Product: Interactive 3D Working Models

Developed by: Srikanth Rangdal

Courses benefitted:

1. **Kinematics of Machines**
2. **Dynamics of Machines**
3. **Machine Design**

No of Models developed: 8 (Eight) with each one having multiple varieties in the single file. (Details are enclosed in the file).

Software used: Onshape Cloud CAD. Recently acquired by PTC - Parametric Technologies Corporation, The company that developed Pro/E or Creo/Elements Pro

Book referred: S S Rattan (The design & geometric dimensions, however, were chosen arbitrarily.)

Benefit to the institute: The cost invested in physical models will be saved while actually significantly improving the overall experience of students.

Features / Facilities: The students will be able to carry out below-mentioned activities on the 3D model.

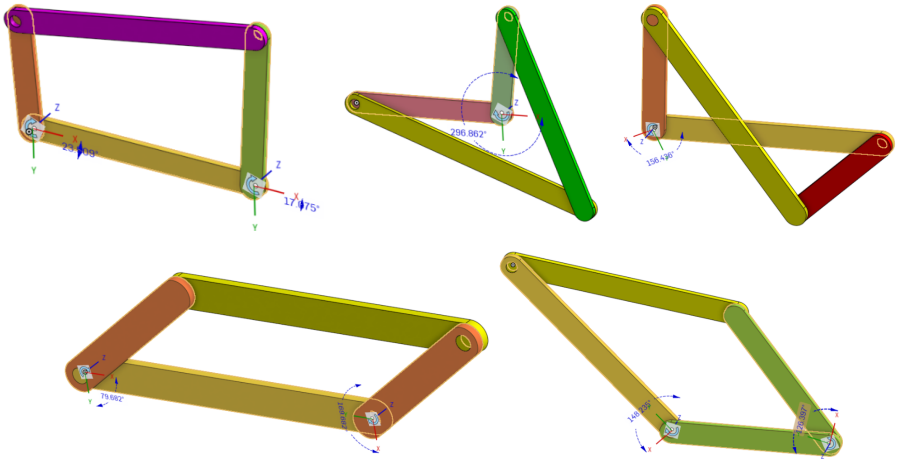
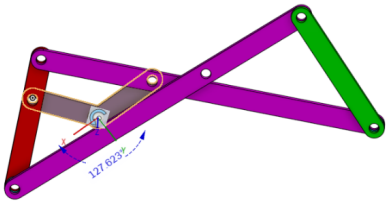
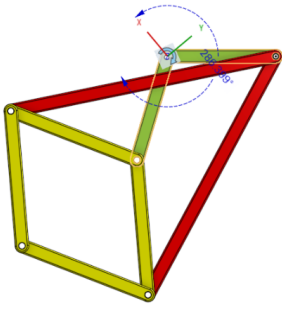
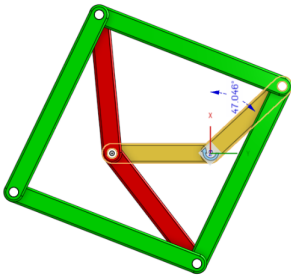
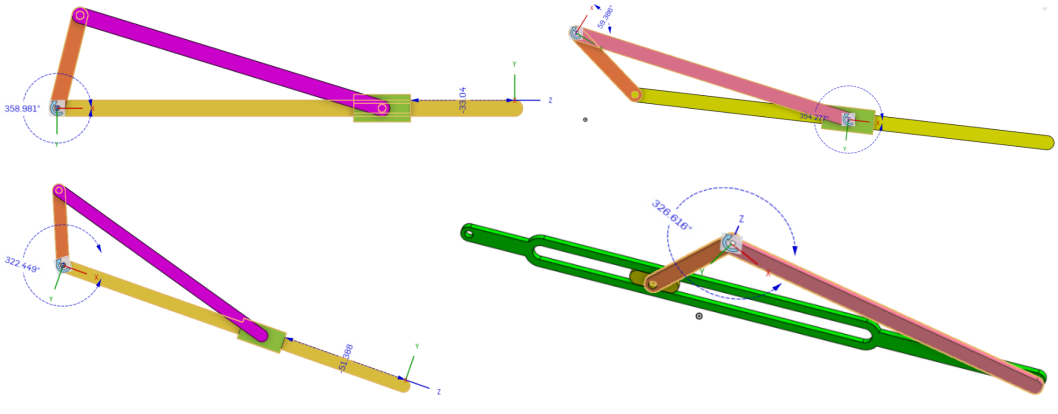
1. Motion Analysis/visualisation of constrained mechanisms through animation.
2. The constraints are developed in accordance with the subject taught (Kinematics of Machines) unlike other CAD Packages like Solidworks, CATIA, Unigraphics, AutoCAD, Inventor, Pro/E or Creo Pro etc… which use constraint based assembly design.
3. Variation of Link dimensions to analyse how it would affect the motion.
4. Changing of the fixed-frame to obtain different inversions & analyse their motion.
5. Designing useful machines on top of the mechanism structures & target solutions to suitable problems.
6. Obtain the drawings of the parts with dimensional & tolerance information for fabrication.
7. Manufacture or Fabricate the mechanisms using suitable materials (preferably bio friendly).
8. The files can be accessed easily through the link given below on any of the devices mentioned below:

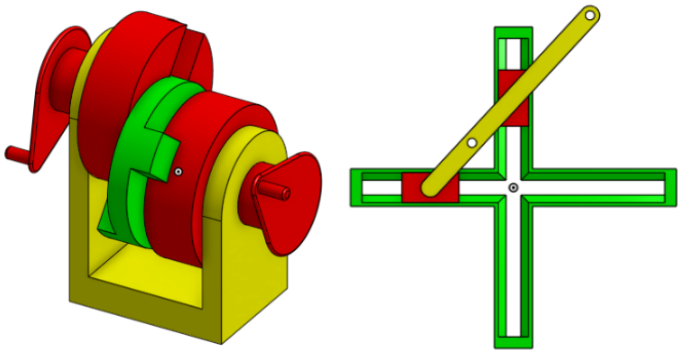
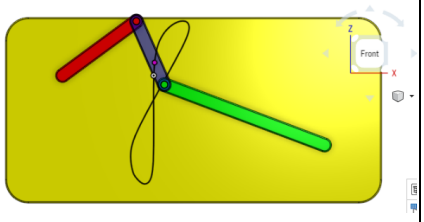
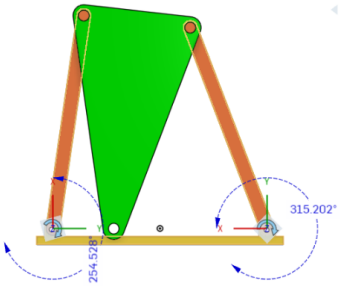
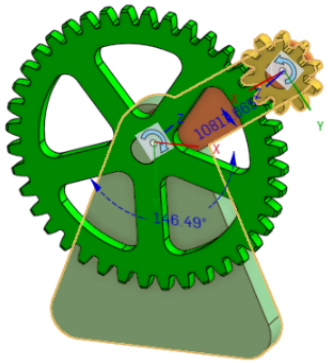
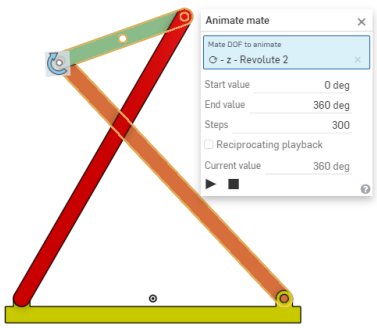
Devices Supported:

1. **Smartphones / Tabs** running **iOS** (iPhone & iPad) or **Android** or **Chrome OS**
2. **Desktops / Laptops** running **Macintosh**, **Windows**, **Chrome OS** or any variety of **Linux** with Chrome or other such **supported Browser**.
3. Sharing the file to students on mobile devices through the link. (Requirements: Android or iOS smartphone or desktop/laptop with supported browser)

Cost of equipment & software that student needs to access it

The educational version of OnShape is **FREE.** Any student can easily create the free account & then upgrade it to an educational version by filling the details of college & purpose of use. Any smartphone can work as good hardware.

Sl No	Mechanism modeled	Link
1	Four bar mechanism (all inversions & special cases)	https://cad.onshape.com/documents/6c3926fb72cacc53ab3ad068/w/a6d2324889ba4809b0cf269b/e/d3bcd7d925809521098466de
		
2	Harts Mechanism 	https://cad.onshape.com/documents/0a1966674d0549ba949d148e/w/4a868a17c80ce7445fe339ef/e/1940ea2fe71fd881bbb8e0b0
3	Paucelliar Mechanisms of 2 varieties 	https://cad.onshape.com/documents/7db10129b77dd6d189ea030b/w/beed387d5b97e0476d0b00ba/e/59fbce29585548fae131fe2b 
4	Slider Crank Mechanism (all inversions)	https://cad.onshape.com/documents/cdc4073c12f0dd125e025e70/w/3339370e9b492a57695a3704/e/5fe77a25767345f253349870
		

5	Double Slider (3 Inversions & Oldhams coupling which overlaps one of the inversions)	https://cad.onshape.com/documents/4b6c99aac9b20839a6d16738/w/100075b9bd5c3ee32ee8845a/e/838089919d75c72e145ee0ff 
6	Watts Mechanism 	https://cad.onshape.com/documents/34dcb052eaf071172f75f6ed/w/2c06e0bdb8e342ad2bf043a0/e/ce834c642d84aac06bed1d08
7	Roberts Mechanism 	https://cad.onshape.com/documents/2ef5a6a1a5b12cd2c9aa18cc/w/8cd7bffd729400a4f36596cc/e/1a8814dbc19624fdc7a507d0
8	Epicyclic Gear Train 	https://cad.onshape.com/documents/3e520aee33ec02e5b10ad357/w/45a768b889d1548245a97f5e/e/e4cc1233db76d41a9f6a4a61
9	Tchebicheff Mechanism 	*Shareable Link:* https://cad.onshape.com/documents/41cdd5860fa99a36e86c7715/w/78ace6a179d7b417fb34352c/e/87e2c2955cf3cc3d96f557fe