IIT Madras
BSc Degree

English –II (Advanced English)

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Lab Manual

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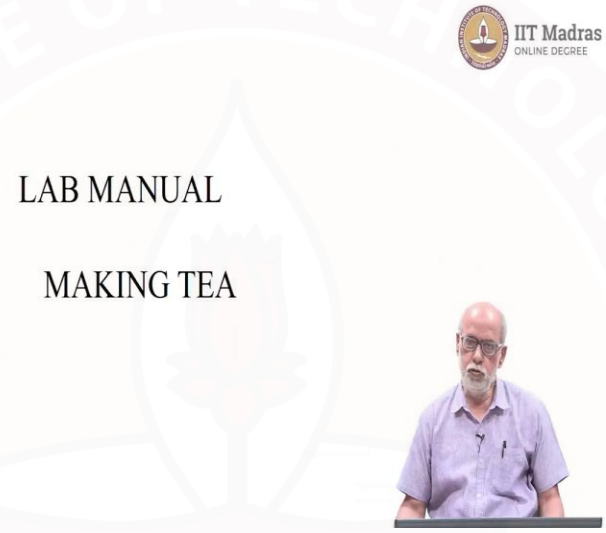

Hello, and welcome to yet another session of the writing module. Today, we are going to talk about laboratory manuals, and possibly we will continue doing so in the following sessions with laboratory reports, etc. For example, today, we have taken something very simple, something almost, almost any adult person knows that is making tea.

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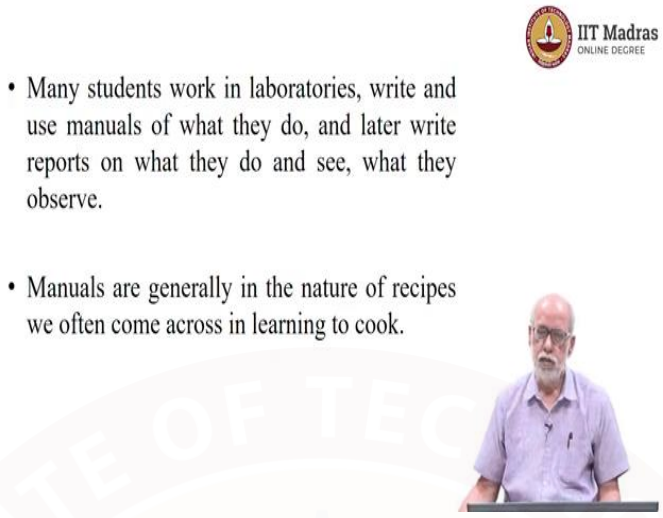

Why do we need to learn all this? Simply because many students in sciences and in social sciences, life sciences, in management, journalism and other places, the need to read and understand manuals, they need to prepare manuals for things they usually do on a routine basis. And after it is done, they write a report on what they may have done in a very general sense. A lot of people know this kind of document as a laboratory manual and laboratory report or lab manual and lab report.

So, in this session, today, we are going to talk about how to write a lab manual. What is so unique or so difficult or so strange about lab manuals, so that we should spend precious time learning how to write these manuals? Here we go. Manuals are generally in the nature of writing recipes.

We often come across recipes when we learn to cook or when we learn to cook new items. How to make coffee, or how to make Payasam in Kerala style, or how to make Rasam in Telangana style, or how to do fish like people in North Bihar, Assam and Nepal do, or like how to cook meat as they do in Kashmir. What spices ought to be there, or Payasam in Rajasthan, or Dhokla in Gujarat?

Each part of the world, just as each part of India, has its own culinary culture. And a lot of times, out of curiosity and sometimes out of necessity, we learn how to cook these things, how to prepare these things, and in that case, what we do is actually looking at manuals. And once we

finish, we talk about it, telling our friends and family; today we cooked Dhokla, and then we tell them what ingredients it took us and how we did it; that part of the conversation can be called laboratory report or lab report. So, today in this session, we are going to talk about a laboratory manual. How to write a lab manual? Actually, writing a lab manual is pretty easy. Come let us see.

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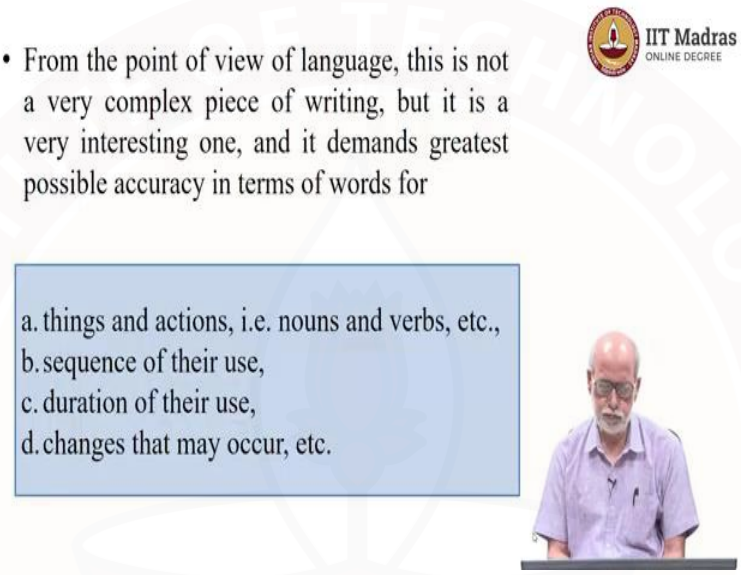

There is not much of a challenge, at least from the point of view of language, in writing a lab manual. If, that is, you know the names of tools, vessels, pots and pans, utensils, spoons, ladles, forks, and similar other things that you use. If you know the names of ingredients, then it is not very difficult to write a manual. The second part of it is, all these nouns, all these things are used in a certain manner there are lots of verbs attached to cooking for instance, if you take cooking.

What is cooking? Cooking is a very generic term. There is nothing actually called cooking, but cooking is a big box, which has lots of other verbs. Say for example, you boiled, you steam, you simmer, you do a whole lot of other things with just steam and water; or you fry, or you deep fry, or you stir fry, or you bake, or you roast, or - go on, there are all kinds of verbs, and many dishes can be done in only one manner, not in another.

Many dishes can be done only with a combination of these two or three verbs, and in a certain order. If you fry something before it is boiled, it will be wasted. If you boil it before it is fried,

even then it will be wasted. So, there are different ways of many people like steamed potato; so, what you do is you first steam it, do not soft boil it, just hard boil it, and then you peel it and fry it with limited oil, on the fume of the oil actually, so that is the process.

So, from the point of view of language, we not only need to know the names of ingredients, we also know what action and what sequence of these actions, whether we are going to boil first or fry first? Are we going to do a stir fry, deep fry or roast or bake? Roast means one thing, bake means another, boil means one thing, steam means another, similarly, you can have things like scalded. Say, for example, when you do kebab, you can have veg kebab, you can have non-veg kebab, but then scald it in a particular manner. So, there are a variety of processes together called cooking.

So, we have to remember exactly what, and in which sequence that is very important. If you boil something before frying, then it is wasted. If you fry something before boiling, it is wasted. Certain things do not need any water at all. Certain things do not need any oil at all. Imagine Idli being fried, though I have seen some people do it, but that is human ingenuity, that is creativity. But if you go for standard Idli, it does not need oil, and if you go for a standard Vada, it needs oil. So, these are the combinations we have to remember.

And then their order, a before b or b before a or a and b together followed by b and a, so that is important. And then, another important set of words here is duration; how long? How long can you do what? Say suppose something involves boiling then how long would you boil? until stream rises, until it boils, until it gets warm, until it is lukewarm, until it is boiling hot; similar thing, with other kinds of things, or if you bake if you fry, do want it well done?

That is a question you might routinely be asked if you eat frequently in restaurants. Do you want it well done? Do you want it mild? Do you want it semi or semi? It depends. And then for how long? So, these terms indicate how long. Hard-boiled means maybe for two minutes, but full boiled would mean perhaps four minutes. And if you are doing it in oven, micro-oven, then maybe a few seconds. 30 seconds can be enough for a variety of operations, and two or three minutes can give you even perhaps a portion of roasted chicken or mutton or anything else that you eat from animals or fruits or vegetables.

So, we have to remember words for these three things. To recapitulate, to summarize, linguistically the challenge in writing the manuals is the following. Number 1, we should know the names of things and tools. Number 2, we should know the kind of actions and the words for them, verbs that we are going to use. Then, the length of each of these actions and durations, and then finally, how do we decide it is done? because all that we cook changes form, changes in a smell, changes in color, changes in taste.

Maybe, we cannot taste though many cooks I know tasted before concluding it is done, but in many cultures, that is considered taboo. Once you tasted something, it becomes unfit for consumption by others, not just gods, but also perhaps human beings. So, in those cultures, how do chefs do? How do chefs and cooks decide that a certain dish is done now it is ready to be served? So, they look at the color, they look at the form, or they look at smell.

I know of cooks who can tell you from the smell of the dish if it has adequate salt or as you say in Tamil "uppu illai", there is no salt. No matter what else have you done with sambar, perhaps, in my opinion, the greatest contribution of India into culinary art, but if you do not know how to add salt properly, then well, your sambar is finished.

So, we have to have words, also, for changes that any dish undergoes. It is true not just of kitchen it is just, it is true not just a kitchen, it is true of anything undergoing or being subject to some chemical process, even to some physical process. It is only that in physical process, change occurs over a long span of time or space. In chemical processes, these things happen perhaps sooner, faster, much more easily visibly, etc., etc. But linguistically, these are the challenges.

To illustrate it, I have taken the simplest possible thing I know by way of lab work. Some of us never go inside the lab, but some of us have some experience with kitchen, which is a wonderful lab. Perhaps, in my opinion, the most useful laboratory or lab that human beings made for themselves. So here, I talk about making tea, let us see.

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- It is possible that we know words for these things, but either through inattention, distraction, oversight, or sometimes even confusion about what to write first and what next, etc.

Now, you might say what is the big problem here? I know everything, Yes, you do; but problem with things that you know problem arises either through inattention, distraction, oversight, lot of experts assume too many things.

When they tell you how to fry potatoes, they say cut it fry it, enough, what more do you need to know; whereas actually the process involves wash the potato, then wipe the potato with a clean towel, keep it on the cutting board, hold it between your thumb and index finger unless you have a cutting machine and then either with knife or kitchen cutter make proper equal-sized slices of the potato and then have, put oil first in the pan, but if you like seasoning, then have some spices there. But do not let it burn, do not let smoke arise, so it goes on.

So, for experts, experts make sometimes grievous mistakes, irreversible mistakes. Novices also make mistakes, perhaps, more mistakes, but mistakes made by novices are said to be reversible, manageable, controllable, rectifiable, but those by experts are said to be. And what is the reason? They know there is a famous saying a famous adage goes, "accidents happen when you are either in a hurry or careless".

So many mistakes in laboratories, sometimes big accident, big accidents in huge laboratories. Why did a huge city like ship called Titanic break? Why did it collide with an iceberg? Why did Chernobyl happen? Why did Bhopal happen? These are all famous cases of somebody not paying adequate attention to his part of the lab process and the language related to it.

So, we must be attentive, and we must know the exact word for exact place that is the meaning of the word exactness; only one nut will fit there. We must know which nut and where and when. Let us go, let us look at this example.

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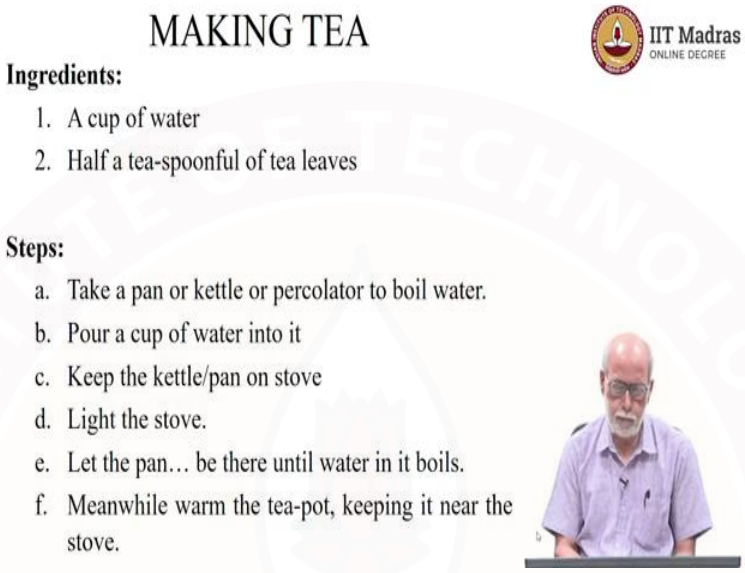

Making tea, simplest. I guess, in countries like India, Vietnam, China, Nepal, Pakistan, Bangladesh, Sri Lanka, many other non-European and some European countries, people know how to make tea or coffee. I wish I could share it with you.

But it follows a sequence. You cannot get wonderful tea, unless you do things in a sequence. So, to illustrate, for example, let us see. What do we need? Other than tools, by way of ingredients, the minimum is a cup of water, and half a teaspoon full of tea leaves. Remember, not to use dust, not to use broken leaves, best tea can be got only when you have unbroken leaves.

Many people, particularly in countries like India, Bangladesh, Pakistan like their tea, either spiced, honey, lemon, all kinds of leaves, ginger. Some people add lime and other spices, and but quite a few people, not a very, not a very tiny minority, maybe not majority, but quite a few people like their tea this way green, as they call it these days, nothing added. Tea for the sake of tea.

And I mean, please, take all of these things unless you are, if you are allergic to tea, then please do not do anything without seeking the advice of a physician. But for many others you can do tea this way, as I am saying. What are the steps for making tea? Number 1, take a pan or kettle or a percolator. Percolator has become very popular recently, in the last decade or two, so easy to boil water.

Now, look at the words that we need to in a simple exercise like making tea; we have to look at the words of sequence. Please come back. Other than words for ingredients I will draw, I want to draw your attention to two things—words for, words related to cooking. So, for example, pour, keep, light, boil, warm. Go next.

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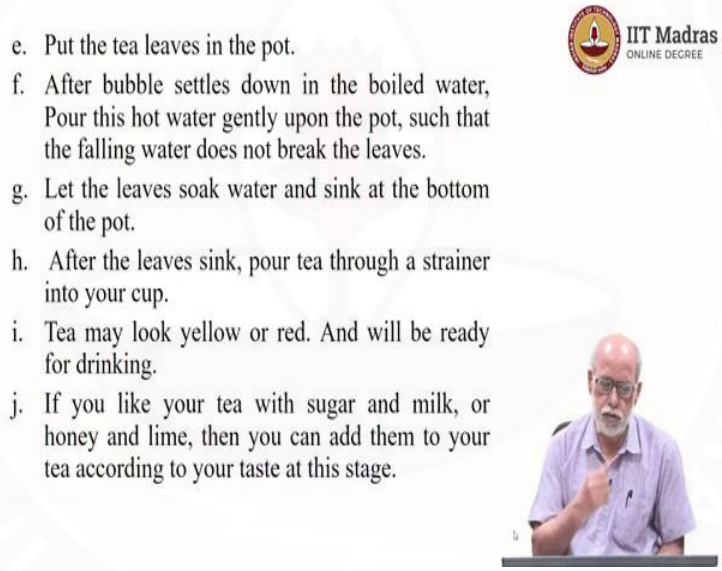

On the stove, near the stove. Then, you can, many people rather than say put the tea leaves in the pot they say, add tea leaves or if you use water bag, sorry, if you use tea bag, then they will say dip, dip the tea bag, that may be the word, but I do not think best tea can be got from tea bag, but I may be wrong. This is my personal opinion. So then boil, then bubble settles.

Leaves, let the leaf soak water, so soak is another verb. After the leaves sink, they will settle down on the bottom of the pot, only then your tea is ready to be drunk. Then look at the changes, the tea that was, the tea leaves that were black or blackish now changed into yellow, the water that was white or plain now changes into yellow or red.

Then you have things like add. If you like your tea with milk and sugar, then you can add these things at a certain stage. Similarly, look at the duration, how long do you do it? After bubble settles. Let the leave soak, that means it will take time. It is not the case that you added the leaves to water or you poured water on the leaves, immediately the leaves will surface, they will start floating on the surface.

But as they soak water, they become heavy and settle down or sink down. So, in this manner, there are words that indicate action, there are words that indicate sequence, and there are words that indicate duration. A lab manual must take care of all of these things in a sequence. Next.

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ACTIVITY

- In a similar manner, write a manual on how to prepare coffee.

As I have been saying, it will be wonderful if you did something else on your own. Say, for example, I have given you a very easy self-check assignment, write a manual on how to make coffee; how to prepare coffee, basic black coffee, not cappuccino or coffee au lait, not coffee with milk, etc., etc. But you can do that as well, if you like. And once you have done that, check your work with the given sample and check them particularly for these three things, processes, combination of processes, duration of processes and sequence of processes. I am sure, if you get them right, you can write great manuals. Thank you very much. Good luck.