

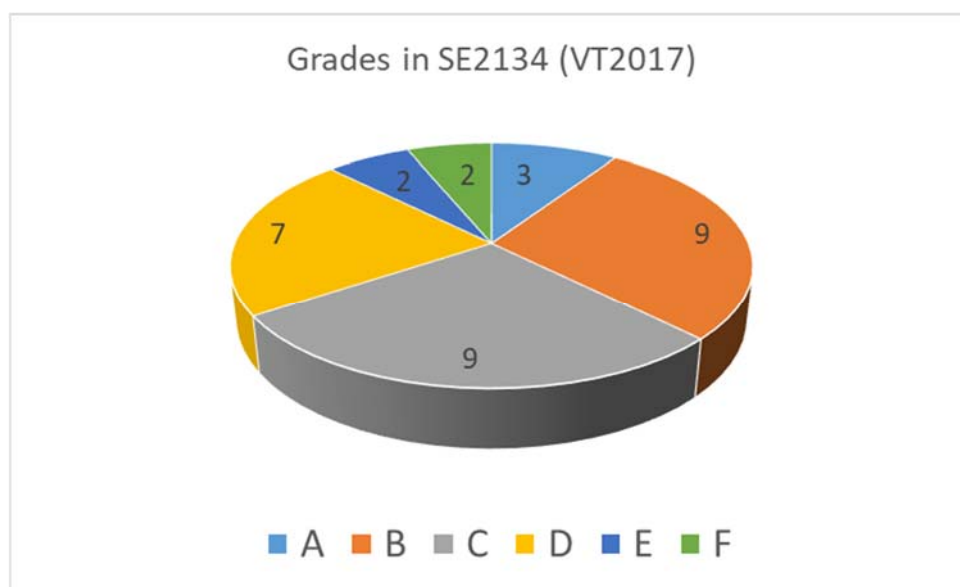
# Course evaluation for Dynamic Problems in Solid Mechanics (SE2134, 7.5 credits, VT2017)

Artem Kulachenko (Examiner)

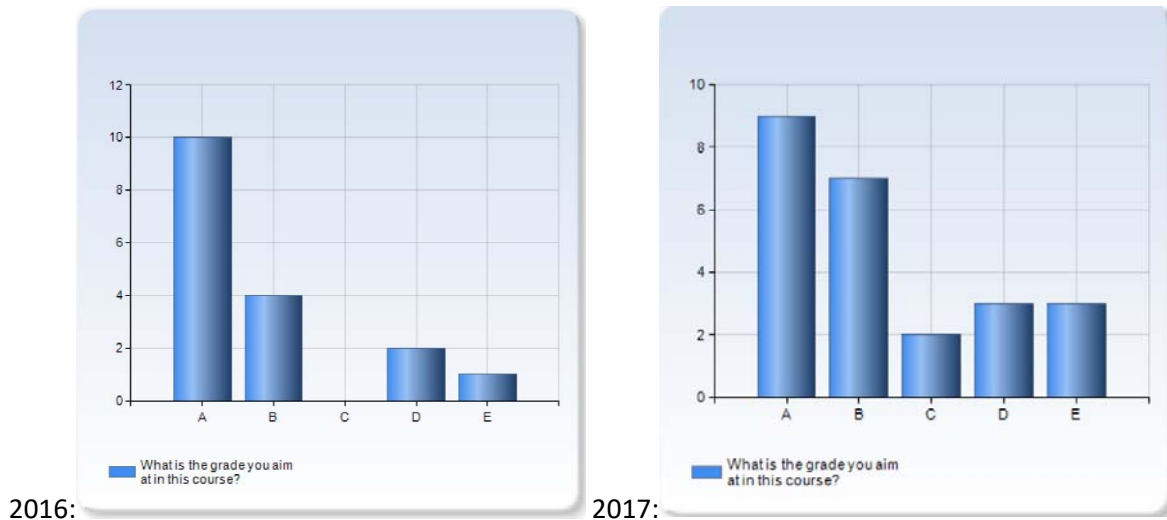
## Background

This was the sixth year I was responsible for the course. The overall structure of the course described in the previous evaluation was preserved, although some changes had to be made because of a larger number of participants.

The grade distribution is similar to the one observed in earlier rounds.



The response to the question about the intended grade posed in the course evaluation questionnaire reveals, for the second time, that a number of the students did not reach the desired goal. At the same time, it shows that the level of ambitions of the students attending the course is generally high, which is reflected in many students attempting to solve all the problems. It is interesting to investigate whether it changes through the course and how the expectations are aligned with the workload during the course. One potential of improving the grade is the exam, and as we attempt to keep the variation in the exam problems, it requires thorough preparation, which not all the students are willing to take knowing that they will have a satisfactory grade from the homework already.



Response to the question about the aimed grade in the course in 2016 and 2017.

The homework remains the most beneficial and, at the same time, interesting activity according to the students. This very much reflects the philosophy of the course, and the future efforts will be about developing the homework problems with relevant engineering problems.

The course is perceived as hard (>7.5 points) but judged from the response, it was not demotivating, on contrary, and the time spent was valued. It is important to recognize that the effort to pass the course with an average grade of C would probably be closer to 7.5 points.

### Problems identified during the previous course round and adopted measures

**Problem 1.** Home tasks were perceived as being difficult by many students. Some of the students complained about not having a clear idea of the criteria used in the evaluation.

The current group of the students was exceptionally good, which became clear after the first homework. We decided to increase the complexity of the tasks to challenge the students and match their capabilities. It soon became clear that we slightly underestimate the time required in the task. Furthermore, the newly introduced problems contained hidden traps, which we did not foresee. The complexity of the task completed the correction, which made it very time-consuming. As the number of students may increase, we have to secure that this problem does not repeat.

**Solution proposed:** We will complete most of the problems with a FEM solution in a form of an uncommented script. This will solve two problems. First, the students will have a reference solution. Second, the students will familiarize with the solution technique, post-processing, and pitfalls of the FEM. We have already tested some of the problems using this method, and we noticed that the interest in attempting the problems accompanied with FEM solution was greater on average.

When it comes to criteria, we decided to abstain from posting them explicitly. We expect to have higher quality and originality of the presentation when students rely on their own quality criteria. However, in giving the feedback, we will boldface the essential points to be addressed.

**Solution implemented:** The implemented solution was similar to the proposed. We had a FEM solution provided for 4 out of 9 tasks in a form of an ANSYS script. The feedback system was changed, as we had to adapt to a greater number of participants. We did not provide a detailed feedback on the first submission. Instead, we graded it on the pass/failed basis judged from the presence of the essential steps in the solution. Students who failed on the first submission were not eligible to send in the complete solution. The general feedback was provided to every passed student.

**Problem 2.** Proficiency in using ANSYS is degrading.

Since ANSYS is no longer used in the FEM modeling course, there is no possibility for the students to acquire the minimum skills required for the task. This year, we struggle to find the students to lead the lab teams.

**Solution proposed:** We hope that the measure to address the previous problem, which involves developing and publishing the model as a part of the homework task will contribute to the improved prerequisite for the lab. We will also consider publishing step-by-step tutorials prior to the lab.

**Solution implemented:** We provided the ANSYS scripts with the FEM solutions of the problem to those passed the first submission round. We made the labs available a week ahead of the schedule so that the students can familiarize with the task and try things at home.

### Other enhancements

The problems for the tutorials were modified and put into a structured manner to facilitate the transfer to the new teaching assistant, who should step in after Prashanth.

One-half of the 5<sup>th</sup> lecture was devoted to seminar activity, working in a group and leadership. It was partly based on the material from the leadership course given to the Associate Professors at KTH.

We granted a limited access to the students outside the track to the meeting rooms at the department to facilitate networking and discussion during the course.

During the introduction, we were explicit about what we expect from the homework submission, namely, originality and self-assessed quality. We draw attention to the previous feedback pointing out uncertainties in the expected quality and emphasized that it should be primarily assessed by the self-control at the stage of development the students should have by this time-point. Together with the modified submission procedure, it has a positive impact on the quality of the submission.

### General observation in response to the changes

Despite the effort of introducing the FEM codes, the solutions were used by only a few students unless it was not a part of the task. This observation is based on the indirect evidence, however. This indicates that the strategy of improving the proficiency in solving dynamic problems using finite element through coupling them to the analytical solution does not work unless enforced through the mandatory course activities. This needs to be reflected

in the future homework tasks, where establishing the connection between theory and numerical methods is integrated into the assignments rather than being optional.

Changing the submission procedure with pass/fail on the first submission had a very positive effect. The quality of the submission was increased, and the workload became more evenly distributed. If previously, we saw a number of students delivering a last-minute attempt to solve the problem on the first submission with the low-quality presentation, it was not the case with the new system. The first-round submission was much closer to the complete version, and the workload prior to the final submission was significantly lower. Therefore, it will be adapted in the following rounds regardless of the number of participants.

Based on the responses from the students, the required prerequisites of having solid mechanics and finite-element analysis courses in the background seem to be adequate.

### **Problems identified during the current course round and proposed measures**

**Problem 1.** Certain students regret not receiving individualized feedback and mentioned unfair help given to the students who sought it.

As we moved away from the individualized feedback, some, very motivated students did not receive enough feedback on their original solutions. At the same time, some students used our help extensively during the preparation of the submission.

**Solution proposed:** We will recognize the motivate students and spend time providing the individual feedback to match their effort. At this point, we do not see why we should limit the students seeking help from the teachers. We should be, however, cautious not giving the ready solution in this process making the grading system unfair. So far, this has not been a case.

**Problem 2.** Timoshenko book is too expensive.

With the increased dollar exchange rate, the cost of the book became unbearably high. We attempted to contact the library and order the electronic books. It appeared to be impossible for the given publisher.

**Solution proposed:** Since the book proved to be a valuable asset in the course, we do not see an easy solution to this problem. We will, nevertheless, attempt to build an alternative recommended reading scheme based upon the books available in the electronic form. This question will be researched toward the course start.

## **Students' responses to course evaluation questionnaire**

Note: the original punctuation and wording are preserved.

## Course evaluation for Dynamic Problems in Solid Mechanics (SE2134, 7.5 credits, VT2017)

Respondents: 34  
 Answer Count: 24  
 Answer Frequency: 70.59 %

### Please, tell the reason why you decided to take this course.

Please, tell the reason why you decided to take this course.

I am interested in dynamics in general and wanted to get a broader base of understanding.

To get more knowledge in this area, which I am quite interested in, and experience many interesting examples.

I wanted to try something new since I have never done dynamic courses before.

I read experimental structure dynamics and i got curious on the different theories that we applied there such as mode superposition and orthogonality. I thought it could be interesting to learn how we use analytical models on complex systems.

It was an exchange module related to my education. i have a keen interest in solid more then fluid.

I've heard alot of good stuff about this course and about Artem and Prashanth so I wanted to take it.

had not taken any dynamics course before, and it felt like an important "field" of solid mechanics with a lot of uses.

Rumour said this was a good course, with alot of good teachings.

It was mandatory for me to take a course in solid mechanics in order to complete my Bachelor's degree in mechanical engineering (I'm an exchange student). The course description sounded interesting and I wanted to deepen my knowledge about dynamic aspects in solid mechanics.

The master students 1 year above told me it was a very good, (but time consumption) course. I checken the course content and agreed on that it seemed interesting.

I have served for two years in automobile industry before taking my masters. I have seen how important the knowledge of dynamic systems is in order to thrive in industry. I always felt something missing within me-which surely was lack of understanding of dynamic systems and operations. This course not only provide the stepping stones towards understanding of physical systems, but also introduces the concepts such as signals and vibrations which I had never studied as a student.

To be able to apply my solid mechanical knowledge onto dynamical cases rather than only static cases.

I had heard good things about the course and wanted to develop my understanding of dynamic phenomenas.

Dynamics is one my subjects of interest and hence I choose this course.

I am an exchange student and my home university asked me to find an equivalent course to "Solid Mechanics" and "Dynamical Mechanics". And this course was supposed to mix both of the mandatory courses my university wanted me to take. Plus, previous exchange students from my university took it and it was approved by my school that is why I chose this course.

For our bachelor exchange our home university ask for equivalent courses to the one we should follow normally. I took this course because it seemed to cover the same subjects as one of the mandatory course from my university.

I had to find an equivalent to a course that was mandatory in my home university.

I thought the content as well as the teaching methods were interesting and challenging in a way that would help me improve in a lot of aspects and not just the course itself.

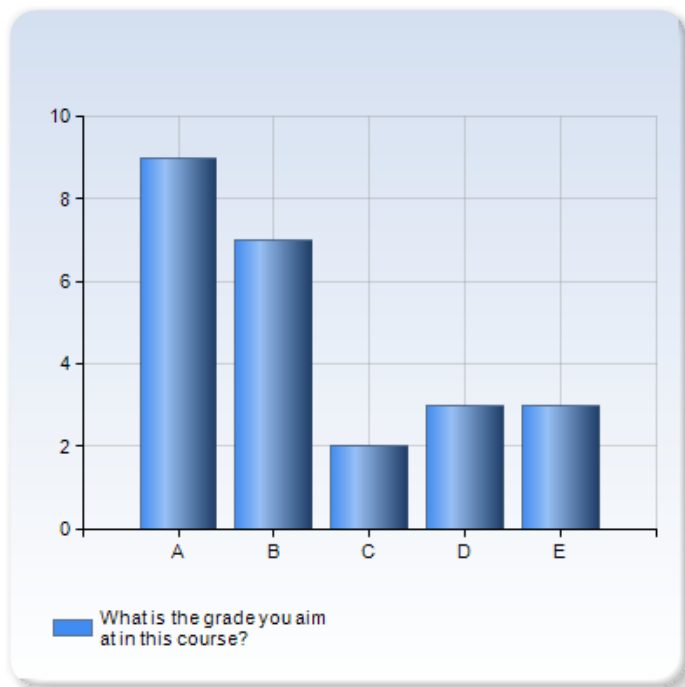
I had heard great things about the course, teachers and teaching assistants. In addition, I believe dynamics is a fun topic that is a absolute requirement to graduate as a mechanical engineer.

I'm an exchange student and tried to follow the "solid mechanics track" as best as I could. I took this course because it seemed one of the most interesting one within the recommended courses.

20 (24)

## What is the grade you aim at in this course?

What is the grade you aim at in this course?	Number of Responses
A	9 (37.5%)
B	7 (29.2%)
C	2 (8.3%)
D	3 (12.5%)
E	3 (12.5%)
Total	24 (100.0%)



	Mean	Standard Deviation	Coefficient of Variation	Min	Lower Quartile	Median	Upper Quartile	Max
What is the grade you aim at in this course?	2.3	1.4	61.5 %	1.0	1.0	2.0	3.5	5.0

**Comment**

Reaching the end of the course, I do not know the current status on all home assignments, so guessing that B might be realistic if I get the theory question right on the exam.

I think every person should aim for the best possible mark.

I always aim for a high grade but I had heard before taking this course that it was very time consuming and difficult so I set my ambition at A but I will not be dissapointed with my grade since it was a good learning experience.

I always aim to do well. However, this time, the modules are harder then expected.

The aim was B or A

Not really aiming at a grade, just that i do my best

Since the assignments were rather challenging for me, I didn't expect to get much over passing grade.

Very much work on the home assignments. So feel like I want to take it calm on the examination period. Therefore I want aim for an A.

I wanted to spend maximum time in this course given that it was the first actual course about dynamics. All other dynamics course to follow such as rigid body dynamics require a basic understanding which can be fulfilled only by deep understanding of this course.

I always study as if I'm aiming for an A, although I'm fully satisfied with any passing grade.

Since my home university wants me to pass the course and does not require anything more than E (pass), I was aiming the grade E because I knew this course was really hard so I did not put any expectations on having a higher grade like A or B.

This course is quite good and the homework are quite interesting to do because they teach us how to think effectively and investigate with efficiency on barious problems. I just think that their is some few links between the course book (compendium) and the class given, and in the end we just stay on the "introduction" of the notions without really working and understanding them. Of course we can work on our side and that is what we Have to do in the end but we cannot know if we really understood the notion or not (maybe we interpreted it the wrong way but we will never know) and this might be a problem.

I need a Pass

As an exchange student I had to take courses from different departments which lead to collisions in the lecture hours and it was not so easy for me to follow the course, consequently it would be hard for me to reach a higher grade.

It was possible to get a B in the course without writing the exam, so this was my goal from the start since i have some other time consuming exams to focus on.

What is the grade you aim at in this course?

- 1
- 1
- 1
- 1
- 2
- 2
- 1
- 2
- 5

Comment
2
1
5
4
2
5
2
3
3
1
4

20 (24)



## Please, list the previous courses which you think are needed to succeed in this course?

Please, list the previous courses which you think are needed to succeed in this course?

Material mechanics, FEM modeling, applied elastic, basic FEM, vibration Mechanic

I think mathematics courses are the ones which should help. I did my bachelor degree in different country, so it is quite hard to say which course I should recommend.

Solid Mechanichs intro, Mechanics 1, Differential equations, Linear algebra, FEM (maybe an ANSYS intro) .

FEM course. Software course. eigenvalue/ eigenvector math.

I think alot of courses are needed because of the diversity of the homeworks.

The mathematics courses in Linear algebra, calculus and specially in differential equations. Course in mechanics and base-course in solid mechanics.

Basic course in Solid Mechanics

Differential equations

Analysis in one variable

Linear algebra

- Introduction to ANSYS

- Introduction to basic dynamics, vibration problems and continuum mechanics.

Grundkurs i hållf.

Mechanics 1 and 2.

Linear algebra.

Envariabeln.

Flervariabeln.

A good understanding of linear algebra and differential equations is a must. I believe many students like me have not realized the practicality of linear algebra-this course forced me to learn linear algebra with a different viewpoint and I loved it. Other than that, basic physics, basic FEM and Applied elasticity with FEM in particular are some courses required for succeeding in this course.

Mechanics 1, 2

FEM for engineering applications (to familiarize with ansys atleast)

Basic Course Solid Mechanics

All math courses, Mekanik 1,2 and in general the solid mechanics courses.

Solid mechanics basic course, Engineering mathematics(linear algebra) and Finite element method.

I think we need FEM course (SE1025) but also so basic knowledge in Structure Mechanics (I don't know if KTH has this equivalent however...). I only did SE1025 that was close to this course this year.

FEM and diverse structure courses. A class about sound and vibrations can be useful too.

Any bachelor course in solid mechanics, and solid linear algebra understanding.

Finite Element Method course

Basic course in solid mechanics

Calculus

Statics

FEM course

Physics (Newtonian)

I'm not very familiar with KTH courses. I would just recommend basics in Solid mechanics, basics in FEM (to manage to do and understand the labs), and basics in maths (resolution of differential equations).

Mechanics I & II.

Differential equations.

Solid Mechanics basic course and applied elasticity.

20 (23)

## Were the objectives of the course (as stated per course description) aligned with the course activities? Please, elaborate on your answer.

Were the objectives of the course (as stated per course description) aligned with the course activities? Please, elaborate on your answer.

The questions during lecture are quite related to the Timoshenko book, not very difficult.

Yes. However, I think that tutorials could have been improved. Some of the tutorials (not all of them) were a bit hard to follow since the pace was too rapid.

I think so, most of the objectives were covered by the labs and the lectures/recitations/homework.

yes, the objective were aligned with the fundamental aim to help the student learn.

Yes it was. You always went through valuable information before the homeworks were supposed to hand in.

It felt like everything stated in the course description were handled during the course. Usually in more than one way, often handles both through homework's and lectures/labs/reading .

I feel like ive evolved my conceptual understanding and problem solving alot, so yes.

Yes, the course offered a good combination of lectures, tutorials and group work while introducing several commonly encountered problems and the corresponding solution methods.

Yes, as I understand its very well corresponding to the course description. However its much more time consuming, before the examination period, than most people would think knowing its an 7.5 credit course.

The main objective of this course is to introduce students to various interacting systems-whether electrical, electronic or mechanical. I think after taking this course, I can think beyond static design considerations, will be able to interact intelligently with cross-functional departments and will be able to analyze the problems with multiple standpoints.

I think so.

Abosulety yes!

Lecture and quizzes- lectures helped to understand the concepts in a better way and in quizzes concepts were thought in the interactive way of learning.

Labs- helped in understanding how the complex real world problems are solved using FEM tool. How one should formulate the problem and what conditions to be fulfilled to solve and interpret the problem and also what really happens behind the screen.

Tutorials- It improved my analytical thinking and problem-solving skills, also helped in solving assignments.

seminar- was a good opportunity to work in a group.

Yes they were. In fact, Artem told us at the beginning of the course that he does not like to grade on an exam at the end of a period and thinks that you can pass the course with the work provided during the period. That is actually the case, but I was not expecting that much work load. But on the fact that you are supposed to know how to think and how to approach a problem, I really think that I improved a lot on how to simplify a problem and how to solve it. I also understood better the DOF and what they represent and I really got better on using Ansys. However, I would not say that I am better now in performing spectrum and random analyses on Ansys. In fact, according to me, a lab is not the best way to improve your skills on a domain because you work in a group so if it goes too fast it is hard to follow. A good idea might be to put an exercise in an Home Assignment about it, because you will do it by yourself and you will certainly have to ask questions to the TA or the teacher in order to solve it. And because you will do it alone, you will improve your skills better than doing it in a group.

Yes, the course was very

The course objectives were fulfilled by the course activities in my opinion. The assignments helped in improving analytical and theoretical skills, the seminar in corporation and research and the lectures and recitations in understanding and further discussing the content of the course.

Yes

The main objective I remember about the course is that you wanted to increase the number of students that really understand the content of the course within those who pass.

Concerning the lectures and the tutorials, the objectives were perfectly aligned with the activities: tutorials and lectures were focused on the understanding of phenomenon, equations, etc..and not on the pure development of the theory (which had to be studied at home).

Concerning the home assignments:

-At the beginning I thought it was really efficient to submit our work twice because it would have helped us to understand our mistakes. The problem is that the feedbacks were not individual. For example to solve an exercise I tried a different method than the main part of the other students. Then the feedbacks mentioned how to deal with the method of resolution I didn't use. So did it mean my method was wrong ? I finally did all this exercise again with the other method and I still don't know what is wrong in my first approach (if it is).

-On the other hand, if we want to get a pass for an exercise, we had to get exactly the same solution than what you expected. For the first submissions I tried to understand and did my best to find the best approach on each tasks. But when it comes to the second submissions, many of us (and I did) focused mainly on "what do we have to find ?". Then I think I was more focused on the solution than on the real understanding of the problem because I didn't want to get a fail whereas I spent days on the first submissions.

-Finally, the tasks were often difficult and every students needed the help of Prashanth. The issue is that it was quite unbalanced because the more someone discuss with Prashanth the more information he has about the resolution of the exercise.

My suggestions would be:

- the information which are given to a student must be given to the others (by the student himself for example). And it would also avoid Prashanth to repeat 20 times the same explanation.

-I also think that the time that could be save could be use to do short individual feedbacks.

I here mentioned many shortcomings concerning the homeworks but it was very interesting and rewarding. Thanks to Prashanth and its knowledges who was very helpful !

Yes it was. I think we pretty much wrapped up every course objective.

There was too little focus on the analysis of the results, like how can the structure be improved.

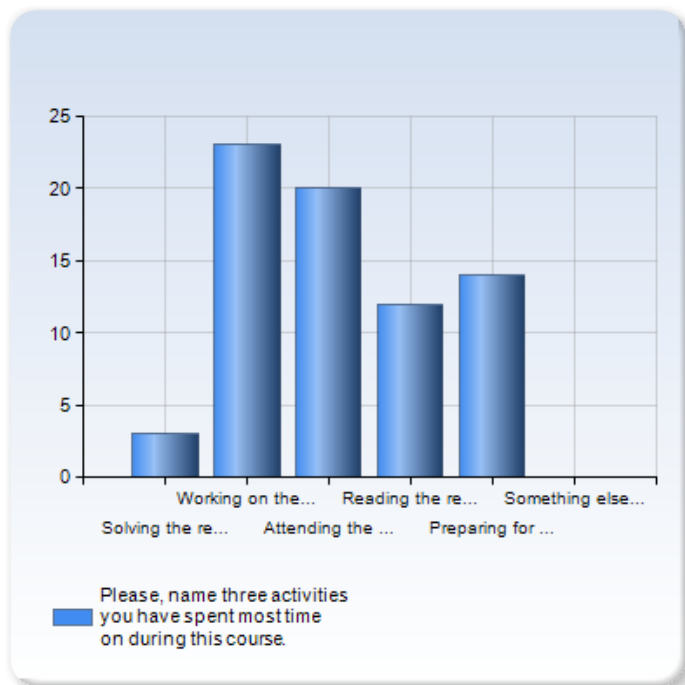
Yes I think so. The homework helped with the objectives of learning how to formulate and analyse problems. The laboratories helped with the FE-part of the course. Lastly, the seminar part gave a more summarized and wholesome view on normal dynamic problems and helped add to the substance of the course.

Were the objectives of the course (as stated per course description) aligned with the course activities? Please, elaborate on your answer.

20 (21)

### Please, name three activities you have spent most time on during this course.

Please, name three activities you have spent most time on during this course.	Number of Responses
Solving the recommended problems.	3 (12.5%)
Working on the homework assignments.	23 (95.8%)
Attending the lectures and recitations.	20 (83.3%)
Reading the recommended material.	12 (50.0%)
Preparing for the seminar.	14 (58.3%)
Something else (please, specify)	0 (0.0%)
Total	72 (300.0%)



	Mean	Standard Deviation	Coefficient of Variation	Min	Lower Quartile	Median	Upper Quartile	Max
Please, name three activities you have spent most time on during this course.	3.2	1.2	37.9 %	1.0	2.0	3.0	4.0	5.0

Comment

Homework took the biggest part of the time. Seminar was the second activity that took most part and just attending the lectures was not so time consuming.

Didn't really have time to solve the recommended problems during the course.

Homework took by far the most time

I would say, working on home assignments took maximum of time. But that is not the complete story. If I had to solve a problem, I had to go through lectures, tutorials, youtube videos, research papers and basic mathematics. I took all the effort which I put very positively, learned a lot in the process and probably gained maximum knowledge in these 2 months. Spending this much of time is truly justified.

Although I picked three, working on the homework assignments took around 80-90% of the time.

Reading the material was a great complement and prepared me well for every lecture.

If you don't have any notions in dynamic and you have to read the recommended material before each lecture, then it can be very time consuming (Impossible ?)!

Home Work assignments were around 80 % of the time spent on this course. 5 % prepare for lecture and maybe 15% reading the course material

The by far most time-consuming part of the course is the homework assignments. Although they where very instructive and learned me a lot they gave me no chance to focus other courses I was taking at the time.

Please, name three activities you have spent most time on during this course.

- 2
- 3
- 5
- 2
- 4
- 5
- 2
- 3
- 5
- 2
- 3
- 4
- 1
- 2
- 5
- 2

Comment

---

3

---

4

---

2

---

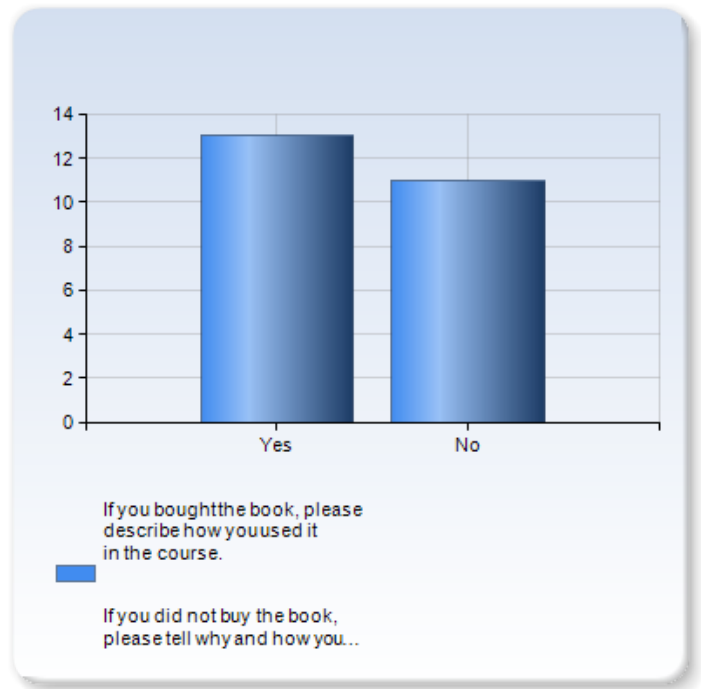
3

---

20 (72)

## Did you purchase the Timoshenko book?

If you bought the book, please describe how you used it in the course.	
If you did not buy the book, please tell why and how you went about it.	Number of Responses
Yes	13 (54.2%)
No	11 (45.8%)
Total	24 (100.0%)



	Mean	Standard Deviation	Coefficient of Variation	Min	Lower Quartile	Median	Upper Quartile	Max
If you bought the book, please describe how you used it in the course.								
If you did not buy the book, please tell why and how you went about it.	1.5	0.5	34.9 %	1.0	1.0	1.0	2.0	2.0

### Comment

- Mostly reading before lectures. Sometimes using it for support in the home assignments.
- The book was relatively expensive and quite hard to get. In most of the cases, when I had to refer to the book, I borrowed it from my colleges and read the required chapters.
- It is a very good book which I used a lot in solving the homeworks and preparing for the lectures. I think it is probably the best course material I have read so far.
- it was too expensive and i could not afford.
- I used it as help in the homeworks but also it was a nice book to have to learn more about different subjects.
- Read before lectures and used examples to get a better understanding about how one could go about solving some of the homework assignments.
- It was out of stock. That's the only reason. I borrowed the book from a friend when needed.
- The book is too expensive compared to the number of times I expected to use it. I mainly used the compendium to prepare for the lectures and the one time I used the book I was able to borrow it.
- I used it for understanding the homeworks, I did not have time to read the recommended material.
- I had an e-copy of this book. Nevertheless, the lectures were elaborated and I took some notes from Internet as well. However, I strictly recommend everyone to buy this book and finish it-not just buy it.
- The book was vital to pass the course. I'm not too sure how you'd pass this course since I don't think the lectures nor the tutorials were sufficient enough of covering the stuff that was expected from you.
- For me the homeworks would have been impossible without the book.
- I just followed the instructions provided in the course PM and I also referred to the particular section when I was solving assignment problems.
- I did not have the money to buy this book and I also thought I could borrow it to other students. Plus, it is a Master Course that my university wanted me to follow but I know that next year I will not do a Master in Solid Mechanics so I thought it was too much money for just one period. I would have bought it if I was going to do a whole Master in this area, but it will probably not be the case.
- The master I am interested in is not following the same subject as this course. I did not feel the need to buy this book for only a few weeks use.
- It was too expensive and Solid mechanics is not exactly the field where I am specializing.
- I found it was a bit expensive and as an exchange student I wasn't sure I could afford it. I searched on the internet or other reading material when I needed something.
- I used the book as a complement to the lectures. The book is truly great, and I don't regret it for a second I bought it. It was my "go to guy" for any question I had. Now looking back at the book, I believe I am able to explain the physics of every chapter, which amazes me. This would not have been possible without the book, and I think my knowledge of dynamics would have been nowhere near the level it is today without it as a complement.

Comment

---

The book was too expensive for me. I found the compedium enough to deal with all the homework assignments. But if you are not familiar with Dynamics and you need details of the content of the course, then I think the compedium is not enough

---

Study with someone who has the book or buy it yourself.

---

20 (21)

If you bought the book, please describe how you used it in the course.

If you did not buy the book, please tell why and how you went about it.

- 
- 1
  - 1
  - 2
  - 1
  - 2
  - 1
  - 1
  - 2
  - 2
  - 1
  - 2
  - 1
  - 1
  - 1
  - 2
  - 2
  - 2
  - 2
  - 1
  - 2
- 

20 (24)

## What are the activities you benefited the most in this course? Please, reason your answer.

What are the activities you benefited the most in this course? Please, reason your answer.

Lectures The lecture material was interesting and a nice touch with the socratic questions.  
The homework problems also gave alot of time to work with the theory.

Both home assignment and seminar. we can learn from each other

I think that the homework. Basically I did a lot individual research on the problems before starting it. And if I got stuck, then I talked with my friends about it, tried to refer to the book or simply search information on the internet.

I think that the lectures and recitations were good because the teachers talk about very interesting things and really try to connect the knowledge from earlier with the one being taught. For example, we talked about the principal of virtual work, linear algebra and differential equations. I also benefited a lot from the homework because some of them were very challenging and difficult but it was fun to discuss the problems with the other teachers and students. I think I learned a lot from that.

the home assignments allowed be to discuss and work on the problems with other.

Homeworks most definitely, that is maybe because I put alot of time in them.

probably most from the homework since i usually remember things better after having done them a couple of times, but the homework probably would not have benefited as much if i didn't have some idea before hand from lectures and reading about how i could go about solving them.

The homework, the homework, and the homework. I'm a learner by doing myself. Listening and reading doesn't do much to me. Also, I spent most of my time doing these.

Solving the homework assignments (as much as possible on my own) because it challenged me in several engineering skills I obtained during my education so far and it also gave me the possibilty to spend a lot of time on a problem and in that way test my persistence to find a solution.

The homeworks. They made it necessary to dig into the coursecontent and understand the theoretical on a deep level.

Learning the methodology behind a FEM software is essential, both in static and dynamic environment. This course helped me understanding the computations done by a software. Working with signals was another aspect which was crucial. This course does not have any finite limits. I was able to learn vivid aspects of solids, fluids and vibrations in total.

The homeworks. They pointed at what things to learn during the course.

The homeworks was demanding to the point of being very beneficial. By working on problems that was "too" hard I learned a lot in a short time.

Lecture- One of my best learning experience. concepts were thought in a clear way through real examples and test our understanding by instant quizzes.

Labs- helped in understanding how the complex real world problems are solved using FEM tool. How one should formulate the problem and what conditions to be fulfilled to solve and interpret the problem and also what really happens behind the screen.

Home assignments- was the toughest activity during the first submission, but once the feedback was out it was much easier.

I think the most important activities are the HA and the exercises sessions because they provide you with all the things needed to understand the most important things in the course. And they also make you work a lot so you understand better what is said during lectures.

The homeworks are the most interesting part of the course according to me. They teach a lot because of the side research we have to do, the time and mathematical research as well as developp Our abilities with matlab and Ansys. They also teach us to face problems we weren't used to before and be accurate.

The homework procedure: searching ways to solve a problem, compute it all on Matlab and of course learning how to present it in a clean way was something new to me. I feel way more confident with Matlab, Latex, Ansys (that was completely new for me) and of course in general with dynamic problems.

The homework assignments because they were challenging and motivated me to constantly want to improve and learn more.

I benefited a lot from the homeworks. However, reading up for the exam was also very rewarding. The fact that it's 1 out of 20 questions that is picked for the theory part suited me perfect. I read up on all 20 and learned a lot form that. I became a better problem solver during the homeworks, but due to their mathematical complexity i am not sure how efficient it was for learning dynamics. Reading for the exam gave me the holistic overview of the subject, which was a really good way to end the course.

Homework assignments: I spent most of time on it. However as I said before, the weeks before the second submissions didn't give me so much benefits since I was more focused on the solution of the problem and the writing of the report.

The lectures: lectures are not boring, if you are familiar with the content of the course then the lectures are very interesting. It gives all the meanings of the theory but also real example.



## Was there anything you lacked in the feedback on the first submission in order to finalize the solutions? In addition, what do you think about the possibility of having a peer-review session right after each submission in which you would check each other's homework and provide unofficial feedback in order to speed-up the correction procedures?

Was there anything you lacked in the feedback on the first submission in order to finalize the solutions? In addition, what do you think about the possibility of having a peer-review session right after each submission in which you would check each other's homework and provide unofficial feedback in order to speed-up the correction procedures?

I think there is quite enough for the student to do in this course. I did not find the wait for feedback troublesome since there was always a new homework to work on.

I think we should check our file before hand in.

For the first submission of the first homework, I lacked feedback on the 3rd problem. I did it in quite different way than the others, therefore, I did not have an opportunity to discuss about it with my colleagues. At one point, I was stuck and could not go forward.

The peer-review sessions sounds good to me. However, I talked with other people on how they solved the problems all the time so I do not know if I would ave benefited from this activity. The discussion with others helped me a lot to understand things better and made things more clear.

I came pretty far on the first submission and the feedback was enough to finalize it. I don't know if I think it is necessary with peer-review but I base that on the fact that I discussed the problems with a lot of the other classmates. Not everyone does that so maybe it could be a good idea.

i think peer review is unnecessary because the students are working with each other to solve the questions. eventually, having the student that worked with you to check your work is pointless.

To have a faster correction procedure would be gold worth because now we probably will get the homeworks pretty close on to the exam. I personally didn't like the feedback given due to its generality but I understand its not doable to have personal feedback when we were this many students.

Having a peer-review session could probably be a good idea. Since the feed-back this year weren't personal you sometime were a bit unsure if you had solved the problem in a different manner then the general feedback proposed. Also seeing and discussing different ways of seeing / solving the problems tend to at least give me a better understanding.

Not really, I think that it wasn't harder than going upstairs to ask if there was anything unclear.

Regarding the peer review, I think the option should always be available (and optional).

I thought it was a pity that we couldn't receive individual feedback, even though I understand that this is not possible with that many students. The general feedback was well structured and helpful to improve the second submission. A peer-review session would be a good extension of the feedback and add another aspect to the course, since one has the chance to exercise in reviewing the work of others.

That would be great, just if it would not take to much time!:)

I think the feedback was appropriate, with additional questions to ponder upon. However, after the final submission, solution copy should also be provided-maybe the best response may be uploaded by teacher if there is unavailability of time with him.

The peer review is an excellent method in my opinion, given the work load on teaching assistant could be incredible. Also, we can learn a lot by going through others assignment. However, a general feedback as provided by teaching assistant is still more credible.Maybe a willing student from 2nd year can be appointed to provide individual feedback.

The quality of the feedback did not meet my expectations, considering the fact they were targeted towards the whole class and not me personally. This is most likely due to the unusally high participants of this year's master courses, and might be solved by having a peer-review session as suggested.

I think both personalized feedback and especially peer review would have increased my understanding.

feedback was collective mistakes or shortcomings from the whole class, which was good to know how the other peers think and how could one go wrong.But individual feedback would have benefited more on my personal view. peer review session would be really great.

I talked with people from last year who took this course and they told me that they had personal feedback before. I think it was really missing this year because a general feedback does not tell you where your were right or wrong. Thus, you sometimes lose time on correcting something that was right instead of trying to understand better what was wrong. I really think that since to pass the exercises it needs to be 100% correct, a personal feedback is more appropriated. But still, Prashanth was really helpful and patient with me to explain me everything I needed. So if you choose to not give a personal feedback, the TA has to be as we was during this period, i.e. very present to answer questions and help you, and it is something I really liked during this course.

I think a peer-review is a good idea if it is added to the feedback of the TA. If it is only peer-review, it will be impossible to do 100% correct to the questions at second submission.

I really think that the feedback on a non-individual basis is really difficult to use. It is really hard to see where we are wrong in our answers using only the feedback (the second and third feedbacks were particularly difficult to interpret). I don't think a peer review might be useful after a feedback because student might be confused by the feedback and a bit lost so they might bad peer review on others and lead them to mistakes.

The feedback on the first submission was helpfull but there were alot of things that were unclear, since the feedback was not individual, I did not know exactly what was expected for me to change on my submission, what was right or wrong. On the other hand, Prashanth and Artem were always very welcoming and open to discuss the problems which was really helpful.

The peer-review can be a very good idea, but I think most of the students would compare their results and discuss them with their peers anyways.

The feedback was clear and helpful. It may have been better if there was an individual feedback for each student, but I know this was not possible due to the number of students. Having said that a peer-review session would be a good chance to discuss any confusions an receive a second opinion, something which would also help in writing a complete and correct report and speed-up the correction procedure.

The peer-review part is good in theory. However, i am not sure how applicable it is. Most of us solid mechanics students was already arguing and solving problems in pairs. I believe a mandatory peer-review would feel more of a hassel than a rewarding session.

I did not feel that the feedback lacked anything. I was able to spot my mistakes, and further go through the problems by looking at the feedback. The feedback was great, Prashanth has been steady as a rock in this course, and i would really like to complement him on his approach to helping and guiding us through the problems.

The first feedbacks are not enough. When someone is stuck on a problem he, most of the time, needs more than written explanations. Since it does'nt seem possible to have individual feedbacks, a peer review session would be a very good compromise.

Was there anything you lacked in the feedback on the first submission in order to finalize the solutions? In addition, what do you think about the possibility of having a peer-review session right after each submission in which you would check each other's homework and provide unofficial feedback in order to speed-up the correction procedures?

---

20 (23)

**Please, suggest how the course can be improved (homework, lectures, tutorials, labs, seminar, etc.). In addition, if you think that the course load does not correspond to 7.5 credits, what are the activities that should be dropped in order bring the workload to the expected level?**

Please, suggest how the course can be improved (homework, lectures, tutorials, labs, seminar, etc.). In addition, if you think that the course load does not correspond to 7.5 credits, what are the activities that should be dropped in order bring the workload to the expected level?

I found the lectures, tutorials and labs to be great. I think one could spend a bit more lecture time on the material regarding random response and spectrum response. Maybe give some more reading material on these topics. I also think it could help to provide a link to the Ansys Theory Manual referenced in the reading literature.

I found the workload to exceed 7.5 hp by the time spent on the homework assignments. I would not want to take away from any of the other parts so maybe reducing the number of, or complexity of, the homework tasks.

Maybe less home assgnments, but same level of difficult, just to reduce reports.

The workload of this course is very demanding. I had to consider homework problems every day so I was constantly involved in this course. For the improvement, I think that the tutorials could be a bit different, starting from a easier problems just to warm up.

The workload was definitely more than 7.5 credits. I think that this can be improved by dropping out the seminar and making some of the "Advanced" problems into "Beginner" or "Intermediate". However, the quality should decrease. The best thing is to make the course 9 credits.

I think that the seminar was interesting but I do not think that it should be a contest. In my opinion a seminar should be an exchange of ideas, not a competition for the highest grade. This could cause other group members to blame each other if the one being selected for presentation does not perform well, and it could cause people to choose convenient problems instead of interesting and difficult problems.

it would be great if the full solution can be given out after the final assign just to you know if you have done the question correctly. If there was an intention to drop a portion, i believe the lab should be removed because it has long hours and you learn about the function of the software more then the coursework itself.

I would really like to see that maybe having a more consistent difficulty on the homeworks (like having hmw1 easy, hmw2 intermediate and hmw3 being intermediate + ultra guru godmode) that way you wont get any surprises and maybe skipping an task in homework 1 wont feel as bad when you get the surprise hard assignments. (this did not happen to me but I can think of it as an possible outcome)

I think that the seminar part of the course could be dropped. I at least didn't learn anything (except about the four subjects) from that part of the course. It would also lighten the workload around then Homework 2 and 3 were to be re-submitted.

The seminar was pretty bad. The outcome wass too reliable on the presenter, which in our case was the weakest member, so all the work we did wasn't as good as it could be.

I dont think it corresponds to 7.5, rather 12. I believe noone had time to read the cook or do suggested problems. However, I learned AOT.

In my opinion the computer labs could be removed from the curriculum since they didn't give much possibility to improve skills or knowledge about ANSYS (at least not for everyone), but still were rather time consuming.

I would like the seminar to be dropped. It was interesting and its an good thing to always refine presentational skills. However it can also be done in all course and after the studies.

If the seminar is dropped, it can maybe be replaced with some preparatory questions at Bilda before each lecture. Those questions could be used to see if the students are reading the course material. If sufficiently many preparatory questions are answer correct at the end of the period, maybe it can give some bonuspoints for the tentamina?

I think a lot more students would then read the course material, learn more, if that was used as an "carrot", and dropping the seminar gave more time.

I believe only thing missing from the course is explicit dynamics lab session-although we were given a small introduction in last lecture. As far as I have discussed with everyone, we have an impression that 7.5 credits are not justified given the amount of effort we had to put. Although I took it in a positive way, but this affects performance in other simultaneous courses. My suggestion is to make this course worth 9 credits by including one more lab.

I did not think the course load corresponded to the appointed credits. I'm not too sure what activity to remove since I thought all parts of the course were great learning opportunities. I'd suggest to actually increase the appointed credits to maybe 9 or 9.5.

This course, for me, has taken MUCH more time than what is meant for a 7.5-credit course. I might not have been the best prepared for this course but I think that most people has been forced to treat this as a full-time-course. I have found the course very rewarding but I'm of the opinion that the course should be given over two periods or a few home assignments subtracted.

The course structure is really good, no comments on that.

No point in removing the activities, instead it would be better to increase credits by including extra home assignment and a lab session.

I think 7.5 ECTS is really not a lot of credits compare to the work I did this period in order to pass the course (I completely dropped another course to focus on the HA..). I think people will lose less time if there is a personal feedback instead of a general one. But for everything else (seminar,labs...), I think it was the perfect ratio work load/credits needed. Only the HA need a lots of work and I am not complaining about the difficulty but more about the time spent for the second submission and the hints we had.

It is a lot of work and stress in this course but as you can pass directly the course with the homeworks I think the credits are really worth it. But I do not think that it would worth less credits (6credits for this work load would be to few).

Indeed the workload, compared to some other courses here at KTH, was quite important for 7,5 credits. That being said, all the activities were interesting so I don't know if it is a good idea to drop one of them.

I found that some of the homework exercises were difficult and required a lot of time, but other than that the work load was as it should be.

Please, suggest how the course can be improved (homework, lectures, tutorials, labs, seminar, etc.). In addition, if you think that the course load does not correspond to 7.5 credits, what are the activities that should be dropped in order bring the workload to the expected level?

---

To be honest, it felt more like 9-12 credits. But, with that being said, i believe the structure with homework accounting for most of your grade is requires the course to be this way. I wouldn't want to remove any activity, but perhaps raise the credits til 9?

The complexity of the labs was very nice. I am used to labs being really trivial and many times just a waste of time. When we had to answer all the questions with propper arguments and reasoning, the labs actually thought me a great deal about FEM. It also introduced the concepts underlying this neat software.

I would recommend perhaps changing the correction of the homework. Perhaps rewarding each problem a score of 0-10, where 10 is everything correct. For example B being everything between 85-90 points, and so on?. This allows for students to have small errors, and stil be partly rewarded for the problem.

---

- The seminar is really not necessary.

- Lectures and labs: It could be nice that you provide a written explanation of solutions of the quiz at the end of the lecture. And your own explanation of the lab questions after we submitt it.

-Tutorials: perfect

-Homework: the information which are given to a student by Prashanth must be given to the others (by the student himself for example). And it would also avoid Prashanth to repeat 20 times the same explanation. I also think that the time that could be save could be use to do short individual feedbacks.

---

## Would you recommend taking this course to your younger colleague? If so, what would be your recommendation on how to succeed in this course?

Would you recommend taking this course to your younger colleague? If so, what would be your recommendation on how to succeed in this course?

Yes. Not to read another heavy course at the same time.

Wise choice to take this course. Best course in my first year master degree.

Yes, I would recommend this course. I would suggest to discuss the homework problems with others and work together rather than alone.

I would recommend this course to everyone studying solid mechanics. I think it is probably the best course I have taken at KTH since I bring a lot from it even if I feel that I lack a lot of skill and knowledge but it made me want to learn more about the subject. I also think that Artem and Prashanth were very helpful with the homework and lab questions. They actually want you to learn as much as possible.

My recommendation would be to communicate a lot with the other students taking this course and start early with the homework. I would also recommend you to by the book from Timoshenko. It is expensive in Europe but I bought mine from India for 320 SEK.

Despite the hard work. this course offers a lot to learn and many room for discussion in the topic. To succeed in this course, the person should probably only take this course in the period so that he/she has time to work on the home assignments.

I would most definitely recommend it because of its great content and how the focus was set as Artem said " the idea of a university is not to stuff your brains with formulas and diverse facts - it is to teach you how to \*learn\* in a very broad meaning of this word and, with that, to make you confident in your abilities to conquer any problem having enough patience and persistence." which was exactly what I gained from this course. I really enjoyed it. Both Artems and Prashants effort was shown and appreciated.

Sincerely,  
Johan.

I would recommend it to others taking a master in solid mechanics, but not to students taking other masters. To succeed i would recommend to discuss the homework problems and how you plan to solve them with others. This to both be able to easier do the homeworks but also to get a better understanding of the subject. You usually need a pretty good grip on a subject in order to be able to discuss it with others.

Yes.

Start in time with the homework, and don't be afraid to ask questions.

Yes, I would recommend the course to everyone who is willing to put effort in learning more about dynamic problems in solid mechanics. It is an interesting course but it demands also preparation for each class and quite a lot of work for the homework assignments.

Yes.

Rec. 1:

Do not choose more than one other course in this period!

Rec. 3:

Collaborate as much as possible with your classmates, else you want succ eer without some few new gray hairs.

Rec. 4:

Be prepared, it will consumption your time... So start imidiatly with the first HW, after the first lecture.

Rec. 5:

The course material is VERY good to read for the homeworks, so dont hesitate too check the material when questions arises.

Rec. 6:

Do not hesitate to ask the teachers questions, thats a key of learning efficiently, and have so been in all times.

I would say any Solid Mechanics engineer is incomplete without taking this course. When you are going to work in an industry, you need to understand cross-functional systems and need to work in different projects. The major work in industry or academics concerning s Solid Mechanics is CAE, fatigue investigations, material testing, response evaluation and life predictions. If we see around ourselves, most of the systems are dynamic. Getting a sound understanding is important. The task of this course is not to make students expert, but to provide a methodology in tackling problems. The key is to learn concepts-rather how to learn concepts. So I would strictly recommend this course to my younger colleagues.To succeed in this course, you need only two things-positive attitude and curiosity to learn-rest everything is taken care by extremely hardworking teachers.

Buy the timoshenko book as well as reviewing your old mechanics knowledge. Try to not have any other time consuming courses while taking this course.

I would recommend it to anyone but tell them to prepare for many long hours.

one should attend all the lectures even if it is not possible to go through pre-reading material every time. Tutorials will definitely help you in solving assignments.

Understanding the concepts are the utmost important thing!

If you want to be a boss in Solid Mechanics and really improve your skills in interpretation and solving of hard problems, this course is perfect. But for Bachelor people who would like to discover and have an introduction to the solid mechanics in order to see if it is interesting for them, I think it is a really hard course. Maybe at the beginning of the period you should ask if there are people in the class that are in Bachelor and warn them about the difficulty and propose them another course where you see the basis required to follow this course with more ease afterwards.

I would recommend this course to the ones that really want to do a career in solid mechanics and are really interested in it and want a solid knowledge in this field.

To succeed this course I would recommend to have solid basis in the previous courses, a lot of time also. Also to really work on the notions seen in class and follow the tutorial with interest.

I will recommend this course to the next students in my program who will come for their exchange at Kth because I think it was very useful. However I will also advise them to try to have an easiest course in the same period because this one can be very time consuming for people who do not have alot of skills in Ansys or are not used to Latex reporting.

I would definitely recommend this course to someone. I would suggest though that he/she had the necessary knowledge to follow the course (the previous courses mentioned) and to try to attend all of the activities of the course.

Would you recommend taking this course to your younger colleague? If so, what would be your recommendation on how to succeed in this course?

---

Yes. This is by far the most rewarding course i have had at KTH so far. To succeed in this course, make sure to have some partners that are willing to put in the hours arguing and problem solving. I believe solving this course solo is dreadful, and if that is your plan, i would refrain from the course.

All in all, this course and the timoshenko book is my first recommendation to other students, that are willing to learn and eager to explore the topic. If the willingness is not there, there are perhaps other courses that are better fit for that student.

Thanks for a great course Artem and Prashanth!

---

Of course I recommend it. It'll be very time consuming but this is the last and the best course I've taken in KTH. One recommendation is just to start to work on the homework as soon as possible.

---

20 (24)