**Nanyang Technological University**
**Nanyang Business School**

# BF2217 Commodity Markets

## A) Course Aims/Description

The course aims to give students a solid understanding of commodities markets with primary focus on agriculture, metals and minerals and energy and chemicals. It focuses on fundamental concepts and terminology necessary for understanding commodity production, transportation, economics and marketing. It also educates students in trading technology trends and innovation and look into sustainability challenges and legal aspects.

## B) Intended Learning Outcomes (ILO)/Objectives

By the end of this course, you would be able to:

1) Analyse the basics of commodity trading and worldwide trade flow for the agricultural-commodities, metals and minerals and energy and chemical product markets
2) Evaluate impact of treatment, process and transport methods
3) Evaluate how the commodity markets are inter-linked
4) Analyse corporate social responsibility
5) Evaluate how substitution may impact commodity trade flows

## C) Course Content

## 1. Oil, Gas and Chemicals

**Introduction to Energy and the main sources**

- Oil, Gas, Coal, Solar, Wind, Hydro, Nuclear

**Global energy fuel mix and changing trends**

- Fossil fuel remains dominant
- The rise of renewables
- Growth and challenges

**Singapore energy fuel mix and development**

- Status and recent development

**Introduction to environmental challenges**

- Climate change and CO2
- Carbon tax and implications
- Decarbonisation

**Introduction to Crude Oil and its value chain**

- Exploration and Production (Upstream)
- Types and characteristics
- Supply (source including key players) and demand
- Price markers and valuation

- Shipping and logistics
- Trading and recent development

**Introduction to Oil Products and their value chain**

- Refining and the various oil products (Downstream)
- Applications and markets
- Supply (including key refiners) and demand (users)
- Shipping and logistics
- Price markers and valuation
- Trading

**Introduction to Gas and Liquified National Gas (LNG)**

- The cleanest burning fossil fuel and its growth
- Pipeline gas vs Liquified and their features
- Supply (source and producers) and demand (including emerging markets)
- Processing and shipping/transportation
- Price markers
- Trading challenges and recent development

**Introduction to (Petro)Chemicals**

- The role of Chemical products in our daily lives
- Production: Integrated vs Stand-alone; feedstock types and options
- Main products and specialities including main types of plastics
- Supply (main players) and demand
- Pricing and trading
- Sustainability and circularity

**Introduction to political, policy and sustainability impact on oil, gas and chemicals**

- Energy security considerations and pricing implications
- Regulatory trend and development driving quality and pricing
- Sustainability driven changes
- Long term outlook

## 2. Metals, Minerals and Ores

a. Introduction to Extractive Metallurgy
   - Mineral deposits, mining and extraction
   - Types of metallurgy and mineral processing
   - Classification of minerals
   - Introduction metals refining and smelting
   - Sustainability in a mining environment

b. Technical Marketing & Commodity Analysis
   - Supply & demand planning and long-term price forecasting
   - Value in use modelling
   - Product regulatory frameworks (license to operate)
   - Transportable Moisture Limits & cargo liquefaction
   - Case study

c. From Resource to Market

- Sales and operations planning
- Transport, freight and logistics
- Commodity trade finance
- Commodity value creation levers
- Case study

d. Commodity Trade Risks
   - Types of risks in commodity trade
   - External regulations and legal framework
   - Material risk management
   - Risk assessments (bow tie analysis)
   - Case study

## 3. Agriculture

**Introduction to agricultural commodities and supply chains; Focus on production and processing**

- Key agricultural commodity types and uses
- Scope of agricultural sector worldwide
- Overview of supply chain stages and actors
- Geographic spread of supply & demand; key shifts in agricultural production and economic impact
  - Significance of agriculture commodities to origin countries
  - S&D factors incl. weather, politics, disease, energy (biofuels), changing diets
- Production & upstream processing
  - Input provision, farming, aggregators, cooperatives, smallholders vs. large scale production dynamics, GMOs

**Trading, logistics, and market development**

- Pricing dynamics
- Trading: future hedging, basis pricing, major trade flows
- Logistics: shipping, storage, etc.
- Food and end-product manufacturing and brands
- Market development: investment, building assets

**Sustainability, public policy, and the future of agricultural commodities**

- Agriculture and the climate (GHG emissions, carbon pricing, water use, deforestation, climate change impacts)
- NGOs and industry groups
- National, regional, multilateral policy impacts on agricultural sector – trade and sustainability commitments
- Wrap-up: the future of agricultural commodities

***Deep-dive, comparative case studies will focus on: rice, cocoa, rubber, and palm.***

**D) Assessment (includes both continuous and summative assessment)**

| Component | Weightage | Team/ Individual |
|---|---|---|
| 1. Group Assignment (3 questions, one for each sector) | 30% | Group |
| 2. Group presentation (each group will be assigned to present 1 of the 3 questions done in the group assignment) | 10% | Group |
| 3. Individual reports (Reflection reports: 1 on personal and 1 on working in a group) | 20% | Individual |
| 4. Quiz 1 (Agri- commodities)<br>Quiz 2 (Metals and Minerals)<br>Quiz 3 (Energy and Chemicals) | 10%<br>10%<br>10% | Individual |
| 5. Class Participation | 10% | Individual |
| **Total** | 100% | |

**E) Planned Weekly Schedule**

| Week | Topic |
|---|---|
| 1 – 3 | Introductory discussion on Course matters and three course instructors involved (one hour)<br><br>Metals and Minerals<br>• Introduction to Extractive Metallurgy Mineral deposits, mining and extraction<br>• Types of metallurgy and mineral processing<br>• Classification of minerals<br>• Introduction metals refining and smelting<br>• Sustainability in a mining environment |
| | Metals and Minerals<br>• Technical Marketing & Commodity Analysis Supply & demand planning and long-term price forecasting<br>• Value in use modelling<br>• Product regulatory frameworks (license to operate)<br>• Transportable Moisture Limits & cargo liquefaction<br>• Case study |
| | Metals and Minerals<br>• From Resource to Market<br>• Sales and operations planning<br>• Transport, freight and logistics<br>• Commodity trade finance<br>• Commodity value creation levers<br>Case study |
| | Metals and Minerals<br>• Commodity Trade Risks Types of risks in commodity trade<br>• External regulations and legal framework<br>• Material risk management<br>• Risk assessments (bow tie analysis)<br>Case study |

| | |
|---|---|
| | • Introduction metals refining and smelting<br>• Sustainability in a mining environment |
| | Metals and Minerals<br>• Technical Marketing & Commodity Analysis Supply & demand planning and long-term price forecasting<br>• Value in use modelling<br>• Product regulatory frameworks (license to operate)<br>• Transportable Moisture Limits & cargo liquefaction<br>• Case study |
| | Metals and Minerals<br>• From Resource to Market<br>• Sales and operations planning<br>• Transport, freight and logistics<br>• Commodity trade finance<br>• Commodity value creation levers<br>• Case study |
| | Metals and Minerals<br>• Commodity Trade Risks Types of risks in commodity trade<br>• External regulations and legal framework<br>• Material risk management<br>• Risk assessments (bow tie analysis)<br>• Case study |
| 5 -7 | **Introduction to agricultural commodities and supply chains; Focus on production and processing**<br>- Key agricultural commodity types and uses<br>- Scope of agricultural sector worldwide<br>- Overview of supply chain stages and actors |
| | - Geographic spread of supply & demand; key shifts in agricultural production and economic impact<br>  o Significance of agriculture commodities to origin countries<br>  o S&D factors incl. weather, politics, disease, energy (biofuels), changing diets<br>- Production & upstream processing<br>  o Input provision, farming, aggregators, cooperatives, smallholders vs. large scale production dynamics, GMOs |
| | Recess Week |
| | **Trading, logistics, and market development in Agriculture**<br>- Pricing dynamics<br>- Trading: future hedging, basis pricing, major trade flows<br>- Logistics: shipping, storage, etc.<br>- Food and end-product manufacturing and brands<br>- Market development: investment, building assets |
| | Sustainability, public policy, and the future of agricultural commodities<br>- Agriculture and the climate (GHG emissions, carbon pricing, water use, deforestation, climate change impacts)<br>- NGOs and industry groups<br>- National, regional, multilateral policy impacts on agricultural sector – trade and sustainability commitments |

| | |
|---|---|
| | Wrap-up: the future of agricultural commodities |
| 8 | Recess Week |
| 10-12 | **Introduction to Energy and the main Sources**<br>- Oil, Gas, Coal, Solar, Wind, Hydro, Nuclear<br><br>**Global energy fuel mix and changing trends**<br>- Fossil fuel remains dominant<br>- The rise of renewables<br>- Growth and challenges<br><br>**Singapore energy fuel mix and development**<br>- Status and recent development |
| | **Introduction to environmental challenges**<br><br>- Climate change and CO2<br>- Carbon tax and implications<br>- Decarbonisation<br>**Introduction to Crude Oil and its value chain**<br><br>- Exploration and Production (Upstream)<br>- Types and characteristics<br>- Supply (source including key players) and demand<br>- Price markers and valuation<br>- Shipping and logistics<br>Trading and recent development |
| | **Introduction to Oil Products and their value chain**<br><br>- Refining and the various oil products (Downstream)<br>- Applications and markets<br>- Supply (including key refiners) and demand (users)<br>- Shipping and logistics<br>- Price markers and valuation<br>- Trading<br>**Introduction to Gas and Liquified National Gas (LNG)**<br><br>- The cleanest burning fossil fuel and its growth<br>- Pipeline gas vs Liquified and their features<br>- Supply (source and producers) and demand (including emerging markets)<br>- Processing and shipping/transportation<br>- Price markers<br>- Trading challenges and recent development |
| | **Introduction to political, policy and sustainability impact on oil, gas and chemicals**<br>- Energy security considerations and pricing implications<br>- Regulatory trend and development driving quality and pricing<br>- Sustainability driven changes<br>- Long term outlook |