TA202A

Manufacturing Processes II

Overview of the plan for the course

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Overview of the course

- **Normally**
  - 6 credits
  - 1 lecture (50 min) and 1 Lab (180 min) a week
  - Lab oriented course, with class supplementing labs
  - Emphasis was on you learning through making
  - Evaluation was: Lab – 75%, Class – 25% (one mid- and, one end-sem)
  - 450+ students
- **This time (special circumstances)**
  - 3 credits
  - 1 video lecture a week
  - Only class. Mostly overviews of what concepts you'd otherwise have appreciated through making in the labs
  - Proposed evaluation: Quizzes (x 4) – 90%, Online participation – 10%
  - 970+ students!

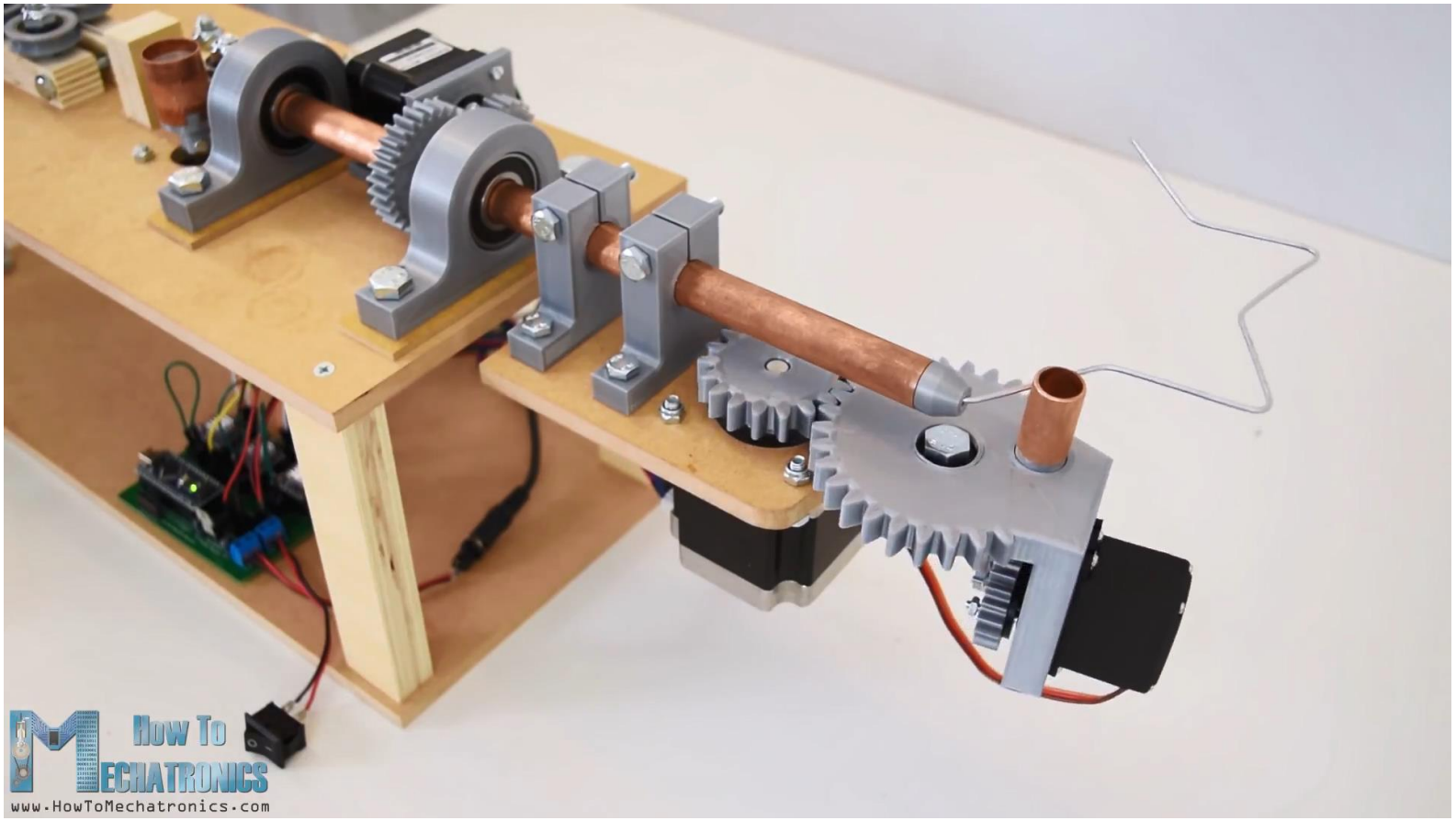
Course structure and delivery

- Will be conducted in the asynchronous mode, i.e., lectures will be posted online, and you can view them as and when you like.
- https://hello.iitk.ac.in/ (Videos, lecture notes, quizzes, forums, etc.)
- Discussions hours will be scheduled every other week (see detailed schedule in the course handout), during class hours, i.e., from 8 to 9 am on Tuesdays.
  - Zoom. Fresh meeting links will be sent the day before the scheduled discussion hour.
  - Discussion hours will discuss questions that you may have. Those questions should be posted the day before the schedule discussion using a forum.

TA202A - Manufacturing Processes II

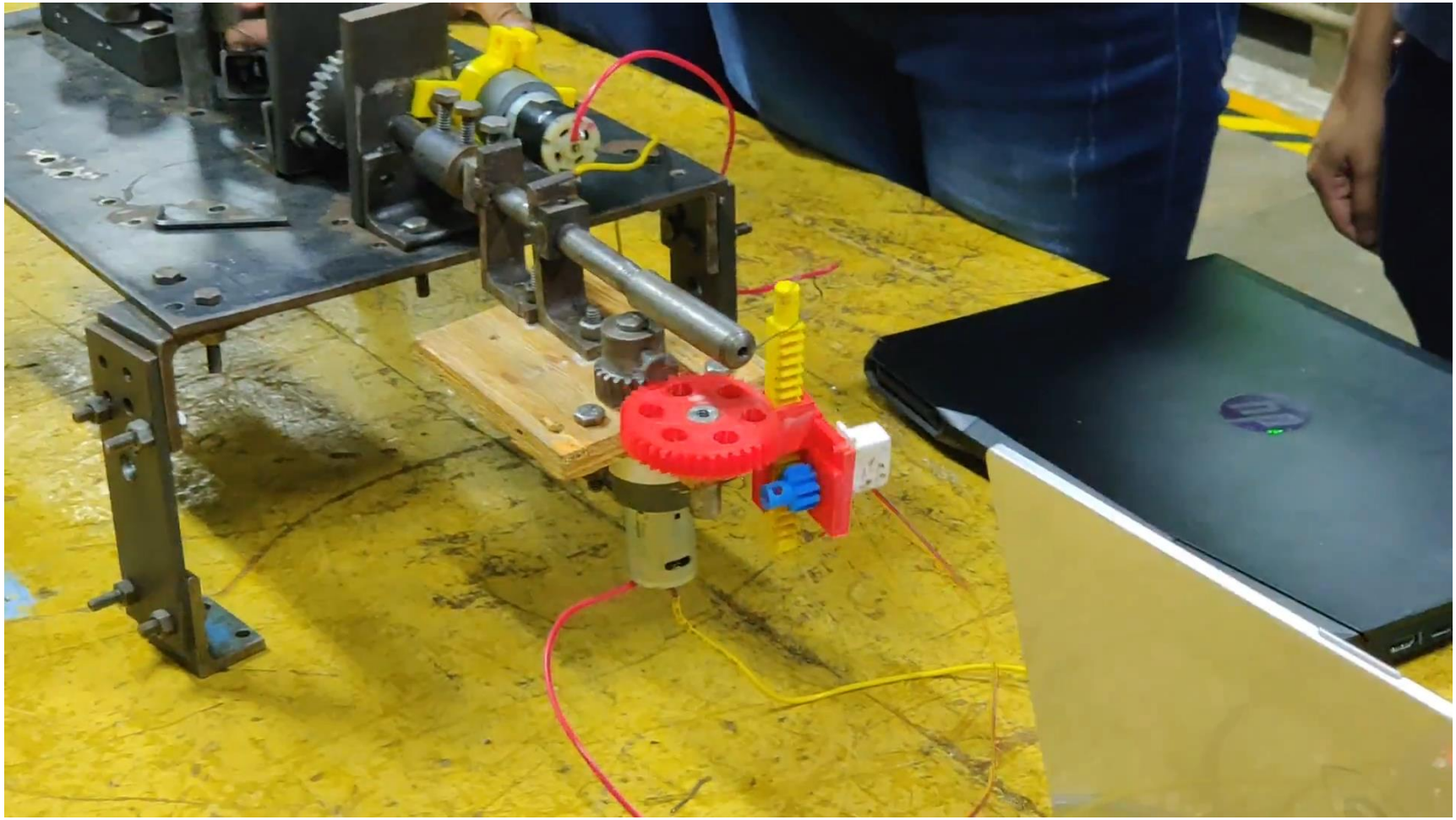
- This course is not about primary manufacturing processes, but secondary – that is why the course is titled: ‘Manufacturing Processes II’
- Primary manufacturing processes include processes like casting, forging, forming, joining, etc. These are covered in ‘TA201A:Manufacturing Processes I’
- The course will mainly deal with machining processes, and machines used for those processes. We will also discuss additive manufacturing.
- The main aim of the course was (is) learning through hands-on-experience of manufacturing a product – project work!

Example of a project idea: wire bending machine

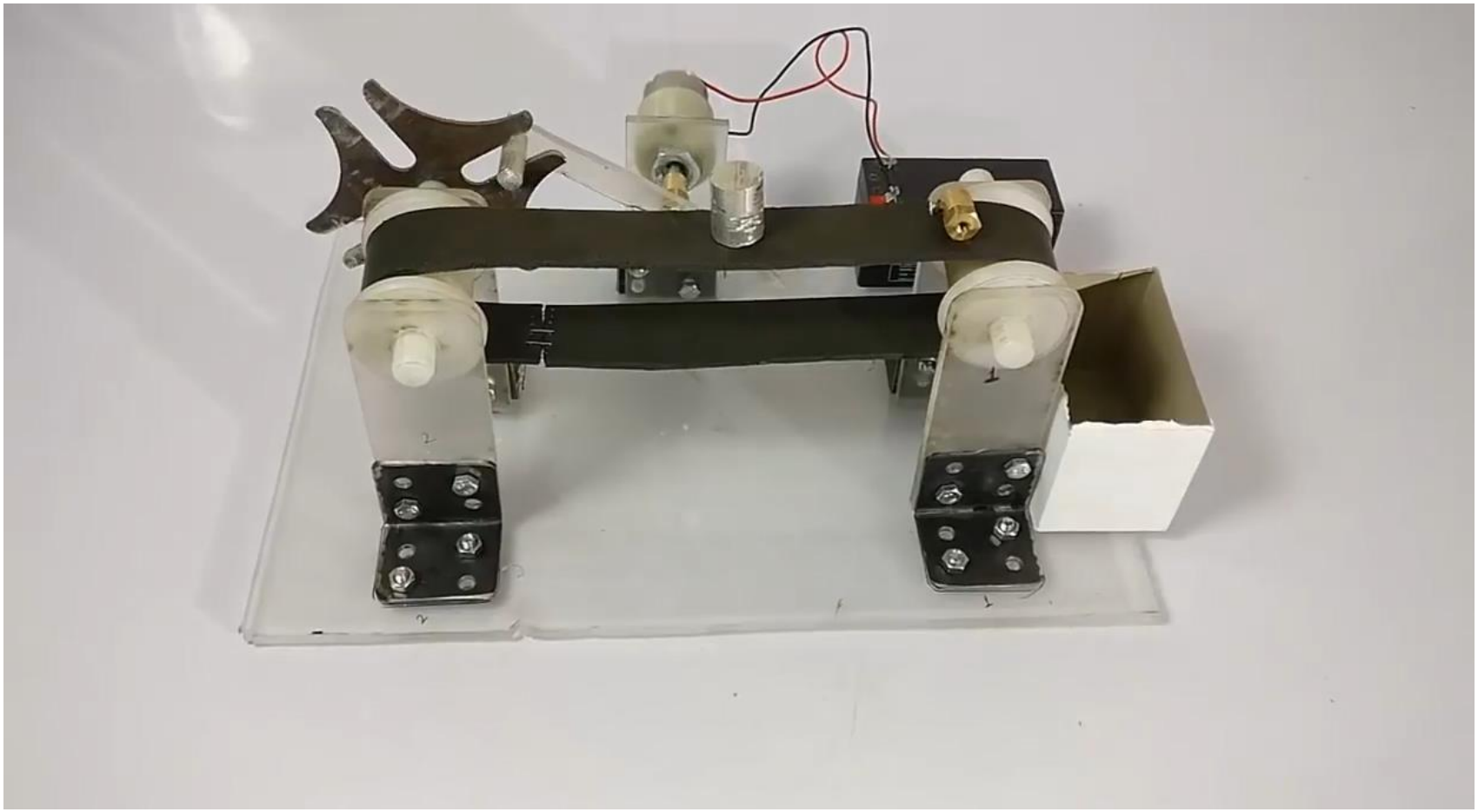


https://www.youtube.com/watch?v=HPQbKTJPsU4&t=21s

What your colleagues made last year



Project examples: mini conveyor



https://www.youtube.com/watch?time_continue=1&v=GHWAhXgC2Zs

What your colleagues made last year

Course content

- Mechanisms
- Machines
- Machining processes (conventional and not)
- Microfabrication
- Additive manufacturing
- Metrology

Reference texts:

1. Manufacturing Engineering and Technology by Kalpakjian and Schmid
2. Fundamental of Modern Manuf. Materials, Processes and Systems by Groover
3. Several other books. You might benefit more by watching the videos and looking the at slides again.

Course schedule. Indicative.

Lecture Number	Planned lecture release date	Topic	Assessment	Delivered by	Schedule of discussion hour (8 am to 9 am) and date of Quiz
1	1st Sept. 2020	Introduction. Course overview.	-	ML	8th Sept. 2020 (Discussion hour)
2		Mechanisms	-	ML	-
3A		Machines and Machining Processes	-	ML	15th Sept. 2020 (Discussion hour)
3B		CNC machines	-	ML	
4		NC programing	Quiz 1	ML	22nd Sept. 2020* † (Quiz)
5		Mechanics of machining	-	ML	6th Oct. 2020 (Discussion hour)
Mid-semester exam period			Quiz 2	ML	13th Oct. 2020* † (Quiz)
7	13th Oct. 2020*	Overview of non-conventional machining processes	-	NS	20th Oct. 2020 (Discussion hour)
8		Physics of select non-conventional machining processes	-	NS	-
9		Overview of additive manufacturing	Quiz 3	NS	3rd Nov. 2020*† (Quiz)
10		Physics of select additive manufacturing processes	-	NS	10th Nov. 2020 (Discussion hour)
11		Micro/nano fabrications processes	-	NS	-
12		Engineering Metrology	-	NS	24th Nov. 2020 (Discussion hour)
End-semester exam period			Quiz 4	NS	1st or 8th Dec. 2020* † (Quiz)

* All dates are tentative. They will be confirmed as the course progresses.

† If you miss these for bona fide reasons, make up quizzes will be governed by policies outlined in the UG manual.

Course objectives and outcomes

- To celebrate manufacturing.
- To introduce concepts and working principles of mechanisms and machines that are used to make things.
- To introduce machining processes possible on those machines.
- Developing a bottom-up thinking approach to engineering.
- To appreciate how manufacturing adds value to material.
- Gain some basic understanding of the physics of secondary manufacturing processes.

Course evaluation (indicative)

- Quizzes (x 4): 90%
  - Quizzes will be online, via https://hello.iitk.ac.in/
  - Each quiz will have 10+ questions. There will be multiple sets of questions for each quiz, and you will be a assigned a random set.
  - Quiz will be announced, and you will be given ~45 min within a window of 3 hours to attempt it once.
- Participation in class related discussion forums: 10%
  - Based on analytics of lectures viewed, and the quality of your contributions to discussion forums*

* formal criteria will be communicated in time

Grading:

Grade	Cumulative total
A*	≥ 95
A	≥ 85
B	≥ 70
C	≥ 50
D	≥ 40
F	< 40

Stay safe, healthy, and well. For anything, reach out.

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