for example: 1 team takes 2 weeks = 2 teams take 1 week).
The labour rate is 5K$/week per team. Overhead cost is 10k$/week.
Expected deliverables:
•Project Charter file in word, text, pdf or similar
•Project Planning file (MSProject, ProjectLibre or other).

TASK NAME	DURATION [week]	MATERIAL COST [K$]
Departure station	2	100
Arrival station	3	80
Foundation 1	1	10
Pile 1	1	20
Foundation 2	1	10
Pile 2	2	20
Engine system	2	50
Cable laying	1	30

Sample Ex. – Develop a project charter

Project Charter

- Project Name:
- Project Description:
- Project Manager:
- Project Sponsor:
- Business Case:
- Expected Goals/Deliverables:
- Risks and Constraints:
- Milestones:
- Team Members:

Solution file: 8.2_project_charter.docx

Sample Ex. – Develop a project plan

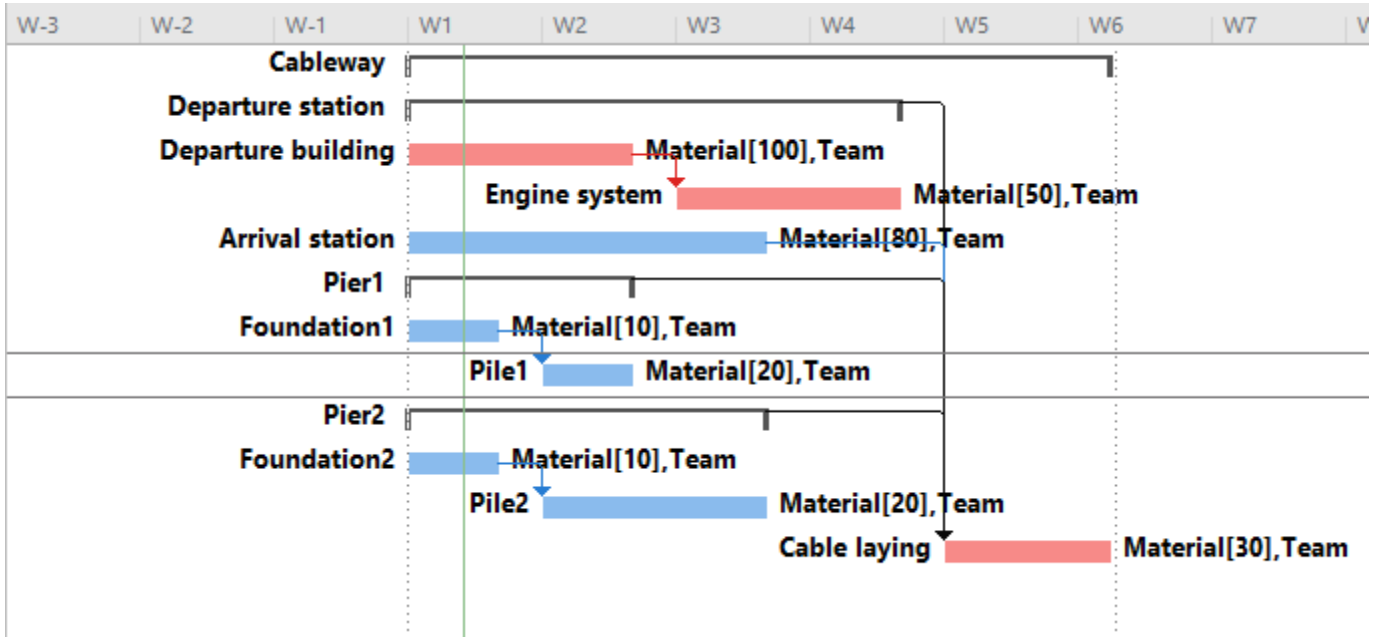
Project Plan

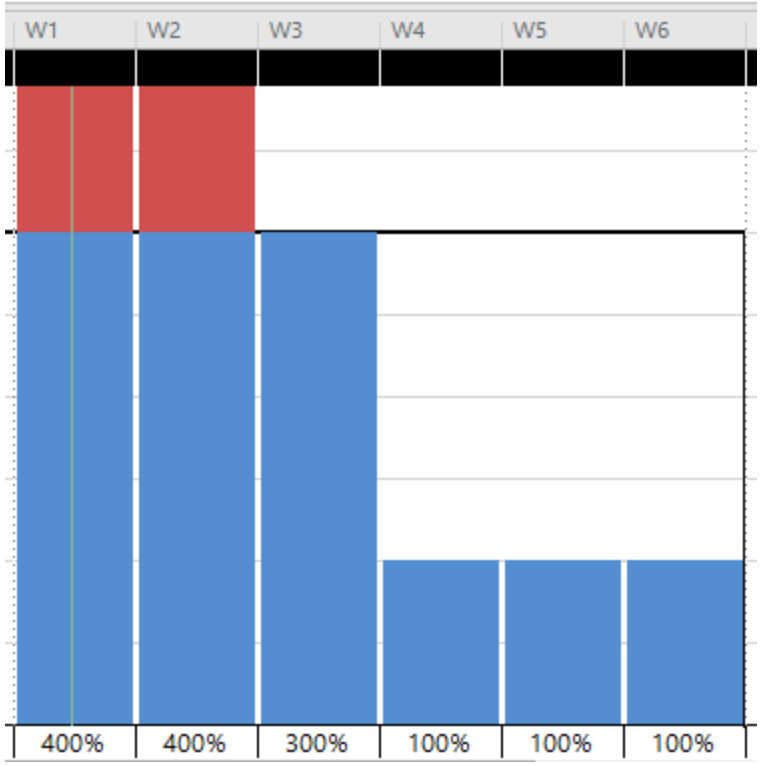
- Scope:
  - 4.3.11 Define scope: given
  - ***4.3.12 Create work breakdown structure: optional***
  - 4.3.13 Define activities: given
- Resource:
  - 4.3.16 Estimate resources: given
  - **4.3.17 Define project organization: establish resource engagement**
- Time:
  - **4.3.21 Sequence activities: to be done**
  - 4.3.22 Estimate activity durations: given
  - **4.3.23 Develop schedule: optimize**
- Cost:
  - 4.3.25 Estimate costs: given, direct and indirect
  - **4.3.26 Develop budget: to be done**

Sample Ex. – Develop a project plan

- *4.3.12 Create work breakdown structure: optional*
- **4.3.17 Define project organization: establish resource engagement**
- **4.3.21 Sequence activities: to be done**
- **4.3.29 Assess risks: to be done**

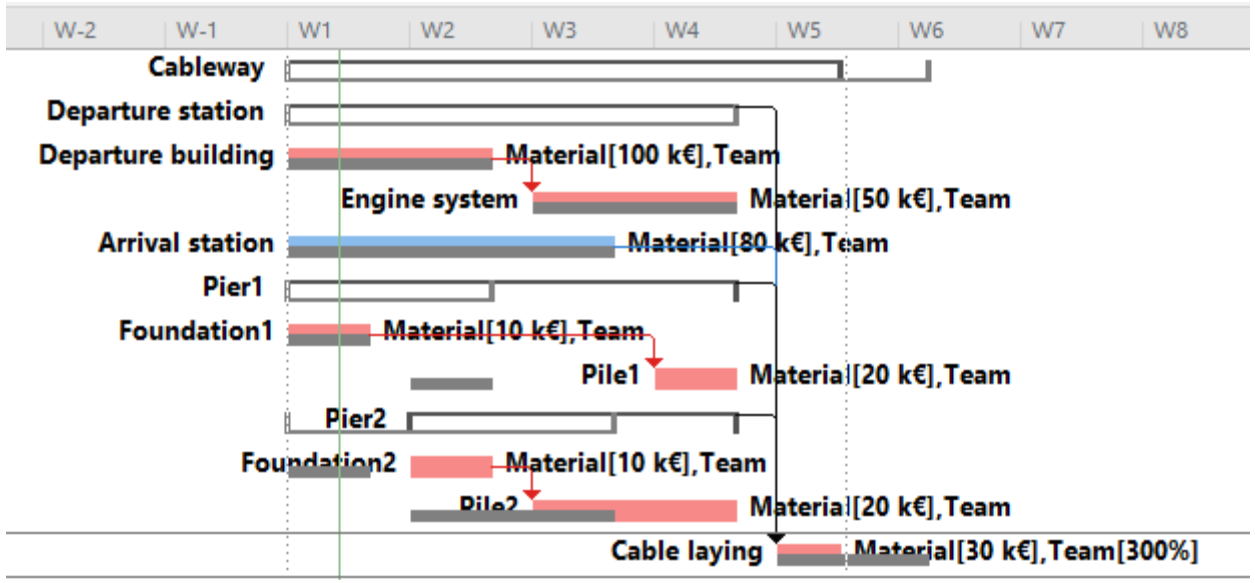
Resource Name	Type	Material	Max.	Std. Rate
O/head	Work		100%	€10,000.00/wk
Material	Material	k€		€1,000.00
Team	Work		300%	€5,000.00/wk

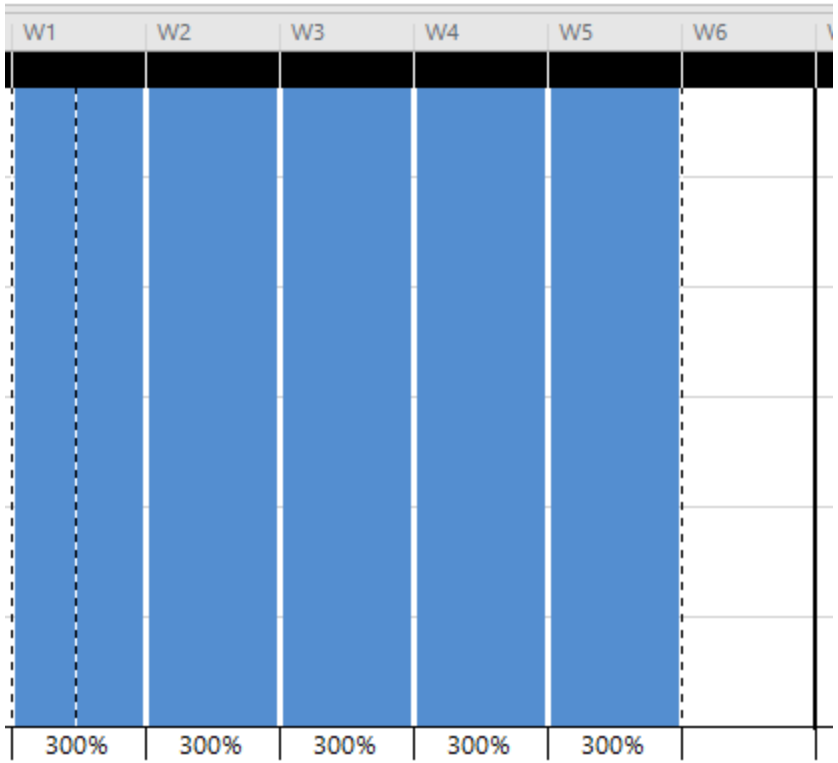




Sample Ex. – Develop a project plan

- 4.3.23 Develop schedule: optimize
- Smooth or level?
- Heuristic: shortest highest slack last

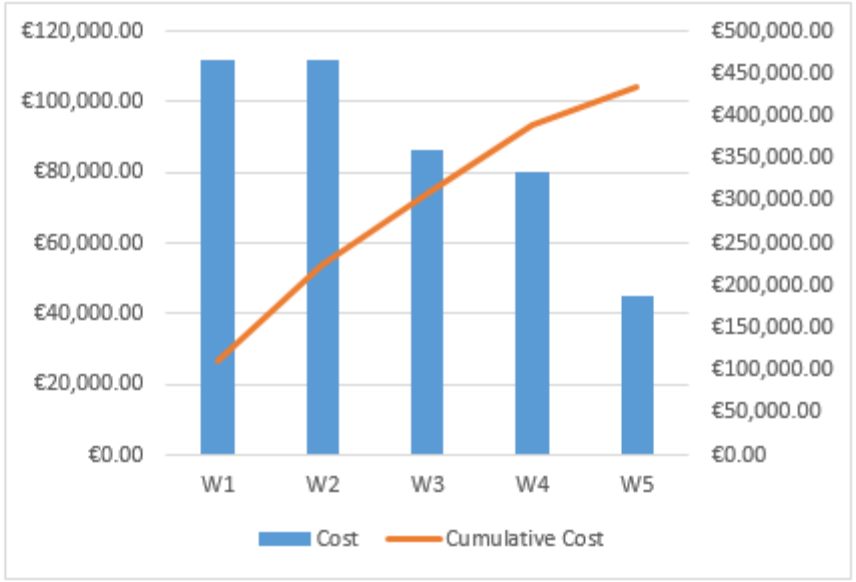




Sample Ex. – Develop a project plan

- **4.3.26 Develop budget: to be done**

CASH FLOW



Name	Cost
O/head	€48,000.00
Material	€320,000.00
Team	€67,000.00

Sample Ex. – Monitoring

AS the PM of the cableway project project, Your boss asks you to estimate the profit that your project would net at completion, based on current performance. What would you answer?

The project, as described in the chart below, has budgeted cost totalling 435 k€ and 5-week scheduled duration. The contract provides for the contractor to be compensated a lump-sum 544 k€ firm fixed price. A penalty worth 5k€/week is agreed upon the contract.

Wk	BV	EV	AV
#	k€	k€	k€
1	112	37.55	161.85
2	223	142.93	263.84
3	310	240.31	246.80
4	390		
5	435		

Sample Ex. – Monitoring

Solution

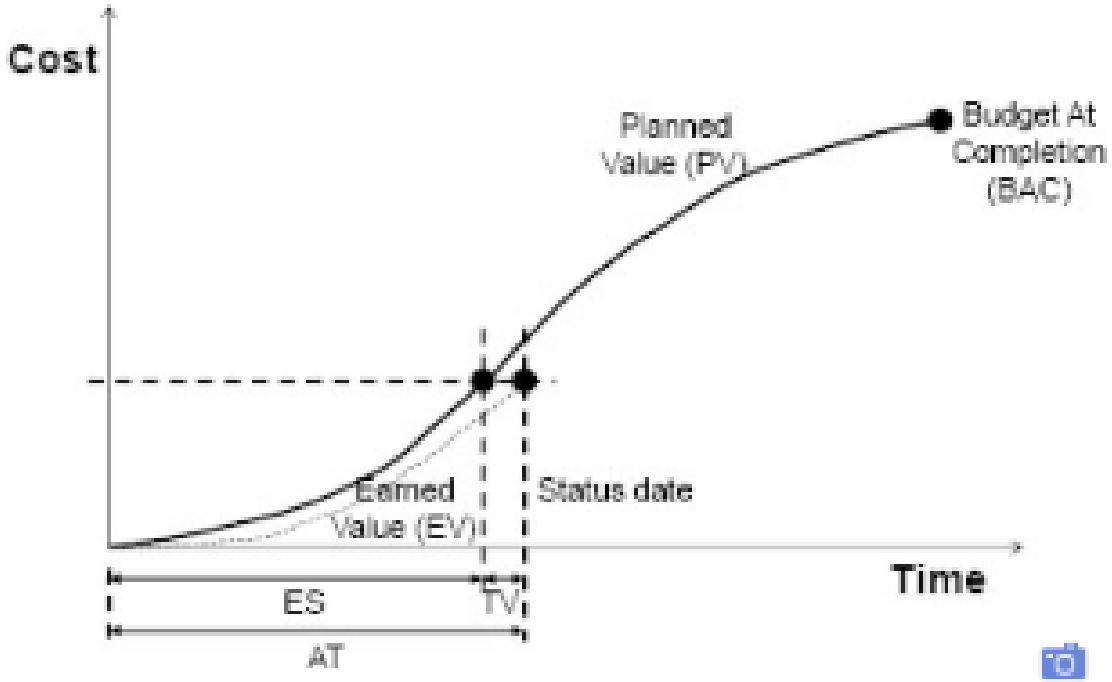
- Refer to lecture 14 – Monitoring

Key formulas

- ES = (AT-1) + (EV – PVc) / (PVc+1 – PVc)
- CPI = EV / AC
- SPI($) = EV / BV
- SPI(t) = ES / AT

Use revise estimate approach: most conservative!

- CEAC = AC + (BAC – EV) / CPI
- TEAC = AT + (PD – ES) / SPI(t)



Sample Ex. – Monitoring

Wk	BV	EV	AV			EVM		
#	k€	k€	k€	ES		BAC	435	
1	112	37.55	161.85			PD	5	
2	223	142.93	263.84	1.28		AT	3	
3	310	240.31	246.80	2.20				
4	390					CPI	0.97	
5	435					SPI($)	0.78	
						SPI(t)	0.73	
						CEAC	446.73	revise estimate
Profit estimate		**k€**				TEAC	6.82	revise estimate
	Price	544.00				Ex. Schedule delay	1.82	
	penalties	(9.11)	penalty rate	(5.00)				
	Revenues	**534.89**						
	Budget Cost	(446.73)	BAC					
	Cost overrun	(11.73)	CEAC	435				
	Costs	**(458.47)**						
	Profit	76.43						
	ROS		14%					

Sample Ex. – Contracting

Suppose to be the CEO of the ski resort company. You are asked by the Board of Directors to evaluate an alternative contract organization to build the new Cableway.

Consider that you manage a small resort, with little yearly capital expenditure and don't have in-house specialized technicians.

On the other hand, take note that globally in the ropeway industry there are no more than 5 player and that the leader has a market share approaching 40% globally, with a turnover in excess of 1bn€.

What would you suggest with regard to the delivery system, payment scheme and award method? Briefly justify your decision in writing.

Sample Ex. – Contracting

Key concept of contracting

- Scope: choose combination
  - The contractor is much better fitted to handle the complexity of the context, has good financial ways, especially given the context of ski resort operator as battered by the pandemic. However, they cannot handle the specifics of the local resort market : **Turnkey**
- Payment scheme: Firm fixed price, no advance. Contractor finance repaid during operations.
- Award: negotiation. Difficult to exercise client power.

Sample Ex. – Initiating

Suppose to be the CEO of the ski resort company. You and the Board of Directors are debating about the business case and questioning whether to authorize the project or not. Please provide your recommendation to help management decide. Support your recommendation with appropriate data analysis.

The business case presents the following preliminary estimates:

Total capital expenditure		1,000 k€
Revenue per year		200 k€
Operating cost per year		70 k€
Inflation rate		0%
Corporate tax rate	30%	
Cost of equity		10% annual
Cost of debt		5% annual
Capex period		1 year
Expected period of operations	15 years	

Sample Ex. – Initiating

Key concept of business casing

- Financial viability: NPV
- “Bankability”: pretax DSCR > 1.2

Sample Ex. – Initiating

NPV	- Capex + NPV(EBITDA)	1871						
Capex		1000						
EBITDA		130						
	Rev	200						
	Exp	-70						
NPV(EBITDA)		2870.5971		EBITDA * ((1+WACC)^n - 1)/WACC				
	n	15						
WACC		5.31%		E%*Ce + D%*Cd(1-Tr)				
	Ce	10%						
	Cd	5%						
	Tr	30%						
	D%	72%		?				
	E%	28%		?				
Satisfy DSCRmin >= 1.2								
DSCR		1.2	=	EBITDA / (Loan repayment + Interest)				
				EBITDA / (Capex * D% *(1/ loan dur + Cd) = 1.2				
Loan repayment								
	Loan dur	10						
	Max repay	100		Capex * D% / Loan dur				
	Max interest			Capex * D% * Cd				
	D%	72%		D% = EBITDA / (Capex *(1/ loan dur + Cd) * 1.2)				