2022 Fall
IE 313 Time-Series Analysis

0. Orientation

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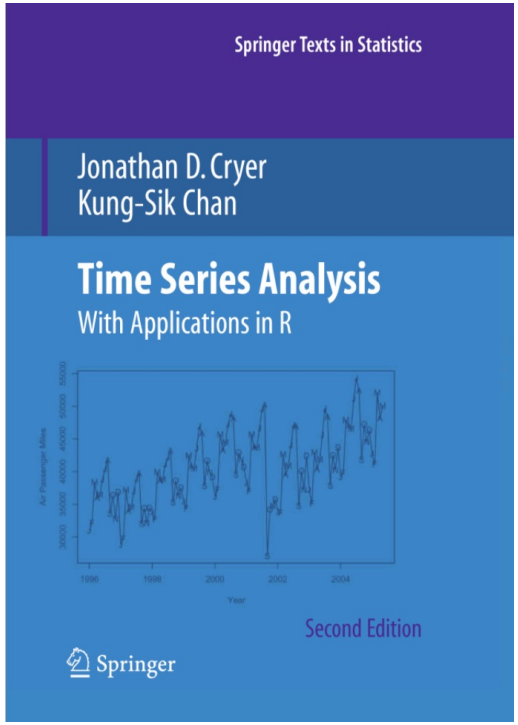
Course materials

- **Textbook**
  - **Time Series Analysis with Applications in R, 2nd edition**
    - by D. Cryer & Kung-Sik Chan, Springer, 2008
    - eBook in pdf format can be downloaded from UNIST Library website



Course objective

- **After this semester, I expect you to know (or to have)**
  - Characteristics of time series data
  - Basic ability infer information from time series data
  - Topics you should study if you want more advanced stuffs

Course plan

- **For each topic,**
  - First, learn theoretical backgrounds
  - Second, be familiar with basic code examples
  - Third, do simple applications on your own
  - The textbook is well-written, so I recommend that you should read the textbook carefully

Course plan

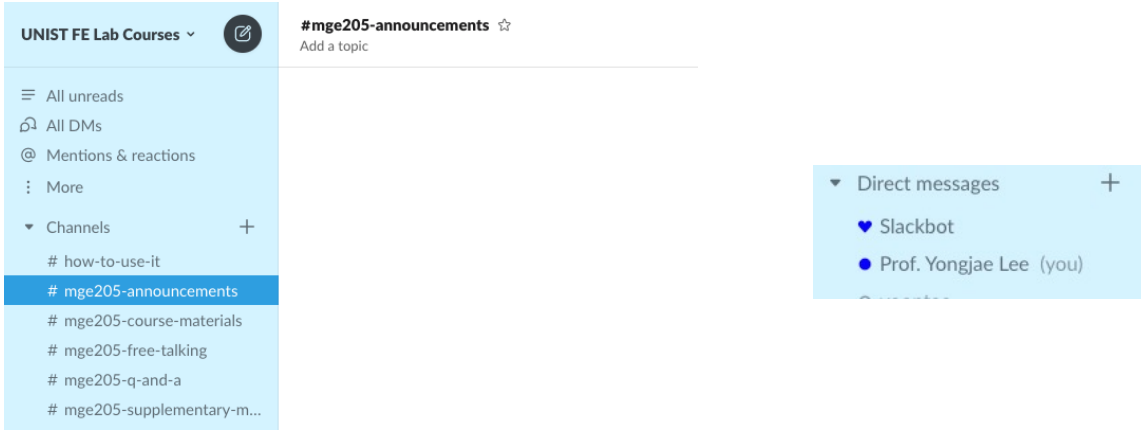
- **A simple project**

  - Choose your own data
    - Real-world data (not some hypothetical data)
    - Should set up a relevant problem

  - Set up the model, run some tests, and infer information
    - Infer important information from the data that can help to resolve the problem

How we communicate?

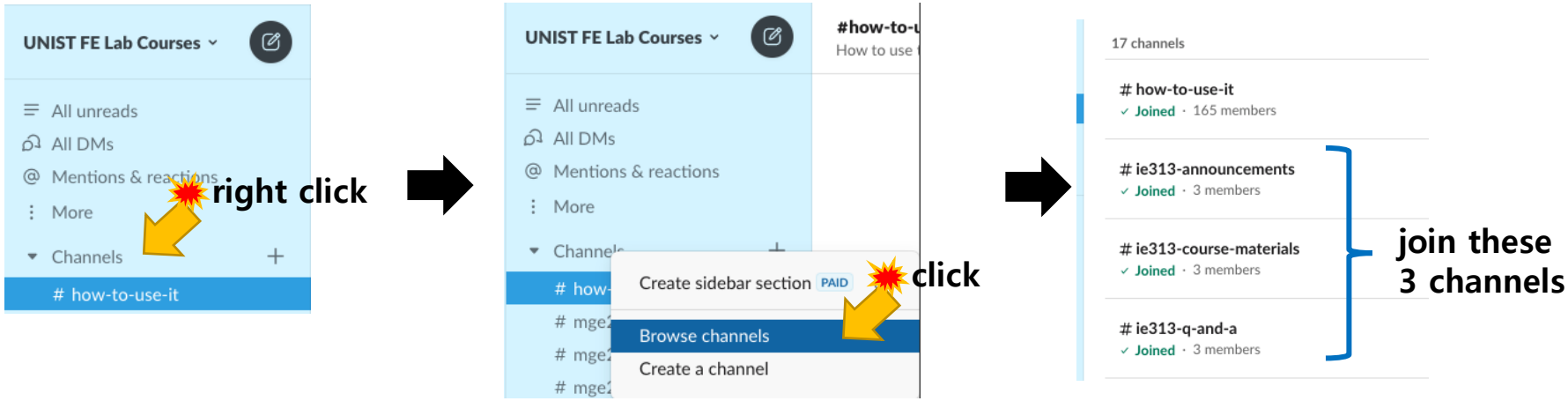
- **Slack**
  - What is Slack? (https://slack.com/intl/en-kr/)
    - It is basically a **messenger** (for web, PC, Mac, mobile)



    - We can create channels like above and have discussions separately depending on the topics
    - Also, we can communicate through direct messages (DMs) (Others cannot see DMs. These are private messages)
      - You can also create group DMs (only group members can see)

How we communicate?

- **Slack (use your UNIST email account)**
  - **Step 1.** Join Slack via the following link: https://join.slack.com/t/unistfelab-courses/shared_invite/zt-1f8y7b4v5-XOozc1qHKOOw8IcNYATW7A
  - **Step 2.** Set your display name
    - Use any display name you want (especially if you want anonymous)
  - **Step 3.** Join relevant channels



How we communicate?

- **Slack**
  - Channels
    - How-to-use-it (default)
      - I will post some rules that you should follow when using Slack
    - Announcements
      - Announcements made by me or TA
    - Course-materials
      - I will upload course materials here as well as BB
    - Q-and-a
      - You can ask questions here. Me and TA will try to answer them. (Some of them might be answered in Live Q&A Sessions)
      - Also, you guys can answer them or have discussion with each other

How we communicate?

- **Slack**
  - Direct messages (DMs)
    - You can DM me or TAs only when you have some personal problems
      - E.g. you would miss live Q&A session because you have to go to the hospital
      - E.g. you have some difficulties in downloading lecture videos
    - Do not ask questions related to courses via DMs. All questions should be made through public channels
  - Overall
    - Please check Slack regularly for sudden announcements or Q&As
    - I recommend you install Slack on your PC/Mac and mobile

Course evaluation

- **Evaluation criteria**
  - Quiz 20%
  - Midterm exam 30%
    - Open-book
    - Within a short time period (e.g. 2 hours)
    - (This might change depending on the university's guideline)
  - Assignments 25%
    - Some assignments might include a bit of programming
    - Roughly 3~4 assignments will be given
  - Term project 25%
    - Application of time series models

- **Note**
  - Any form of academic misconduct will not be tolerated

Bad news (good news?)

- No classes on…
  - September 12
    - 추석 (Chuseok, Korean Thanks Giving)
  - Oct 3
    - 개천절
      (The National Foundation Day of Korea)
  - Oct 10
    - 한글날 대체휴일
      (A substitute holiday for Hangul Proclamation Day)
- Therefore, we **might have a delayed midterm in November**

Weekly schedule (tentative)

Week	Topics	Remarks
1	Introduction & Fundamental Concepts	Chapters 1, 2
2	Trends	Chapter 3
3	Models for Stationary Time Series	Chapter 4
4		
5	Models for Nonstationary Time Series	Chapter 5
6		
7	Models Specification	Chapter 6
8	Parameter Estimation & Model Diagnostics	Chapters 7 and 8
9	Forecasting	Chapter 9
10	Seasonal Models & Time Series Models with Heteroscedasticity	Chapter 10 and 12
11	**Midterm Exam**	
12	ML Time Series Models (State Space Models)	Other materials
13	AI Time Series Models (Recurrent Neural Networks)	Other materials
14	AI Time Series Models (Transformers)	Other materials
15	Additional Topics	Other materials
16	**Term Project Presentations**	