Meeting 5

Date	Tuesday, 09 February 2021
Attendees	Dr Ali Yetisen (AY), Marie Jones (MJ), Mathusan Kandiah (MK), Zong Lee (ZL), Yuxin Liu (YL), Mustafa Nasar (MN), Helen Ogbobi (HO), Wei Ooi (WO), Andreas Richardson (AR), Stephen Tan (SN), Sathurthini Thurairatnam (ST), Mingchuan Zheng (MZ), Antonia Feilden (AF), Abdullah Ahmed (AA)
Apologies	
Chair	Zong Lee (ZL)
Secretary	Mustafa Nasar (MN)

Minutes

Item	Discussion
1 – Recap of interim report (teamwork)	**Teamworking** ZL: Improvement in optimising time since week 1 → meetings were split so only necessary people need to attend; subgroups made effective ZL: Need to improve work allocation (too much pressure on YL regarding Aspen) MJ: People moved around teams close to the deadline due to the pressure → poor management ZL: Suggestion – reallocation after every two weeks SN: Work is very interdependent – need to convey requests to other teams; need to find an effective method AY: Rate your interim report 1-10 ZL, HY, MK: 7 or 8 AR: Useful substitute to daily check-ins → read other team's report section MK: Could implement AR's idea weekly (once a week) AY: For teamwork, look at Slack. Any ideas from AA and AY? AA: Make an Excel deliverables sheet which has deadlines → update it daily, overview other people's tasks, see where workload needs to be shared (X is working on 10 tasks whereas Y is working on 3) AY: Important to build your network and friendship during FYD AA: Take out an hour each week to talk and socialise AF: Do a personal check-in with each teammate (job apps, home responsibilities, other course deadlines, etc) → implement in daily check-ins AY: Book a meeting with Faith Marsh regarding team wellbeing **Interim report feedback** ZL: What can be changed from interim report? E.g., if we find a better reactor, can it be changed? AY: Yes AY: Feedback timeline – 2 weeks for me to review, 2 weeks for KH to review ZL: Request ed AY to provide feedback directly to us as soon as possible AY: Yes, in 2 weeks
2 – Final report	**General report & working style** ZL: Tips for moving from interim to final report? AY: Even distribution across all sections of the report

	AY: Develop a clear outline early and follow it (stay organised) AY: Who will be keeping track of the team and coordinating all the teams? MJ: Volunteers AY: Need constant communication between upstream and downstream teams (e.g. changes in reactor teams affects separation and finance) AR: Major change decisions need to be relayed immediately ZL: Need to draw the line as to when to stop changing things AF: Be open to change, but be rational as to how necessary it is AF: Have a quality checking procedure in place to keep checking your work (have your Aspen reviewed by others!)
3 – Progress update	**Synthesis** MJ: Our process is quite novel (not commonly found in industry) → we had to handle each reaction individually and then find the best way to combine the process (e.g. use MCDM) MJ: Next step is to perform in-depth sensitivity analysis to make sure our findings are robust MJ: Next steps is also to investigate process intensification and heat exchange MJ: How to do a sensitivity analysis – what is interesting and relevant? AA: Determine all your key parameters – do a sensitivity on these AY: There are many parameters and errors (e.g.intra-/inter-experiment errors, instrument errors, etc) – find the key ones AY: If you are not analysing an error/parameter – justify why not AA: Is KH sharing information about sensitivity analyses, MCDM, other useful synthesis tools? MJ: Yes, it is posted on BB AA: Will go through links and let you know an ideal way to go ahead with sensitivity analysis – contact AA **Reactor** ZH: 4 reactors chosen → need to decide which one to focus on for the final report. ZH: Need to decide the exact parameters for the reactors in the final report – any tips? AA: Safety, scalability, industrial transition from batch to flow, what factors affect this transition [upscaling of existing employees, compatibility with existing equipment (translation potential of project)] AF: Nitration is very exothermic – look at heat exchange potential AF: Caution: A big pressure drop can affect your reactor AF: Determine compatibility with chemicals (acids) → understand the corrosivity of your reactor (varies with temperature) AY: Look at automation, look at industry principles ZL: Should we discuss novel technologies (e.g. automation) in our final report? ZL: Include it NOW – your final report should be novel ZL: Should we include a comparison of current technology vs. our new continuous technology? AY: Yes, include that to emphasise the importance of this new process **Separations** SN: Description of the current separation system SN: Next steps: do more detailed design of each unit SN: We are lacking novelty – our separation is standard

	AY: It is not necessary to have novelty in each section AF: Have you looked into counter current LLE columns? There is increased in LLE vs. stationary processes SN: Yes, seen 1-2 reports MZ: Did not feel it was novel AF: Having a flow unit takes less space (cheaper) SN: Any other considerations? AA: Cost is a major factor – 40% of industrial costs are due to separation AF: Other factors: solvent dilution, recycle, waste, does your process release heat? **EHS** HO: How to achieve ALARP? Advice? AY: Prioritise the most important aspects (e.g. pressure, heat) in every single section and execute it → don't focus on minor aspects AY: Six section - six aspects in your first layer AY: Have an internal discussion amongst each team → each sub team reports their safety aspects to HO and HO will put a constraint on their suggestion (yes/no/limit is XX) AY: HO gives input to sub teams and they should reduce their risks AA: Fault tree, HAZOP analysis? AA: HAZOP – is it done with all stakeholders? HO: It would be done by myself and just process flow team AA: After HAZOP, have an internal meeting with every stakeholder (it is important to get everyone's input) AY: Everyone contributes and then HO does the final execution AR: Get everyone on board as it also comes in the exam **Business** MN: Progress has been good; team size will need to increase (2-4 people) as economics become larger MN: Tasks include cash flow statements, KPIs like NPV, etc AA: Ready a template for your cash flow statement, balance sheet, etc
4 - AOB	
5 - Finishing	Next meeting: 3 pm on 16/02/2021

Actions

Description	Assignee	Due
General		
-Find a method to convey requests between sub teams	All	16/02/2021
-Create outline for the final report and timeline	MJ	16/02/2021
-Track the final report outline	MJ	Ongoing
-Quality checking procedure (checking Aspen, Excel,etc)	All	Ongoing
-Decide sub team split for Weeks 5 and 6	All	Done
-Review guidelines, briefings and past reports to plan upcoming work	All	10/02/2021
-Plan report structure (each team)	All	16/02/2021
Synthesis		
-Contact AA about sensitivity analysis methods	MJ	16/02/2021
Reactor		
-Decide on unit for detailed design	ZL,WO,AR	16/02/2021

Separation		
-Decide on unit for detailed design	MK,MZ,ST	16/02/2021
Safety		
-Look into mechanical integrity	HO	11/02/2021
Business		
-Create template for financial calculations	MN	16/02/2021

Approval

Ali K. Yetisen Dr Ali Yetisen *Facilitator*	Zong Hao Lee Zong Lee *Chair*	Mustafa Nasar Mustafa Nasar *Secretary*

Signature: 

Email: mustafa.nasar17@imperial.ac.uk

Signature: 

Email: zong.lee17@imperial.ac.uk

Signature: 

Email: a.yetisen@imperial.ac.uk

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Final Audit Report 2021-02-09

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