

Machine Design

MEC-E1060 – Week 2



Aalto University
School of Engineering

Kaur Jaakma

11.9.2023

Status

Active groups 29

- Earliest submission Thursday 14:42
- Latest submission Sunday 23:57

Zulip discussion board

- 40 students and 5 teachers

Status Survey Week 1

- 31 answers
- DL this Monday

Kaur on conference trip this week (SEFI)

- Delays in emails



Lectures

Week	Monday 10-12 @ K213a	Visiting lecturer
36	PLM in Industry	Tuomas Ruippo, Kone Oyj
37	MBS	Milla Vehviläinen, VTT Oy
38	Design Automation	Harri Taskinen, Evian Oy
39	FEM in Industry	Tuomo Kuusi, Entop Oy
40	Case from Industry	Niko Tapanainen, Bluefors Oy
41	Cases from research and education	Panu Kiviluoma, Aalto University

Group Work

Topic	Deliverables	DL
Preliminary Design	Analyzed case chosen, requirements list, and free-body diagram	10.9.
Mechanism Analysis	Multi-body simulation model of the concept MBS models, results, and plan how to validate	24.9.
Strength Analysis	Updated geometry of the concept FEM models, results, and plan how to validate	8.10.
Detailed Design	Selected machine components (bearings, motors etc.) Final assembly with updated geometry	15.10.



Material in MyCourses (MBS page)

Panopto videos

- Skeleton Technique
- Skeleton Model and Kinematic Simulation in NX
- Plotting Joint Velocities
- Dynamic Simulations in NX

Documents

- About MBS
- Difference between Absolute and Relative coordination in MBS

Quiz

- MBS Orienting Quiz



MBS Tasks

Selection of joints

- Kutzbach criteria

Skeleton models and kinematic simulations

- Joint location plots, joint velocities

Rough CAD models and dynamic simulations

- External loads
- Joint forces, power to run the mechanism

Animation



MBS Report (DL 25.9.2022)

Return a PDF report containing all steps done during the MBS weeks

- Joint selection and Kutzbach criterion calculation
- Skeleton models and results from kinematic simulations
- Simplified models and results from dynamic simulations
- Return an animation of your mechanism from dynamic simulation in .avi format (Motion, Animation, Export to Movie)
- Include also how you should validate simulation results
- Include learning outcomes and own justified grade estimate





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