

Petroleum Economics and Management
Prof. Anwesh Aditya
Department of Humanities and Social Sciences
Indian Institute of Technology, Kharagpur

Module - 01
Introduction
Lecture - 01
Relevance and Syllabus

Hi everyone. I am Dr. Anwesh Aditya, Assistant Professor in the Department of Humanities and Social Sciences of Indian Institute of Technology, Kharagpur. My research interest lies in the field of International Economics and Development Economics.

I have been teaching the courses like Microeconomics, International Trade, International Business, Labor economics, Statistics for economics. Over the last few years I have developed a course named Petroleum Economics and Management. The course was mainly developed for the BTech and MSc students of IIT, Kharagpur.

The course was well accepted by the students of IIT, Kharagpur. So, I thought to offer the course in the NPTEL program because I found that there is a dearth of courses in the Indian Academic Institutes relating to the discussions in the very important happenings in the global oil market and their implications in the World Economy and the Indian Economy. So, with this idea in mind I developed the course petroleum economics and management. And to be very frank I enjoy teaching the course. The best thing I found about teaching the course is that the way it has evolved over time since I started teaching the course. In the last five years, there are new events, both economic and non-economic events around the world which keep on adding new dimensions in the course.

For example, the COVID-nineteen pandemic and the pandemic induced lockdown led to huge implications in the global oil market because we saw that for the first time the WTI future contract price of oil became negative on twentieth April two thousand twenty. This was completely unprecedented.

After the lockdown policies were gradually relaxed and with the vaccine the pandemic came under slight control, so again transportation started resuming. So, oil demand also

gradually started increasing. And oil price was gradually restored. With that again with the Russia-Ukraine war oil price again started very much rising.

So, you see the happenings in the world both economic and non-economic events like war, natural calamities, they affect the world oil price so much and this has huge implication for the world economy and especially for the Indian economy. Why? Because we know that India is one of the largest importer of energy.

And high amount of energy demand of import is met by import of fossil fuel. So, we are a large importer of fossil fuel. And given that the demand for oil is increasing in India, and India's domestic demand is quite insufficient. So, we have to import huge amount of oil. Oil price, we will discuss it later, that it is increasing over time. And given the nature that oil is inelastic in nature, when price of oil increases quantity demanded falls, but by less magnitude.

Therefore, India has to spend lot of foreign exchange reserve on import of oil and this puts India under huge crisis of balance of payment reserve. Therefore, we need leaders in the energy sector who can understand this complex global socio-economic cultural implications on the world oil market and can lead us in the future. So, who knows the problem of investment, risk and sustainability, so who can lead us in the energy sector from the point of view of sustainability and energy security.

Therefore, we are urgently in need of game changers and leaders in the oil market. With this idea in mind, I have developed the course. The course will be extremely beneficial for anyone who wants to lead the oil sector. For example, those who want to join the oil and gas companies, not only that those who have a background in geology and geophysics, naval architecture, say a chemical engineering, mining and metallurgy, they also found the course very beneficial I hope.

Even it is not limited to those engineering or science students, those who are aspiring to become civil servants or those who want to join the analytic sector, consulting sector, they might be also gaining from this course. Because this course discusses the very recent events like the implication of the COVID-nineteen pandemic on the oil market, the impact of Russia-Ukraine war on the oil market, how the exchange rates are determined because oil is one of the most traded commodities.

We will see the importance of oil in the global market. Therefore, we will also study how exchange rate is determined. So, with this idea in mind I have developed the course for anyone who is interested to know the world oil market and their implications on the Indian economy and global economy.

So, in the very first lecture I will be discussing about the relevance of having a course on petroleum economics and management. Why do we need a such a course? And then I will be outlining the syllabus of the course, what are the contents that we will be studying.

(Refer Slide Time: 06:03)

The slide features a white background with a blue header and footer. The title is 'Why do we need a course on Petroleum Economics and Management ???'. Below the title, there are two bullet points: 'In the early 2010s, the annual production value of oil was between \$3500 and \$4000 billion.' and 'World oil exports were in the range of \$2200 and \$2800 billion.'. The slide also includes a small video inset of a woman speaking in the bottom right corner. The footer contains the IIT Kharagpur logo and name.

**Why do we need a course on
Petroleum Economics and Management ???**

- In the early 2010s, the annual production value of oil was between \$3500 and \$4000 billion.
- World oil exports were in the range of \$2200 and \$2800 billion.

Indian Institute of Technology Kharagpur

So, why do we need a course on petroleum economics and management? Because in our day to day life we consume so many goods and services. But of course, we do not have courses for each of the goods and services, we are consuming in our daily life. Then, why do we need such a course? It is because of the importance of petroleum products in our daily life, in the world economy, it is the indispensable nature of oil and it is the phenomenal price movement of oil.

So, first I am going to discuss the three reasons of having a course on exclusively on petroleum economics. So, first reason is the importance of oil in the global economy, both in total world trade as well as in total world GDP, ok. So, if we show some data, we can understand the importance of petroleum products in the world economy. So, in the

early two thousand tens, the annual production value of oil was in between three thousand five hundred billion dollar to four thousand billion dollar.

As far as export is concerned, the world oil exports were in the range of two thousand two hundred dollar billion to two thousand eight hundred dollar billion.

(Refer Slide Time: 07:21)



The slide features a title 'Importance of Oil in World Economy' at the top. Below the title is a list of five bullet points. A small video inset in the bottom right corner shows a woman speaking. The slide footer includes the IIT Kharagpur logo and name.

- In 1970-1972, oil alone represented an export value equal to the aggregate of the next nine largest commodities.
- Oil is the world's most vital commercial energy source and will remain so in the 21st century (OPEC, 2004).*
- According to World Bank, fuel exports as a percentage of global merchandise exports were 12 per cent in 2018.
- Refined petroleum is one of the most traded item globally.**
- Value of oil production in 2013 was 4.8% of global GDP.

Notes: *OPEC Speeches, 2004; **Forbes

Indian Institute of Technology Kharagpur

So, if we start having a historical perspective, we can see that from nineteen seventy to nineteen seventy two oil alone represented the total value of export which is equal to the aggregated of the next nine largest traded commodity. So, that shows the importance of oil. So, oils export value is equal to the sum of almost the next nine largest traded commodity, ok.

So, oil is the world's most vital commercial energy and in the near future it will remain so, in the twenty first century. According to the World Bank, fuel export as a percentage of global merchandise exports were twelve percent in the year twenty thousand eighteen. Refined petroleum is considered to be one of the most traded item globally as the OPEC report suggests.

(Refer Slide Time: 08:18)

Table 1: Exports by Principal Commodities (US dollars in millions)

#	COMMODITY	2001	2007	2013	2020	2021
1	Petroleum Products	474298	1704751	2705766	1186043	1882422
2	Natural gas*	71949	193261	380325	132262	362432
3	Coal, coke and briquettes	23598	61560	122041	89836	142534
4	Coal**	20653	52739	111986	80124	126079
5	Iron ore and concentrates	9169	41312	139991	145234	230959
6	Wheat***	14627	30732	49933	45178	60832
7	Copper	29976	124530	132510	124852	182035
8	Cotton	7411	12730	22210	16265	20793

Notes: *whether or not liquefied, **whether or not pulverized, not agglomerated, *** (including spelt) and meslin, unmilled
Source: UNCTAD



So, if we look at some data where the United Nations conference on trade and development represent the export by principal commodity in US dollar million. So, if we see from two thousand one to two thousand twenty one onwards, you see that petroleum products dominate all other most traded commodities.

So, even if we compare with other type, so one can think that it is because of its nature of petroleum that it is one of the source of energy and it is non-renewable resource. But even if you compare with other type of resource like say coal or natural gas, but we can see that even iron, coal, copper, but we see that petroleum dominates all such are the type of non-renewable resources, ok.

So, petroleum products you see, the first row from two thousand one onwards it has been growing and even if there are some temporary reduction in values, but as compared to other products other energy sources, these are very high. Other metal and minerals these are very high.


Even if we compare with other agricultural products, like you can see the values of corresponding to cotton and wheat, so petroleum products just surpass all the other products, ok. So, it shows the importance of petroleum products in the world trade, the world export, ok.

(Refer Slide Time: 09:47)

Importance of Oil in World Economy

- In 1970-1972, oil alone represented an export value equal to the aggregate of the next nine largest commodities.
- Oil is the world's most vital commercial energy source and will remain so in the 21st century (OPEC, 2004).*
- According to World Bank, fuel exports as a percentage of global merchandise exports were 12 per cent in 2018.
- Refined petroleum is one of the most traded item globally.**
- Value of oil production in 2013 was 4.8% of global GDP.

Notes: *OPEC Speeches, 2004; **Forbes



Indian Institute of Technology Kharagpur


So, not only in world export, petroleum is also very important as far as the world GDP is concerned. In two thousand thirteen value of oil production was almost five percent. It was exactly four point eight percent of global GDP.

(Refer Slide Time: 10:07)

Table 2: Production of Principal Commodities ('000 Metric Tonnes)

Commodity	2011	2014	2017	2020	2021
Coal	7218020	7419808	6986940	7023071	-
Oil	3637812	3831314	3979276	3783778	3829591
Iron Ore	3270000	3820000	3940000	3990000	4200000
Wheat	632216	661118	700610	690300	-
Copper	51700	59400	62900	45900	47000
Cotton	25869	26259	23378	26134	24303

Sources: EIA, USGS, FAO, Statistical Review of World Energy, ICAC



Indian Institute of Technology Kharagpur

So, just a single product corresponding to four point eight percent of global GDP. So, if we see, if we look at the data on production of principal commodities in thousand metric tons, we see that oil importance is very high. Though it is not the largest one because as

far as production value is concerned, so coal and iron ore also have high production value. So, oil comes either in second position or in third position.

But it is a very important component of world trade. And that is the reason of the geopolitics that we are going to discuss in our upcoming lectures. So, the first motivation of having a course on petroleum economics is the importance of oil in the world economy.

(Refer Slide Time: 10:52)



The slide features a central title 'Indispensable Nature of Oil' in a bold, black font. Below the title, there are four bullet points: 'In the near future it is hard to replace oil.', 'In power generation since mid 1980s oil has been successfully replaced by expanded usage of coal, gas, nuclear and renewables.', 'The dominant market segment for oil - as a fuel for transport on roads, in the air and across the seas - continues to prevail despite the price changes.', and 'This makes the global economy highly vulnerable to oil supply disruptions.' The slide is decorated with faint background graphics of gears, a tree, and a molecular structure. In the bottom right corner, there is a small video inset showing a woman speaking. The footer of the slide includes the Indian Institute of Technology Kharagpur logo and name.

- In the near future it is hard to replace oil.
- In power generation since mid 1980s oil has been successfully replaced by expanded usage of coal, gas, nuclear and renewables.
- The dominant market segment for oil - as a fuel for transport on roads, in the air and across the seas - continues to prevail despite the price changes.
- This makes the global economy highly vulnerable to oil supply disruptions.

The second reason of having a course which is solely dedicated to discuss petroleum economics and how to manage the resource is the indispensable nature of oil. Hardly, we can imagine our day to day life without using energy and the main source of energy till now has been petroleum products. And in the near future we do not have any easy cheap substitutes which is easily accessible even in the developing and underdeveloped countries. So, in the near future it is almost impossible to replace oil.

However, in power generation sector since the mid-nineteen eighties onward oil has been successfully represent replaced by expanded use of coal, gas, nuclear and renewable energy sources. For example, from mid-nineteen eighties onward the new power plants those were built they are mainly built using say thermal power plants, tidal power plants or other type of sustainable or renewable sources of energy, non-exhaustible sources of energy for example, solar energy.

However, transportation, both international as well as domestic transportation is completely and heavily dependent on oil. There is no easy substitutes of oil or petroleum products in the transportation sector. So, because of some advantages of oils, for example, oil is we know its fluid in nature. So, it is less costly to carry in travel over long distances, ok.

So, because of this we can carry oil for sea transport, air transport at a much less costly way as compared to other sources of energy like coal. Therefore, the dominant market segment for oil as a fuel for transport of road, air as well as sea it continues to prevail despite the price changes.

You think about air transport. So, it is less costly and its weight is less also when you are carrying oil in air as compared to other solid sources of energy like coal. And that is why the energy to weight ratio of oil is very high as compared to other sources of energy. Therefore, international transportation completely depends on oil. Till now we do not have any easy substitute.

And that is one of the reason when the COVID-nineteen pandemic led to the lockdown and the travel restriction. There was sudden demand side shock in the world oil market leading to the negative price of oil, which we will discuss in very detail. And we know that international trade mainly takes place via sea transport as well as via air transport. Therefore, it also implies that given the importance of oil for international transportation. So, oil is also so important for international trade.

And nowadays almost all the economies in the world are open though the degree of openness can vary, but oil plays a very crucial role in the international economic scenario. So, all these factors make the global economy highly vulnerable to oil supply disruption. So, if we look at historical perspective, whenever there has been oil supply disruption that leads to spiraling consequences in the global economy.

So, we will discuss all these issues in greater detail. Just in the first class we are motivating our course, why do we need a course on petroleum economics. So, this was the second reason the indispensable nature of oil in our daily life.

(Refer Slide Time: 14:45)

The slide is titled "Nature of oil price changes" and features a background graphic of a tree with various icons (gears, atom, lightbulb, etc.) on its branches. The text on the slide is as follows:

- The almost ten times real price increase between the early 1970s and the most recent years has been unparalleled.
- Metals and minerals in aggregate, which are also exhaustible and were sold in unchanged quantities over time, less than doubled in constant money prices over the period.

A small video inset in the bottom right corner shows a woman speaking. The slide footer includes the Indian Institute of Technology Kharagpur logo and name.

The third reason is the nature of oil price change. There has been almost ten times real price increase between the early nineteen seventies and to the mid nineteen sorry mid-two thousand tens and this is just incomparable. If we compare with other types of metals and minerals which are also exhaustible in nature and they are also sold in unchanged qualities over time, they experience just less than doubling value in constant money price.

Whereas, in constant money price the oil price has increased almost ten times. And if we think in terms of nominal value I will show you the data later. So, till mid-two thousand ten from seventies, nineteen seventies onward the oil price increase has been hundred times. We will show will show the actual data when we will be discussing about the oil price movement, since nineteen seventies to till date.

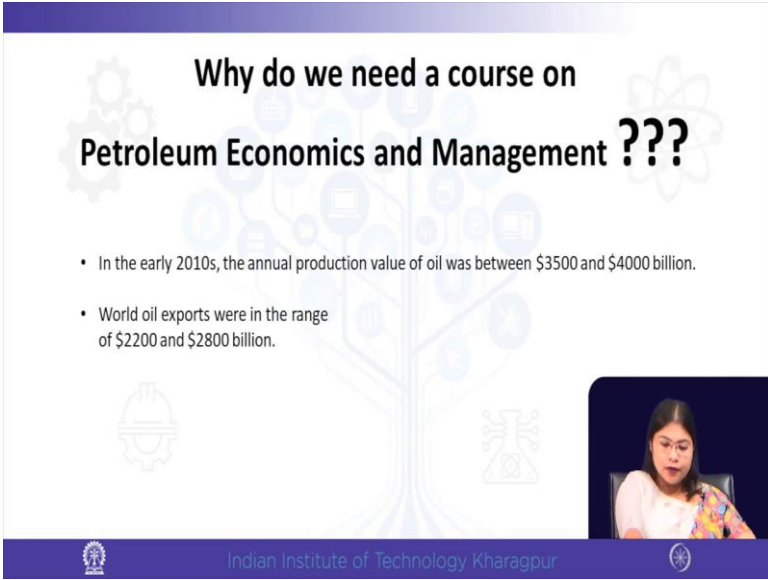
So, nature of oil price change is just unparalleled, cannot be compared to any other commodity, any other goods or service even if we take the exhaustible resources like metals and minerals. Therefore, we need to understand the movement of oil price, we need to understand what are the reasons of such oil price movement, what are the global factors that have led to this changes in oil price.

However, there are temporary dips as I gave the example of the COVID-nineteen lockdown and before that also in two thousand fourteen, when there was a shale oil

revolution at that time also oil price experienced a sudden decline which was not predicted by the economists who are specialized in predicting the oil price.

So, there is huge uncertainty related to oil price and these also have implications as far as the macroeconomics parameters are concerned like exchange rate, volatility, unemployment. So, we will discuss all these issues in greater detail.

(Refer Slide Time: 17:00)



**Why do we need a course on
Petroleum Economics and Management ???**

- In the early 2010s, the annual production value of oil was between \$3500 and \$4000 billion.
- World oil exports were in the range of \$2200 and \$2800 billion.

Indian Institute of Technology Kharagpur

Therefore, we can just summarize our lecture so far. So, we discussed the importance of having a course on petroleum economics and we boil down to three main reason. So, first reason is the importance of oil in world economy. Second reason is the indispensable nature of oil in our day-to-day life. And the third reason is the nature of oil price change.

So, that is why we need to understand the complex world oil market, and we need to know the uncertainties, and also the issue of sustainability is very important as far as the problems of environment and climate change is concerned. So, we are going to discuss these issues in greater detail.

(Refer Slide Time: 17:49)

The slide features a central graphic of a tree with various icons (gears, a person, a flask) on its branches. The text on the slide is as follows:

And then came Covid-19

Negative oil price??? Is it???

- The price of US benchmark for oil, West Texas Intermediate (WTI) crude oil futures contract became negative during the 3rd week of April, 2020.

The slide footer includes the Indian Institute of Technology Kharagpur logo and name.

So, even after this oil price has experienced sudden rise, so we discussed that there are temporary dips with the COVID-nineteen pandemic, oil price became negative, the future contract WTI price became negative.

(Refer Slide Time: 17:56)

The slide features a central graphic of a tree with various icons (gears, a person, a flask) on its branches. The text on the slide is as follows:

Russia-Ukraine war again raising oil price

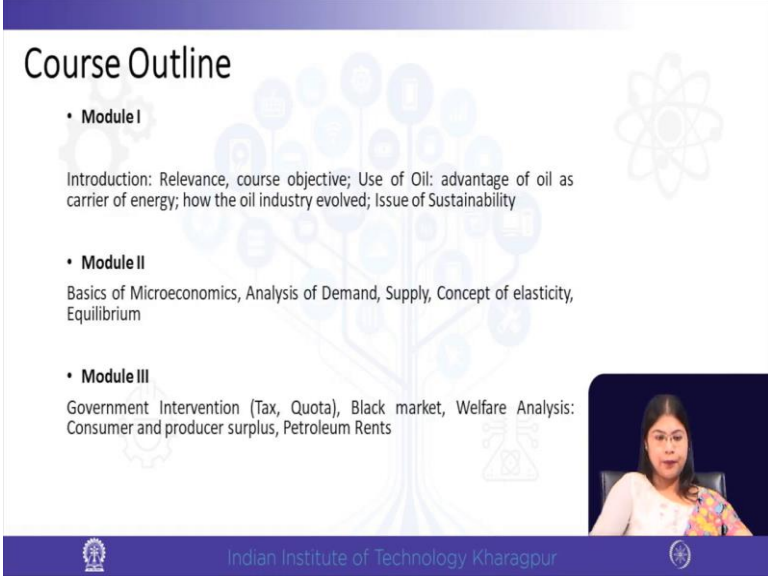
- Since the beginning of the war, Brent crude oil prices reached a 10-year-high of \$130 per barrel at the beginning of March as the UK and US banned Russian oil imports; however, prices later fell to close to \$110 per barrel.

The slide footer includes the Indian Institute of Technology Kharagpur logo and name.

But after the Russia-Ukraine war oil price again started rising. So, since the beginning of the war, the Brent crude oil price reached a ten year high of one hundred thirty dollar per barrel at the beginning of March as UK and US banned the Russian oil imports.

However, prices later declined to one hundred ten dollars per barrel. So, we will discuss all these issues in greater detail.

(Refer Slide Time: 18:22)



Course Outline

- **Module I**
Introduction: Relevance, course objective; Use of Oil: advantage of oil as carrier of energy; how the oil industry evolved; Issue of Sustainability
- **Module II**
Basics of Microeconomics, Analysis of Demand, Supply, Concept of elasticity, Equilibrium
- **Module III**
Government Intervention (Tax, Quota), Black market, Welfare Analysis: Consumer and producer surplus, Petroleum Rents

Indian Institute of Technology Kharagpur

So, before moving forward we will discuss the outline of the course. Now, this course is intended for anyone who wants to understand the global oil market. Therefore, students from disciplines of economics, engineering and science, as well as industry professionals can find the course interesting.

However, as the name suggests that petroleum economics and management, so it is a specialized branch of economics. Therefore, for understanding the issues discussed in the course and for successful completion of the course, one needs to have some overview, some basic concepts of economics.

So, with this let me just outline the course. So, the first module deals with the introduction, the relevance and the course objective which is discussed in the first class. From the second class onward we are going to discuss the use of oil, the advantages of oil over other sources of energy, why oil has become so important in our daily life. Even if it is in scarcity, but it is so important. So, we will discuss the benefits of oil and we compare with other sources of energy.

Next, we will have an historical background and we will discuss how the oil industry has evolved over time. And then we will come to the issue of sustainability from the point of

view of environment and climate change, how to deal with the because oil is something which is stored. We know that its fossil fuel, so the oil that we are currently using that is stored for from the past millennium.

The rate at which it is currently being formed is much less than the rate at which we are currently consuming it. So, at some point of time we may run out of oil, and we do not know exactly how much is there. So, it is this uncertainty that makes the oil market, so volatile and vulnerable.

So, because of this uncertainty, we need to use the resource prudently, we need to manage the resource prudently therefore, we will discuss the issue of sustainability. And we will also discuss the north-south conflict that is the conflict between the developing and the developed countries as far as use of petroleum products are concerned.

Next, before moving forward for the topics to be dealt with petroleum economics course, as I was just mentioning, one needs to have some basic concepts of economics to understand the topics to be covered in petroleum economics and management course. Therefore, some basic of economics will be discussed because the course does not have prerequisite for the purpose that anyone who is interested in the oil market should be able to join the course.

Therefore, there is no prerequisite. But some basic concepts of economics are required. So, in module two, I will start with some basics of economics like what is economics all about? What are the branches of economics? So, microeconomics and macroeconomics and their distinction.

And then, we will also study some basic concepts of microeconomics to the extent which is required for understanding the upcoming topics in petroleum economics and management course. Just for successful completion of the course, whatever concepts from microeconomics will be required, we will cover in module two.

So, we will start with defining market, what do we mean by a market? How the market functions? What are the two sides in the market? There are two sides in the market, the demand side and the supply side. So, we will talk about the laws of demand and supply, the functions, the demand and supply functions. How a market, how the oil price is determined.

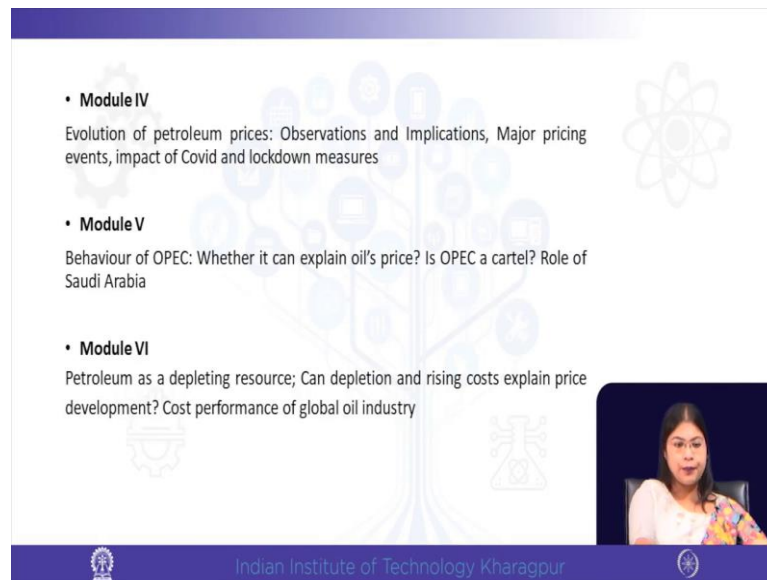
So, in the market how do we say that a particular price and quantity is transacted? So, we will study, we will bring the demand and supply together and we will get the equilibrium. Next, a very important concept as far as petroleum is concerned is the concept of elasticity. If price changes, how much quantity demanded will change? So, this concept is very important.

So, we will discuss, we will define elasticity, its measurement, the relationship between slope and elasticity, the mathematical calculation of elasticity. So, these will be discussed in module two. Now, in module three, we are going to discuss the welfare policies, the public policies, the government intervention like tax and quota. This is because a petroleum products are very important sources of revenue for the national governments, ok.

They are very reliable sources of revenue because as I was telling that petroleum being inelastic in nature. So, even if tax is imposed, the quantity demanded falls by less than percentage magnitude. We will discuss these issues in greater detail. Therefore, the government can earn revenue out of selling petroleum products. So, we need to understand the tax policies, and if there is a quantity restriction how that is going to affect the petroleum market, how that will lead to a black market.

So, we will discuss these government interventions, taxing petroleum, the petroleum rents. And we will do so by using the concepts of surplus, the consumer and producer surplus. So, this is our module three.

(Refer Slide Time: 24:06)



• **Module IV**
Evolution of petroleum prices: Observations and Implications, Major pricing events, impact of Covid and lockdown measures

• **Module V**
Behaviour of OPEC: Whether it can explain oil's price? Is OPEC a cartel? Role of Saudi Arabia

• **Module VI**
Petroleum as a depleting resource; Can depletion and rising costs explain price development? Cost performance of global oil industry

Indian Institute of Technology Kharagpur

So, this module two and module three, basically deals with the basics of microeconomics and economics overall and the government intervention part. Now, from module four, onwards we are into the core of our syllabus. So, module four starts with the movement of oil price. So, how the petroleum price has evolved over time? So, we will start from nineteen seventies to the very recent time of two thousand twenty-two.

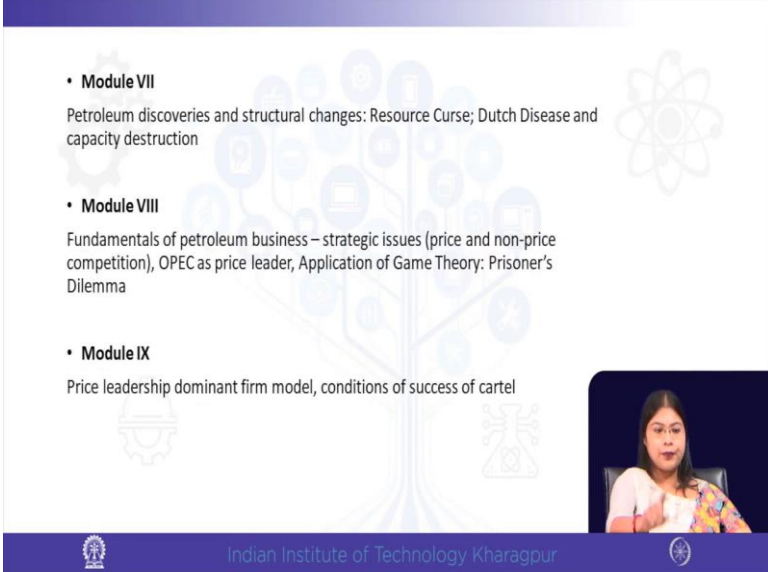
So, we plot the data, we see the movement in oil price and then we relate the oil price movement with the major global events. And then we will study the impact of COVID and lockdown measure, and also the latest one the Russia-Ukraine war impact on oil price.

Now, in module five and six, what we are going to discuss? We are going to explain the oil price movement. So, you see the linkage in module four we are explaining the oil price movement, we are seeing the oil price trend. In module five and six, we are going to explain the reason of such oil price movement.

So, in module four, we are going to ask whether it is it because of the behavior of OPEC that oil price is increasing so much. So, we are going to study the structure of OPEC, the role of OPEC, whether OPEC can explain the oil price movement, ok. So, and we will study the views from the literature whether OPEC is a cartel or not and then we will study the role of Saudi Arabia in particular, because within OPEC Saudi Arabia place the leader.

So, we will study the role of Saudi Arabia how Saudi interventions affect the world oil price. In module six, we are going to explain oil price movement from another point of view, whether is it petroleum because it is a depleting resource. So, is it because of that oil price is increasing? So, we will discuss the issue of depletion, we will study some concepts related to reserve of resource, we will also study the cost performance of global oil industry.

(Refer Slide Time: 26:18)



- **Module VII**
Petroleum discoveries and structural changes: Resource Curse; Dutch Disease and capacity destruction
- **Module VIII**
Fundamentals of petroleum business – strategic issues (price and non-price competition), OPEC as price leader, Application of Game Theory: Prisoner's Dilemma
- **Module IX**
Price leadership dominant firm model, conditions of success of cartel

Indian Institute of Technology Kharagpur

Next in module seven, we will discuss what happens in an economy when suddenly petroleum is discovered, how that leads to a structural change in the economy. So, we will study a two sector simple theoretical model. And then, we will also study the concept of resource curse because many times we see that the economies which are endowed with natural resource, they perform not so good in terms of welfare like education, health, literacy.

So, we are going to discuss the concept of resource curse and Dutch disease with examples of some country experiences. In module eight, we will discuss the fundamentals of petroleum business, the strategic issues of price and non-price competition. We will study the role of OPEC as price leader and we will do so in a game theoretic framework. So, again some basic exposure of game theory will be given with examples of a very famous game of prisoner's dilemma.

In module nine, we are going to discuss the market structure of OPEC, the price leadership dominant firm model, and we will discuss what are the conditions of a successful cartel.

(Refer Slide Time: 27:32)

• **Module X**
Theories of price formation of Petroleum: Intertemporally Optimal Prices; Market Structure – perfect competition versus monopoly

• **Module XI**
The management of petroleum wealth: Uncertainty and optimum rate of extraction

• **Module XII**
Implications of fiscal and trade policies (with special attention to exchange rate policies, BOP crisis and Indian economy)

Indian Institute of Technology Kharagpur

In module ten, we will discuss how prices are formed, because petroleum is in fixed quantity which is used over time. Therefore, in inter temporal setting how the optimal price is formed under different types of market structure or perfect competition and monopoly. In module eleven, we will study under uncertainty how do you find out the optimal rate of extraction because we currently do not know in exact amount how much petroleum is there. So, we need to find out the optimum rate of extraction.

In the last module, that is module twelve, we will study the implications of fiscal and trade policy, because as I was telling the petroleum products are major traded commodity and in international market the exchange rate is important. So, exchange rate is the value of one country's currency in terms of another country's currency.

So, we will see the implication of oil price shock on exchange rate under different types of exchange rate regime, the fixed regime and the flexible regime. And this will be done with reference to the balance of payment crisis that the Indian economy faced in nineteen ninety-one.

So, this is more or less the outline of the course.

Thank you.