

IE 477/478 Systems Design: Analysis and Synthesis

Second Week: Essentials

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Course Coordinators

Yeşim Gülseren
University-Industry Collaboration
Student Projects Coordinator

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Teaching Assistants

22 September 2023



System view

Factories, banks, restaurants, online shopping sites, airlines,

- *divide into parts:*
inventories, production lines, manpower, orders, customers
- *study parts and their interrelations:*
correlated demand, pull, push, precedence, starvation, wip, loss sales, risks
- *synthesize:*
demand forecasts, basestock levels, production schedules, maintenance

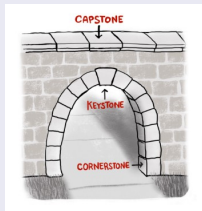
Course mission

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Capstone



Build a path/gate to solutions of problems

- Cornerstones: IE 303, IE 325 (modeling, optimization)
- Keystone: IE 375 (resource allocation of all kinds)
- Capstone: IE 477/478 (analysis and synthesis)

The whole is more than the sum of its parts.

Timeline

22

Sep

Fri

Today

Timeline

22
Sep
Fri

Today

2
Oct
Mon

20
Oct
Fri

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22
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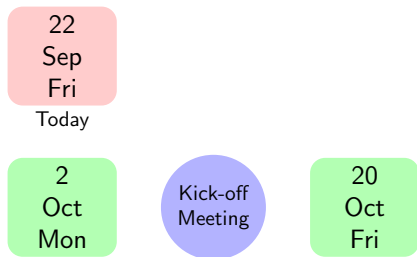
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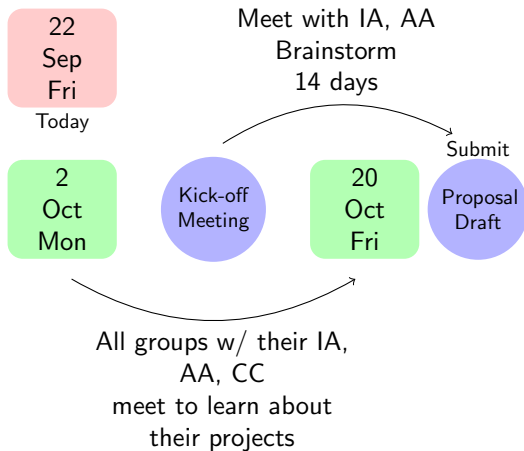
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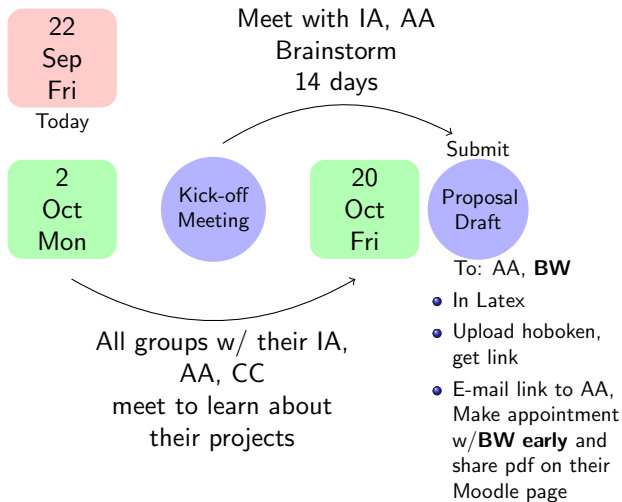


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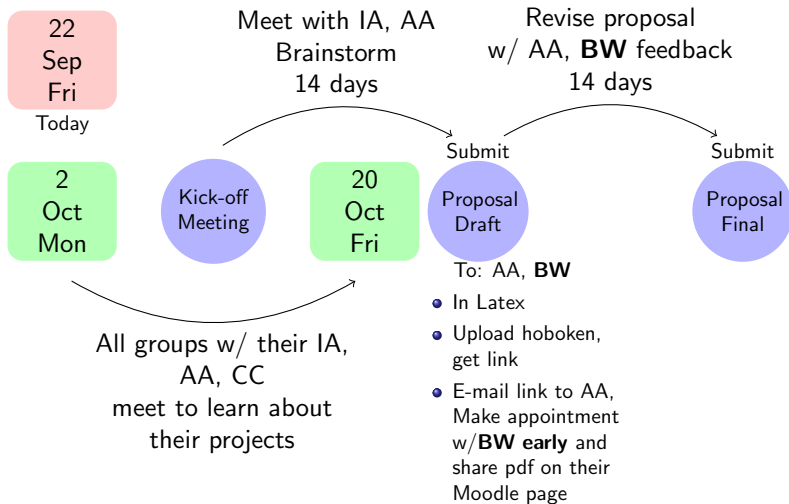
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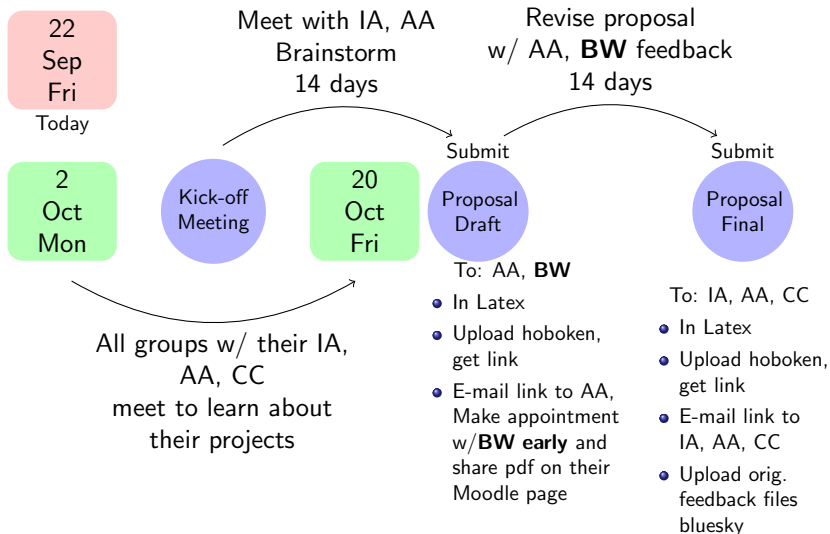
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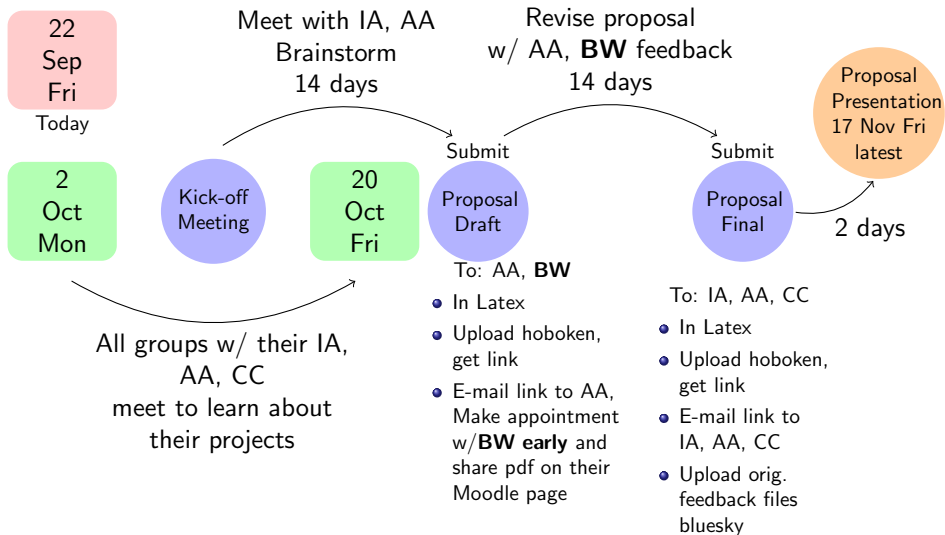
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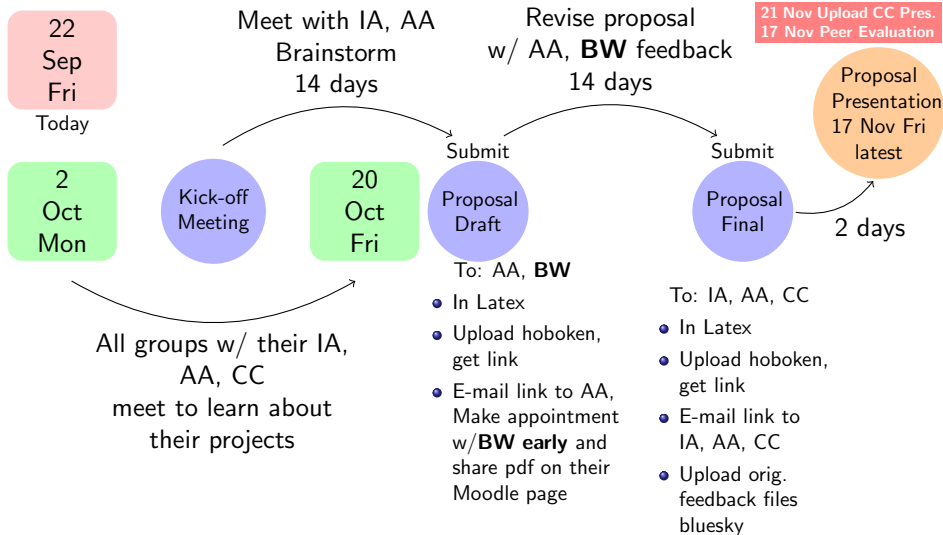
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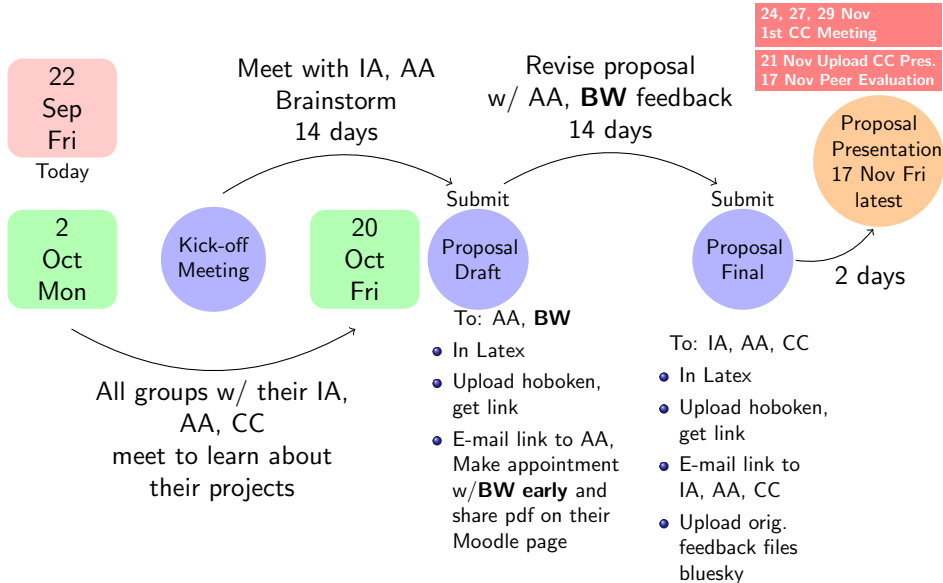
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 - use built-in Gantt chart of **project management system** on bluesky
- Agreeable by IA, AA, CC, the group
 - meet regularly with IA and AA
 - keep minutes of the meeting:
 - what are new actions to be taken?
 - who is responsible for each task?
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- Critical thinking
 - can the real problem be different than what company described?
 - where are the bottlenecks?
 - can there be a solution approach better than what IA, AA, CC may suggest?
 - are the assumptions realistic?
 - are all of important constraints stated?
 - can you solve LP, MIP in acceptable time? do you need a heuristic?

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- CP:
- always available accessible
 - punctual in passing messages
 - kind

We can dismiss CP if s/he does

Roles and expectations, continued

Yeşim Gülseren
University-Industry Collaboration
Student Projects Coordinator

- Seeking projects from companies
- Communication with industrial advisors
- Overseeing project budgets and ensuring their proper use
- Enforcement of non-disclosure agreements
- Organizing course seminars (e.g., project management, teamwork)
- Approval of legitimate project budget spending requests
- Mentoring students on patent applications and entrepreneurship
- Guidance for students to apply for TUBITAK student grants
- Support for project fair organization
- Career advise for students after graduation

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 - fill rate
 - cost/profit
 - multiple?
- compare proposed & current system
- how?
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- April: pilot study
- May 1st Week: DELIVERY

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Rest of May: reports,
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 - Read answers or post questions on [LaTeX Issues](#).

Reports

- write all reports in LaTeX and upload to [hoboken](#) (instructions are there).
 - use LaTeX class file [bule47x.cls](#) designed for reports
 - skim [latex report example.pdf and its tex file](#). Learn how to
 - create sections, subsections, subsubsection, appendices,
 - write math, inline and displayed formulae,
 - create tables, figures, code listings, and bibliography,
 - cite others' work, refer to tables, figures, and code listings.
 - download all files zipped in [bule47x report latex class](#) together. Use `report.tex` for proposal and `report.bib` for bibliography.
 - do not change class file. Do not use overleaf.com. Their LaTeX code is not portable. Otherwise [hoboken](#) will reject your report.
 - Use [TeXStudio](#) to write your report. See [LaTeX Tutorial](#) for details.
 - Read answers or post questions on [LaTeX Issues](#).
- before writing proposal report go to course homepage and read
 - [IE 477 – General Tips on Writing Reports](#) (1 page)
 - [IE 477 – Suggested Contents for Proposal Report](#) (3 pages)

For the upcoming reports (first progress report in fall, second progress, final, and booklet reports in spring) go to [Information on Reports](#) page.

Teamwork

- be professional, respectful, responsible
- CCs will check each member's contribution with questions during CC meetings.
- meet AA and IA regularly.
 - Meeting with each once a week is ideal
 - Use project management system
 - Send iCal invitations for new meetings
 - Before: write agenda, share it, ask invitees for additions of new agenda items
 - After: write minutes, share them, invite for additions and corrections
 - Before meetings come up with well-thought questions
 - Be ready to answer what/how/why/when questions about your work

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 - Always take notes on
 - new actions to be taken
 - who will be in charge?
 - when are they scheduled to be finished
 - Write meeting minutes
 - At the beginning of each meeting, go over the previous meeting minutes. Check if the project progresses as it was planned.

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- do not forget to fill the peer evaluation forms. If you fail, then your grade will be lower.

Data

- anticipate what you may need and how to use it before asking for it
 - plan ahead your analyses
 - do not ask for more than you need
 - ∴ cut waiting time
 - ∴ spare their patience / efforts for the unexpected in future
- often come late
- can be incomplete and inaccurate
- always have plan B. Perhaps simulate data
- we will not accept “lack of data, poor data quality, etc.” as an excuse for an “empty” report.
- no-disclosure agreements (NDA) take time to process:
 - finalize agreement content (Yeşim Hanım)
 - sign in person
 - send to company in mail (not enough to email scanned copies)
 - company signs at its own time of convenience – can take long time on its own.

Start right after kick-off meeting.

PROJECTS

Received 26 projects.

Rank them.

Submit preferences by 17:30 today.

Projects

- Arçelik (6) , Eti (2), Unilever (2), Brisa(1), Erkunt (1), Meteksan (1), Solvoyo (1), Supply Chain Wizards (1), Tepe Betopan (1), Türk Traktör (1)
 - Inventory management
 - Production planning
 - Scheduling
 - Forecasting
 - Process improvement
 - Revenue management (ARPKM how to reduce complexity in design and supply chain, the latter is about reducing product variety)
 - Maintenance
- New companies
 - Nesco / Ankara
 - produces tea extracts
 - run by a former Bilkenter
 - stock optimization
 - Buluttan Weather Intelligence / İstanbul
 - mine weather data for actionable information for farming, sport events
 - run by former Bilkenters
 - data science project

Projects continued

- New companies continued
 - Nestle, İstanbul
 - food sector
 - replenishment, cleaning, and maintenance activities planning with heavy dependence on demand forecasting.
 - stations are scattered around, remote data collected regularly and stored in databases
 - effective use of limited number of teams
 - Turkish Technologies, İstanbul
 - Three projects (one will be accepted)
 - Scheduling
 - Forecasting - abundant data - working along side with data analytics group
 - Ata Teknoloji, İstanbul (Burger King)
 - Two projects (one will be accepted)
 - Manpower planning, forecasting, inventory planning
 - Emeklilik Gözetim Merkezi, İstanbul
 - Supports BES and BEFAS with new policies and projects to increase the participation in private pension system
 - Measure the financial performance and risks associate with various BES funds
 - Enhance default BES fund portfolio for individuals participating private pension
 - Financial engineering, investment analysis, forecasting