BUSI4496

Supply Chain Planning & Management

Lecture 1

Introduction and overview

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Outline

1. What is a Supply Chain?
2. What is Supply Chain Management?
   - What do we cover in BUSI4496? – Module Topics
3. Classification of operational systems
4. Learning points – summary

Pre-Recorded Self Study Session on Moodle

5. The Customer Order Decoupling Point (CODP)
6. Contemporary Supply Chains – Digitalisation of Supply Chains
7. Review questions and the examination

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1. What is a supply chain?

THEY ARE EVERYWHERE!

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Supply Chains in the news - globally

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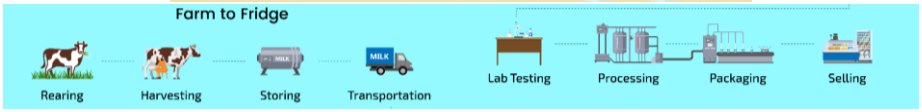
A Simple Supply Chain – Milk & Dairy

Simple with few value adding stages

Why might it be difficult to plan and manage?



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Supply Chains Everywhere

Starbucks

https://www.youtube.com/watch?v=ElYNhGbOTOQ

M&S

They want to be faster and more agile

https://www.businessoffashion.com/articles/news-analysis/ms-breaks-tradition-get-agile-style

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Real Complexity - Boeing - The Dreamliner 787

Flat panels

https://www.youtube.com/watch?v=k4Ng2TptMls

Landing gear

737 production

https://www.youtube.com/watch?v=WTmFXPY0EGI

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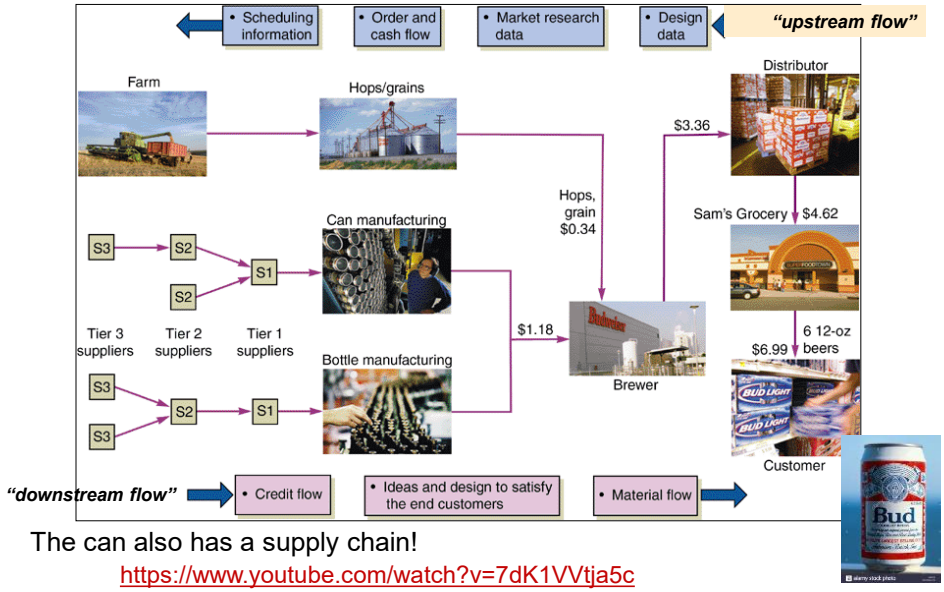
A Supply Chain (SC) – A Brewer's Typical SC



The can also has a supply chain!

https://www.youtube.com/watch?v=7dK1VVtja5c

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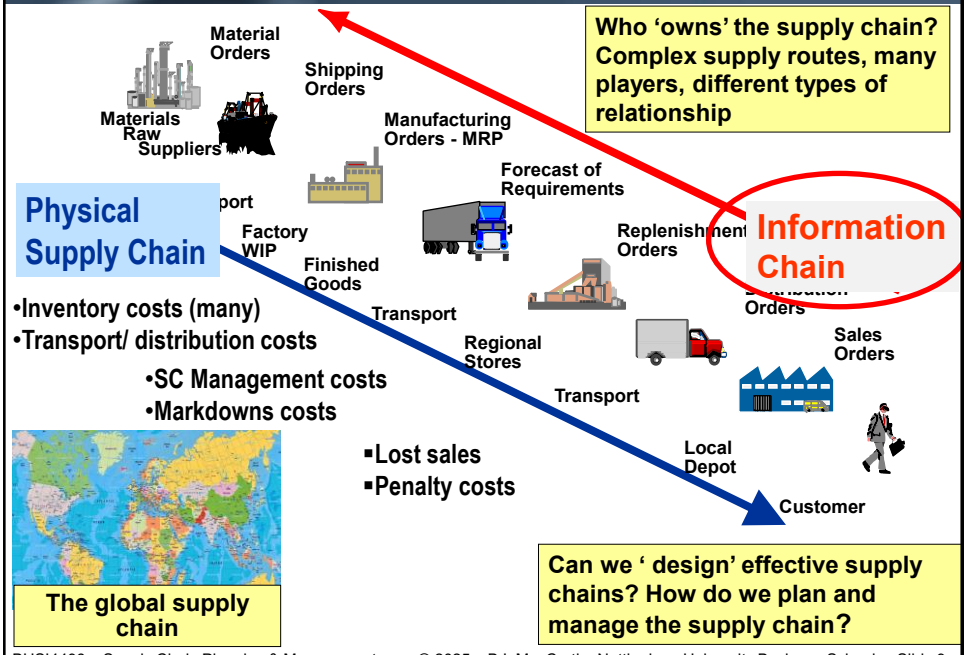
Supply chain flows – material and information



Who 'owns' the supply chain? Complex supply routes, many players, different types of relationship

Can we ' design' effective supply chains? How do we plan and manage the supply chain?

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Supply Chain - definition

"A **system** whose constituent **parts** include material **suppliers**, **production** facilities, **distribution** services and **customers** linked together via the **feed-forward flow of materials** and the **feedback flow of information**."

Stevens (1989)

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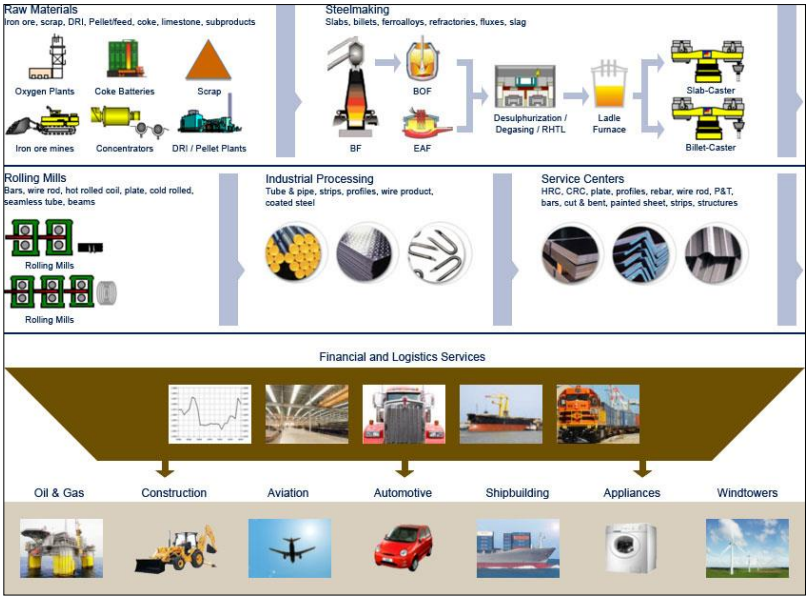
Steel – mature supply chain



http://www.cnfinternational.com/aboutus.html

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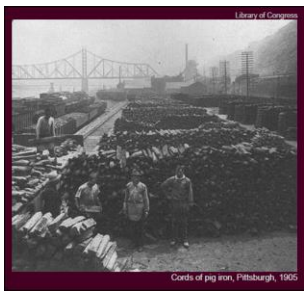
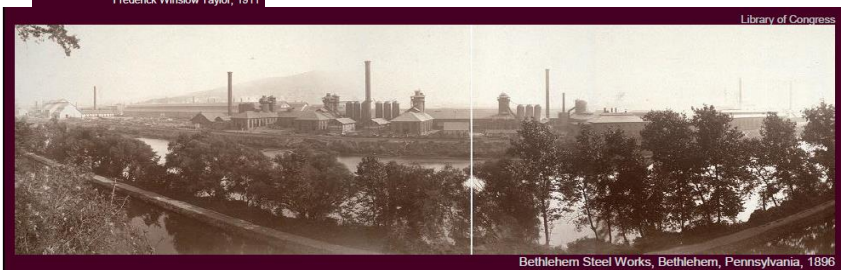
Steel – mature supply chain

Taylor (1911), The Principles of Scientific Management, Harper, NY.





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Clothing supply chains

MacCarthy & Jayarathne (2013)

'Mature' production technologies

but remains a 'low tech' industry

Many changes in global clothing supply networks

Flash memory - new supply chains

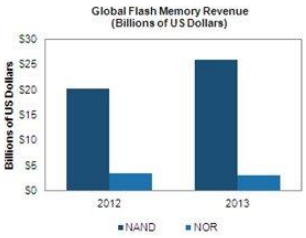
Technology patents barely 25 years old !

Supply Chains only started to emerge in early 2000's !

NAND hits a record year, while NOR Flash shrinks further 25/2/2014

www.electronicsnews.com.au/news/

MacCarthy et al. (2016)



2. What is Supply Chain Management (SCM)?

What do we cover in Supply Chain Planning and Management?

Supply Chain Management - definition

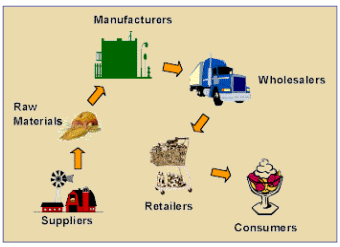
Integrates **suppliers**, **manufacturers**, **warehouses**, **distributors**, **retailers**… so that products and services are **produced** and **distributed efficiently**, in the **right quantities**, to the **right locations**, at the **right time**, whilst **minimizing** system-wide **costs** and **satisfy**ing **service level** requirements.

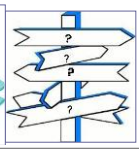
We will deal with the operations and supply chain planning part of supply chain management

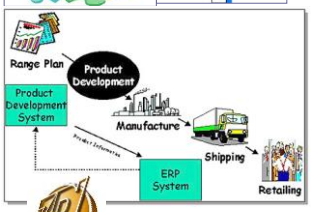
Supply chain management challenges

1. Is my supply chain performing well?
2. Do I need to hold more stock – where?
3. Do I have too much stock in the system?
4. Why can't my supply chain perform more quickly at lower cost?

We will answer **some** of these questions







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Supply chain ramp up – iPhone 17 – 19 Sept 2025

Apple doesn't own any factories!

Why does Apple need Supply Chain Planning and Management?

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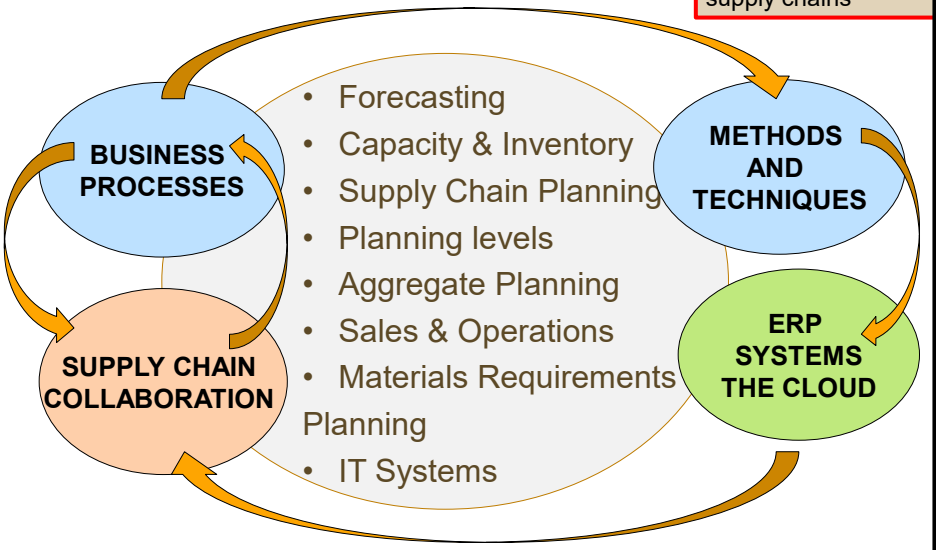
MODULE TOPICS

- **How do you plan supply chain operations?**
- **TREK – C**loud-based ERP

JLR & M&S - cyber attacks affect operations and supply chains



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3. Classification of operational systems

WHY CLASSIFY?

HOW MANY WAYS?

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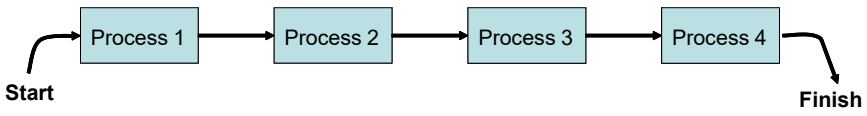
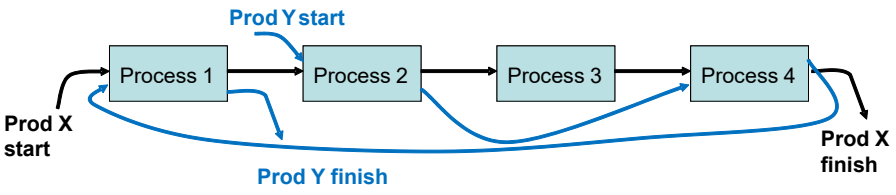
Classification based on routing

- **Flow shop**



- **Job shop**



(+ Project shops)

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Classifications based on flow characteristics

Terminology varies!

- **Volume of flow**
  - Continuous
  - Mass production (repetitive, high speed)
  - Batch
  - Jobbing/ one-off production
  - Project engineering
- **Material flow**

spectrum

discrete ---------- continuous

batch ---- line ---- process

- **Many variations** (e.g. cellular production etc)

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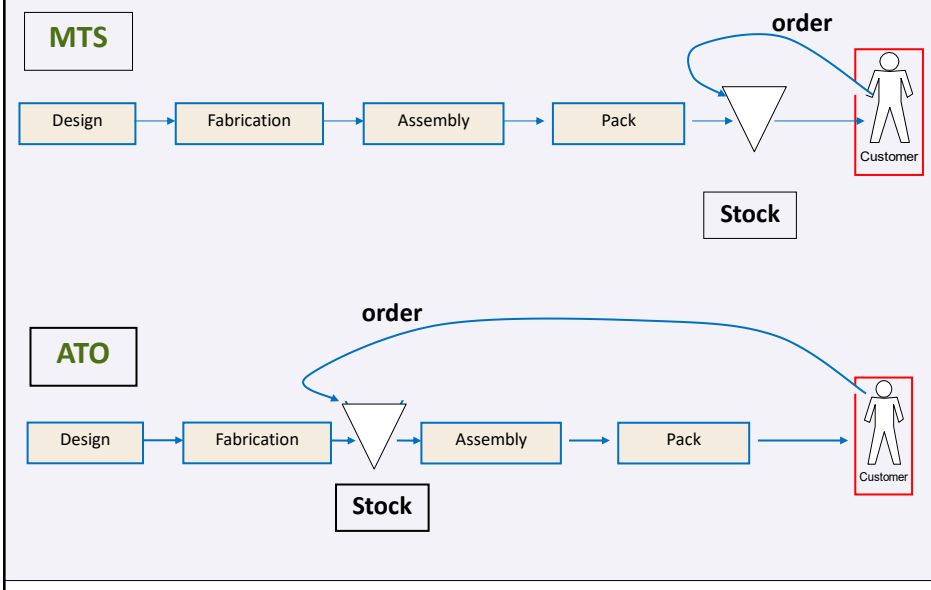
MTS/ATO – how do we meet demand?



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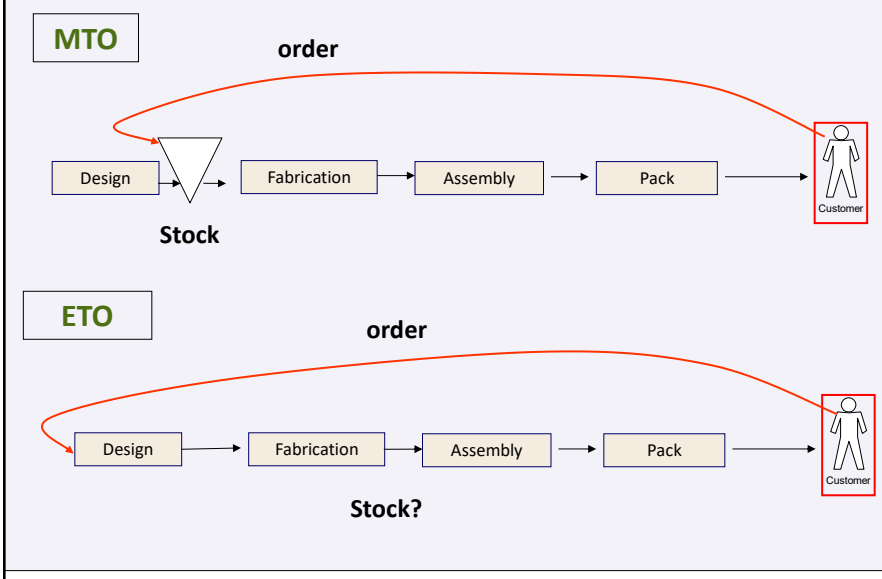
MTO/ETO – how do we meet demand?



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Classification based on how demand is met

- **Make-to-Stock (MTS)**
  - order dispatched from pre-manufactured stock of finished products
- **Assemble-to-Order (ATO)**
  - product assembled from a stock of pre-manufactured components on receipt of an order
- **Make-to-Order (MTO) (or Build-to-Order)**
  - product manufactured on receipt of an order
- **Engineer-to-Order (ETO) (Design-to-Order)**
  - product designed and manufactured on receipt of an order

This classification is important for supply chain planning management and supply chain control!

Notice that the main stocking point moves further upstream as we transition from MTS to MTO/ETO.

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Comparing Make-to-Stock and Make-to-Order 1

Characteristics	MTS	MTO
Kinds of business/ industries	Fast moving, simpler products, high volume, low value, Typical for grocery and many retail products.	Slower moving, more complex and specialised products, lower volume, higher value, Typical for industrial products, machinery, instrumentation
Response time to customer	Tends to be short	May be long
Satisfying the customer with a customised product	Cannot be done	Can be done but the extent depends on the willingness of the producer and the needs of the customer
Cost per unit	Tend to be low if economies of scale and efficiencies in production can be realised	May be high if the volume is low

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Comparing Make-to-Stock and Make-to-Order 2

Characteristics	MTS	MTO
Profit per unit	Tends to be low – small profit margin per unit	May be high, particularly for specialised complex products
In-process inventory	Maintain sufficient in-process inventory to produce at a planned rate based on forecast of demand	What in-process inventories should you keep – do you wait for an order before obtaining inventory?
Risks	What do you do if you have high amount of finished stocks and no customers want them - obsolescence?	What do you produce if you are low on orders – produce nothing?
Operations and supply chain planning	Relatively easy, supply chain and production operations organised for speed and efficiency	May be challenging - depends on the complexity and difficulty of supply chain and production operations

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iPhone 17

Make-to-Order
or
Make-to-Stock?

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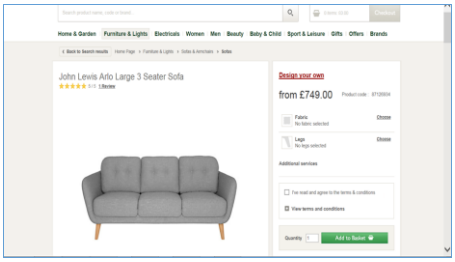
MTS/ATO/MTO?

B&Q household items

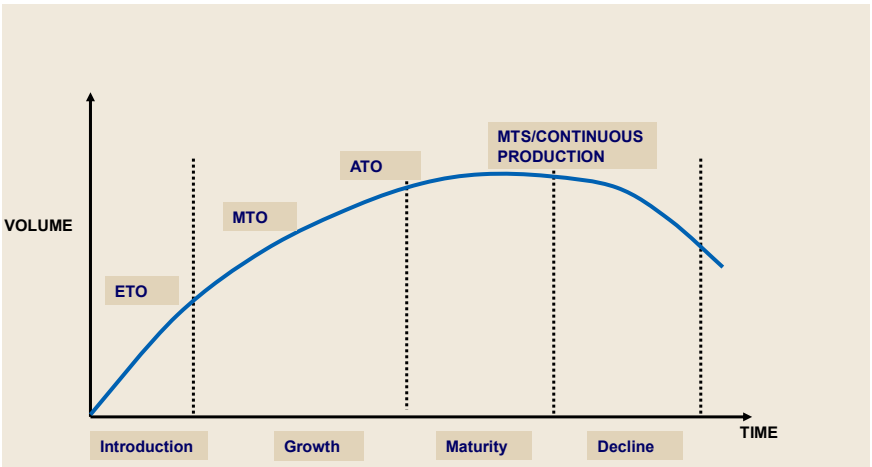


John Lewis custom Sofa

3-door Mini Hatch

Mini cooper custom

Operational mode and Product Lifecycle



The way production/operations is organised can vary over time. A new product may use ETO/MTO in the early phase. When/if the market is mature with stable demand volumes, an MTS approach may be adopted as there is less risk of obsolescence. In the decline phase we may move back to making to order as demand drops.

Summary – key learning points 1

1. A **supply chain** will typically consist of :
   - a **feed forward flow of material** with value adding processes/activities at each stage
   - a **feedback flow of information** on orders, forecast and requirements
2. Supply chains can be **very different in different industries**
   - Some supply chains are well-established, others need to be developed
3. **Supply chains do not run themselves!**
   - they need planning, direction, management and control
4. Supply chain management (**SCM**) requires the **integrated /coordinated** working of many entities
   - This needs **processes, methods** and **techniques** for **supply chain and operations planning**

Summary – key learning 2

5. It helps to **classify supply systems to understand their operations planning and control requirements**
   - For production operations we often distinguish between:

     Flow shops, **Job shops** and **Project shops** (but there are many hybrids)
6. It is very important to understand **how demand is met** in a supply system. We use the terms:
   - **MTS**, **ATO**, **MTO**, **ETO**
   - These apply in different circumstances for **different products** and **different industries**
7. These approaches have **different decoupling points**, where the customer order enters the system, discussed in the **pre-recorded session on Moodle.**