

# BC 3402 Financial Service Processes and Analytics

Seminar 1: Course Overview, Structure of  
Financial Exchanges



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## About Myself

### Service

- Academic Director, Nanyang MBA
- Co-Chair, NTU Senate

### Research

- Senior Editor, *Journal of Association for Information Systems*
- Behavioral Economics, Statistics, Econometrics, Empirical Modeling. Ranked 16<sup>th</sup> globally in individual research productivity (2013 to 2015) by Association of Information Systems (USA)
- Past/ Current projects: Federal Deposit Insurance Corporation (U.S.); NTUC; Khoo Teck Puat Hospital; Tan Tock Seng Hospital; Ng Teng Fong General Hospital; Telenor (Norway); Funding Societies; Capitaland.

### Teaching

- Courses Taught: Accounting Information Systems, Information Systems in Financial Services, Quantitative Research Methods (PhD), Business Analytics (MSc, MBA, EMBA, various Executive Programs)
- Executive training for SGX, Taj Group of Hotels, MTI, STB etc.



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## Useful Information

- 1 session per week, 4 hours
- Assoc. Prof. Goh Kim Huat (Course Coordinator)
  - Tel: 6790 - 4808
  - Email: akhgoh@ntu.edu.sg
  - Room: S3-B2A-34
  - Consultation:
    - By appointment (email please)



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## Lesson Overview

- Administration matters, course overview, expectations etc.
- Structure of financial exchange & the role of technology
  - The Financial Exchange Game



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## Course Objectives

- Understand the impact of financial technologies on financial markets, exchanges, and banking
- Develop the knowledge of different classes of financial information systems such as payment systems, funds transfer networks, trading and settlement systems etc.
- Understand and appreciate different forms of algorithm trading commonly used and its application in general.
- Apply the knowledge and skills acquired in real-world financial services context



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## Seminar Schedule

Week	Topic
1	Introduction
2	IT & Financial Services Industry
3	IT in the Trade Cycle (I)
4	IT in the Trade Cycle (II)
5	IT in the Trade Cycle (III)
6	E-Money and Financial Networks I
7	Financial Networks II: (Electronic Trading Networks) Settlement System in Action
8	Financial Networks III
9	Algorithm Trading I
10	Algorithm Trading II
11	Algorithm Trading III
12	Analytics & Applications
13	Presentation of Projects & Review Session



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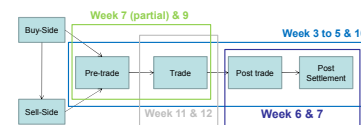
## Type of skills required

- Limited quantitative skills required
- No programming
- Content-based course
- Strong focus on business issues
- Building conceptual skills
- Presentation/ communication skills



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## Outline of the Course



Week 1 and 2 – Overview of the course  
Week 8 – Semester break  
Week 13 – Presentation of projects & review



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### Allocation of Marks

• Class participation & Case Presentation	10%
• Course Project – Group Work	
– Written report & Presentation	25%
• Quiz (open-book)	25%
• Final quiz (open-book)	40%
(Bring along calculators)	
<b>Total</b>	<b>100%</b>



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### Group Project: Preview

Assume you have just joined a software company that develops off-the-shelf software for financial institutions e.g. Murex, SAGE, Algorithmics etc. Your first assignment on this job is to put together materials for a presentation to one of your major potential client, NTUBank. NTUBank is a fully licensed bank in Singapore that provides a wide variety of financial services ranging from wealth management, commercial lending to even investment banking. The business model of NTUBank is that of a "Financial Supermarket" which is adopted by other financial institutions such as Citibank.



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### Group/ Case Presentations

- Form groups of 3 to 4 students each (5 students not allowed)
- Weekly presentation of discussion questions
- Discussion questions consist of a mixture of case and non-case based questions
- Ensure you present at least one case question



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### Deliverables

**Part I:** A sales presentation that will be held during Week 13 of the semester. You have the freedom of choice pertaining to the multimedia used for the presentation but keep in mind the presentation should last about 15 minutes. The sales presentation should be formal – like that of an actual commercial sales presentation. All members of the group are expected to present. A softcopy of the multimedia used during the presentation has to be emailed to the instructor after the presentation for grading purposes.

**Allocation of marks:**

Presentation (individual basis): 5%

Content (group): 5%

**Part II:** A written report detailing the software proposed – including all and additional materials communicated in the sales presentation. The written report should be handed in on or before the seminar in Week 13. Both hardcopies and softcopies of the report are to be submitted.

**Allocation of marks:**

Written Report: 15%



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### Reference Books

- Financial Services Technology: Processes, Architecture, and Solutions (2012), Randell E. Duran, Cengage Learning Asia.
- Barry Johnson (2010). Algorithmic Trading and DMA: An Introduction to Direct Access Trading Strategies. 4Myeloma Press.
- Data Mining for Business Analytics: Concepts, Techniques and Applications (2019) (in R, Python, XLMiner). Galit Shmueli, Nitin R. Patel and Peter C. Bruce
- Data Science for Business: What You Need to Know About Data Mining and Data-Analytic Thinking (2013). Foster Provost, Tom Fawcett



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### Where is the purpose of this place?



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### Class Expectations

- Be on time
- Seminar Structure
- Class Participation
- Group presentation
- Readings
- Homework Assignments
- Textbook vs. Slides vs. Readings
- Group project vs. plagiarism



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### The Financial Exchange Game

- Simulate a financial exchange
  - Back to the old days where IT is less pervasive
  - E.g. SGX, CME Group (CBOT/CME), NYSE
- Focus on understanding the underlying mechanism of trading and the potential role information technology will play



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## Trading Instructions

- Some sellers (black numbers), some buyers (red numbers), some observers.
- Numbers range from 1 to 20
- Conceal your cards **AT ALL TIMES EVEN AFTER THE TRADE!**
- Buyers and sellers negotiate around the class in multiples of \$1.
- Sellers sell at price  $\geq$  to number on your card (the cost of the good)
- Buyers buy at prices  $\leq$  to number on your card (the amount of funds you have)
- List of questions handed out too

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Trading Game

Log in is NOT required

Indicate Game Number \*

Round 1

What price did you BUY/SELL

Your answer:

What is your name? **<Name> <Secret Phrase>**  
e.g. Kim Huat 123

Your answer:

Submit Clear form

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## Closing the deal

- After price is negotiated, go to the front to have the transaction recorded at the desk. (Conceal your card at all times)
- Fill in your "charge slip" and hand it in at the desk
- Go back to your seat and record your earnings on the earnings sheet
- You have 5 minutes to trade. After 5 minutes trading stop, with the exception of those in the queue waiting for transaction recording
- Not everyone will have a successful transaction
- Multiple rounds

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## Charge Slip

- Write down:
  - Your name
  - The transacted price
  - Between you and the transacted party, decide on a "secret" word or phrase (e.g. "this game is so lame" or "BCG")
  - Buyers write down <Name> pay <secret word> <\$transacted price>
  - Seller write down <Name> receive <\$transacted price> from <secret word>

B pay "secret word/ phrase" \$8

B's charge slip

S receive \$8 from "secret word/ phrase"

S's charge slip

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name: \_\_\_\_\_

Seller Earnings		Buyer Earnings	
(sellers use this side)		(buyers use this side)	
first period		first period	
$(\text{price}) - (\text{cost}) = (\text{earnings})$		$(\text{value}) - (\text{price}) = (\text{earnings})$	
second period		second period	
$(\text{price}) - (\text{cost}) = (\text{earnings})$		$(\text{value}) - (\text{price}) = (\text{earnings})$	
third period		third period	
$(\text{price}) - (\text{cost}) = (\text{earnings})$		$(\text{value}) - (\text{price}) = (\text{earnings})$	
total earnings, for all periods:		total earnings, for all periods:	
\$ _____		\$ _____	

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## Hand Signals



THIS SIGN INDICATES BUYING OF SHARES.

THIS SIGN SHOWS SELLING OF SHARES.

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## The Trading Exchange Game (Social distancing version)

- Compute your total earnings, the highest individual(s) will be the winner
- 6 trading sessions
  - 1 mixed (free for all)
  - 2 mixed with (buy-sell signs)
  - 3 buyer-seller split (buy-sell signs)
  - 4 buyer-seller split + tax
  - 5 buyer-seller split with displayed pricing
  - 6 super buyer
- Game starts now

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## The Trading Exchange Game

- Briefly answer question 1 and 2 before the game
- 6 volunteers required
- Compute your total earnings, the highest individual(s) will be the winner
- Volunteers (average out your earnings)
- 6 trading sessions
  - 1 & 2 (regular session)
  - 3 (buyer-seller split)
  - 4 (call out)
  - 5 & 6 (call out & display)
- Game starts now

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### Questions

- What do you think will be the price most trades be transacted at?
- What percentage of the trades do you think will be completed? i.e. If there are 100 buyers and sellers in the class, how many of them will successfully transact at any one period?
- How will you design the trading floor to ensure higher trade completion?
- What will happen to the transacted price and volume if there is a commission imposed on the transaction, where sellers will have to pay \$1 for each trade? What are the implications for financial exchanges?
- What do you think is the impact of announcing the transacted amount loudly to the rest of the class?



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### After the Trade

- Divide yourselves into 6 groups (depending on the number of rounds played)
- Objective of this 2<sup>nd</sup> part of the game is to see how long you take to match all the charge slips to each individual transaction.
- On the given piece of paper, write down the "matched" trades for the trading round that your group has been assigned to.
- Take a moment to think of the strategy before acting on it.



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### Questions: After the Trade

- Is it difficult to match all the trades between the buyers and sellers?
- What are some problems you encounter in the matching? Are there any errors in the buyers' and sellers' charge slip?
- Which team has the fastest time in completely matching the trades? Discuss your strategy.
- What are some ways of which you can modify the recording process so that the matching can be done faster?
- How long do you think it takes to match a trade in an exchange after the trade is completed?



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### Errors

- You never know who you are trading with in an exchange, hence the complexity of matching in trade settlement
- The presences of errors in matching is common
  - Deliberate (e.g. shortselling and fail to honor – with legal consequences recently)
  - Unintentional – transposition errors
- The great pretenders



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### Technology in Financial Exchanges

- Financial Exchanges
  - Achieve price transparency
  - Information Technology helps in achieving that
  - Clearing and Settlement
- OTC versus Financial Exchanges
- Technology in exchanges:
  - Pre-trade analytics
  - Order Management Systems (OMS)
  - Networks
  - Settlement systems
  - Risk management systems
  - Technology to support retail trader



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### The front, middle and back offices

- The game simulates the operations that goes on in the trade cycle
- IT plays a key role in each of this operations
  - Front office (trading floor activities)
  - Middle office (controls)
  - Back office (clearing and settlement)
- How much time do you think has elapsed since the trading floor activities to the final settlement (matching of the "trading slips")?
- Recent focus in IT investments in exchanges



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