Noise Management & Its Control
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Lecture – 01
Course Overview

Hello, welcome to noise management and its control. Today is the first day of this course. This is a 12 week course; total number of lecture hours will be around 30 hours of lecture material. Each week, we will have 6 lectures starting from Monday to Saturday and at the end of this each week, you will be expected to complete an assignment which will test you on the concepts which we would cover on a weekly basis and at the end of the course, you would be expected to take an exam and if you do good in that exam, then you will be eligible for a certificate in the course.

This is a highly application oriented course and in this course we will be covering a gamut of things particularly from the standpoint of view or from the standpoint of applications. So, if you are working in a car industry or you are interested in noise vibrations and harshness related analysis or you are working in developing systems you know air conditioning h back systems where lot of air flows through the through large buildings and you are not only interested in cooling the building, but also ensuring that when air is passing through these h vertex; noise is controlled or if you are interested in noise cancellation then perhaps this would be a course which you will find to be useful.

What I plan to do today is give you some details about this course and the actual course material and the lecture material will actually start from tomorrow. So, today we will just get an over view of the course and that is what we plan to do. So, specifically this week, we will be doing a lot of concepts what is decibel what are different units of sound what are different terminology is associated with sound. So, those are some of the important things which you will learn at least during this week.

Starting next week, we will start addressing some of the important concepts in context of sound because understanding of these concepts is important, if you want to be good in acoustics and especially in noise control. So, some of the important concepts we will address will be what is a linear system another important concept would; what is a transfer function then we will do a quick review of complex algebra both in a plus b ii a

format and also Eulerian format where you express complex numbers as a times exponent I times theta. So, that is what we plan to do in the next week some of the important concepts.

Then in the third week we what we plan to do is we will start developing some very important equations which govern sound and its propagation. So, essentially we will learn about the mechanics of sound waves a lot of times if the sound waves are propagating in one dimensional are one direction in nature that is they are propagating only in a particular direction, then they are governed by one dimensional sound propagation equation.

So, we will develop that equation and we will try to solve that equation in that week and then we will continue that discussion on the fourth week as well, but in reality it is not too many of times that sounds just travels in a particular direction rather sound travels in all directions. So, if I have a source of sound it travels typically radially outwards.

So, in the fifth week and part of the sixth, we will cover the mechanics of spherically propagating sound waves. So, that we will give us some good amount of grounding in the science of acoustics and then we will start talking about noise. So, 6 week onwards we will learn; how is noise measured what kind of instruments do we use what are the important considerations we have to worry about while we are doing noise measurement, then in the seventh week, we will start discussing what kind of different sources are there in terms of noise.

So, we may have a point source we may have a line source we have may have a planar source of noise we may have an you know 3 dimensional or a spherical noise source. So, different types of noise sources how do I how do we identify them and what are some special properties of some of these resources and this is an important area of understanding at least in context of this course. So, we will extend this discussion over a period of 2 weeks that is up to eighth week and then in the ninth week onwards, we will start learning; how do we reduce noise in a structured quantifiable way.

So, there are international standards which are used to reduce which are used in context of noise reduction and noise measurement. So, we learn about different acoustic criteria when we are trying to manage noise and then we will start applying some of these

concepts for different applications for instance; suppose, you are sitting in a room and you want to ensure that the noise or the listening in that room is of good qualities.

So, suppose it is a very large room may be an auditorium and if it is a poorly designed auditorium, then you can have a lot of echoes which in engineering terms are known as reverberations. So, if those reverberations are there, then you tend to do not get a clear cognition or perception of sound and how do you solve that problem using simple tools simple methods. So, that is something we will learn.

So, we will talk about room acoustics then we will also learn the mathematics and the practical aspects of silencers. So, that is another tool which is used to reduce sound we use this silencers in lot of automobiles, but not only in automobiles, but in motorcycles tractors and even in other places for instance in gen sets where we use engines to generate electricity we reduce if it want to reduce the noise coming out of it, we use silencers. So, how do silencers work those another thing, we will learn and then another thing we will learn in the second last week of this course will be; how do we isolate sound. So, sound can get gets propagated in several ways one is that suppose I am speaking some directly reaches and it propagates in all directions.

In other cases, what happens is that when someone is speaking that sound goes and hits a particular structure maybe it is a sheet metal and then that sheet metal starts vibrating. So, and on the other side of the sheet metal if there is a person listening then he will hear the noise because of those vibrations. So, it is important in such cases that we are able to reduce the vibration of the structure. So, if we are able to reduce vibrations in the structure then it will help us to reduce the noise which is propagated due to those vibrations that kind of a noise is known as Vibro acoustic noise.

So, how to be reduce vibrations and how do we isolate vibrations and then we will do several case studies where we will look at some of the practical examples of noise and see how those pro in those practical applications reduce we were able to reduce noise to acceptable levels. So, that is the overall scheme of this course and all of you are welcome there are no specific prerequisites for this course, but I think it will be useful that if you particularly have a degree either in physics or in any area of engineering does not matter it can be mechanical or electrical or civil, then it will be a little bit easier for you at the in terms of understanding whatever we are talking about in part this particular course.

So, I hope that gives you an overview of this course and I look forward to having you in this course over a period of next twelve weeks couple of other important things there are three or four tutors or teaching assistants assigned to this course. So, if you have questions you are welcome to approach these tas and ask your questions please do not hesitate to ask those questions at all, if they are unable to address some of your questions for whatever reasons then you are also welcome to approach me all the contact details are provided on the website about this course.

So, you are welcome to answer you know approach us in this particular regard. So, I hope this gives you an overview and I look forward to seeing you starting tomorrow and I hope you have a pleasant and positive learning experience over the period this course.

Thank you.