Hi, I am a Ashok Chodankar, Associate professor in hemistry, Government College of Arts, Science and Commerce.
Today's program is for first year Bachelor of Science in the subject of chemistry, semester one. The course code is CHC 101. The course title is organic chemistry, section B.
The title of the unit is Unit 2. stereochemistry. The name of the module E&Z nomenclature. The module number is 34.
Outline. E and Z nomenclature.
E AND Z nomenclature of alkenes containing one carbon carbon bond and two carbon carbon bonds.
Learning outcomes at the end of this model, the students will be able to identify and assign correct nomenclature to alkene containing one and two double bonds.

Geometric, geometrical isomerism is exhibited by compounds containing double bonds, for example, carbon carbon, double bond, carbon nitrogen, double bond, nitrogen nitrogen.double bond
It's also exhibited by the compound containing cyclic structure like Alicyclic compounds, And compounds having restricted rotation about a single bond due to steric hindrance. For example, biphenyls compounds.
Conditions for geometrical isomerism.
There should be restricted rotation about a bond in the molecule. Second, both the substituents on each carbon should be different.These are the three simple example.
If you notice here. So this is a carbon double bond and this is another carbon carbon double bond so you will see on this carbon carbon carbon double bond.Substituent A and substituent B is present, so these two substituents are different.Similarly, on this carbon doubly bonded carbon Atom substituent D is there and substituent E is there. These are two different substituent present, so first condition. On each double bonded carbon,two different substituents must be present. Similarly, if you see the second example here also, it's the same, you have A as a molecule substituent there an B as a substitution. So in another double bonded carbon you can have A and B so on each double bonded carbon. Two different substituents are there similarly this. 3rd example.

Geometrical isomerism due to The alkene, there is a carbon carbon double bond, so in this

module we're going to focus on a carbon carbon double bond. double bonds consists of a Sigma and π bond perpendicular to each other. If there is a rotation about a double bond, the pi bond will break does there is no free rotation about a double bond.
Nomenclature of a geometrical isomerism. There are two Ways you can give names for geometrical isomerism. One is Cis and trans Nomenclature which is already covered by another module an. In this we're going to focus on E & Z

system of nomenclature. N E & Z system of nomenclature.

More complete system for naming alkene isomers by IUPAC that is International Union of pure and applied chemistry. The system is based on a set of priority rules which allows you to rank any groups.

This priority rules are called a cahn Ingold Prelong or CIP rules, which are used in R S nomenclature. The general strategy of the E and Z system is to analyze the two groups at each end of the double bond.

At each end, rank the two groups using the CIP. Priority rules. Then see the higher priority group at one end of the double bond and the higher priority group at the other end of the double bond.

If you are on the same site that is called Z or German word Zuzaman, means together. Or on the opposite side, then it is called E from the German word Entegen or opposites of the double bond example. Butene the figure below shows the two isomers of two butene. You should recognize them as cis or Trans. Let analyze them to see whether they are E or Z So these other two structures of. 2-butene. OK,so coming to this doubly bonded carbon Atom. So on this double bonded carbon atoms, the two

groups present are or two substitutions. Presence CH3 and H. OK so among these two CH3 is having a top priority. Go to the next double bonded carbon. So this is the next doubly bonded r carbon on this double bonded carbon. there are two groups. One is the hydrogen, another one is a methyl groups. So among these two top priority is for the methyl group being more atomic number. So the two top priority groups are on the same site, so therefore this will be called as Z, so which is always written in the bracket followed by the name of the compound two butene. Let's go to the next example.It's and two butane only Lee, but it's another isomer, so see this double bonded carbon atoms. The two groups are H and the methyl groups, so top Priority Group is the methyl group. Go to the second double bonded carbon, so again the middle Group and the hydrogen group is there, so top priority is for methyl groups.The two top priority groups on a double bonded carbon are opposite to each other, so
therefore this will be called.as E followed by the name of the compound.
E and Z will always work evenwhen CiS and trans fails. For example, this is a compound.
The example the following figure shows the two isomers of an alkene with four different groups on the double bond. The name of the compound is 1 Bromo,two chloro, one fluoro, one iodo ethene OK so you cant got use cis or trans nomenclature for this type of compound where compound are having four different types of groups. So if you observe this this is a double bonded carbon. So on this the bromine and the Iodo group is there.

So Iodo having a top priority and on this double bonded carbon CL an F is there F is a CL is having more priority, so both. The two groups are on the same site, so therefore this will be called as Z Similarly,go to the next example. This is a double bonded carbon, so top priorities. I odine then again

double bonded carbon. The top priority is Cl the two top priority groups are opposite to each other so therefore this will be called as E. Nomenclature, it should be apparent that the two structures

shown are existing chemicals.However, it is impossible to name them as a Cis and trans.On the other hand, the E and Z system works fine for this compound, which is already. mention.

E and Z will work, but may not agree with Cis and trans and typical example I can take.Is this OK? If you see this molecule it becomes a cis because the two like groups are on the same side. That is methyl

groups. This is 2 bromo two butene. Ignoring the geometric isomerism. Cis or trans,so this molecule is clearly Cis. The two methyl groups are on the same sides, more vigorously, rigorously the parent chain is cis This example should convince you that cis and Z are not synonyms. Cis and trans and E and Z are determined by distinct criteria. There may seem to be a simple correspondence, but it is not a rule. Be sure to determine CIS and ,trans or E and Z separately as needed, so this is the example

so here. This is a double bonded carbon, so top priority for this. This is a double bonded carbon top PRIORITY Is this so? Therefore this is according to E and Z this is going to be Entegen or E and if you go by a simple nomenclature of Cis and trans, this is going to be cis. OK, so E or Z there is a methyl on each end of the double bond on the left. The me is methyl top priority or a higher priority because the other group is H on the right hand side. The methyl is low priority group because other group is Br. So high priority groups are CH3 left and Br are on the right. There's two priority groups are opposite so therefore it is E notation.

Multiple double bonds. OK maximum. We're going to take 2 double bonds if the compound contains more than one double bond, then. Each one is analyzed and declared to be E or Z. OK,

this is a simple example. So this is a double bonded carbon and this is another double bonded carbon. The configuration of the Left hand or double bond is E and the right hand is Z Does the compound is

name as one E? That is, this is one OK, so this is 1 E 4 Z and the 1/5 Dichloro 1,4 hexa Diene.

This is another example of a compound having two double bonds. This is there is no isomerism at this because. This contains 2 hydrogen atoms on the same carbon double bonded carbon. So this is only isomerism is only at this carbon Atom, so this will be called Z, one chloro, two ethyl 1/3 butadiene.

Under some of the examples you can practice. Few more examples you can practice.
References. Organic chemistry by Morrison and Boyd

organic Chemistry, Paula yurkanis
organic chemistry by Frances carrey.
Thank you.