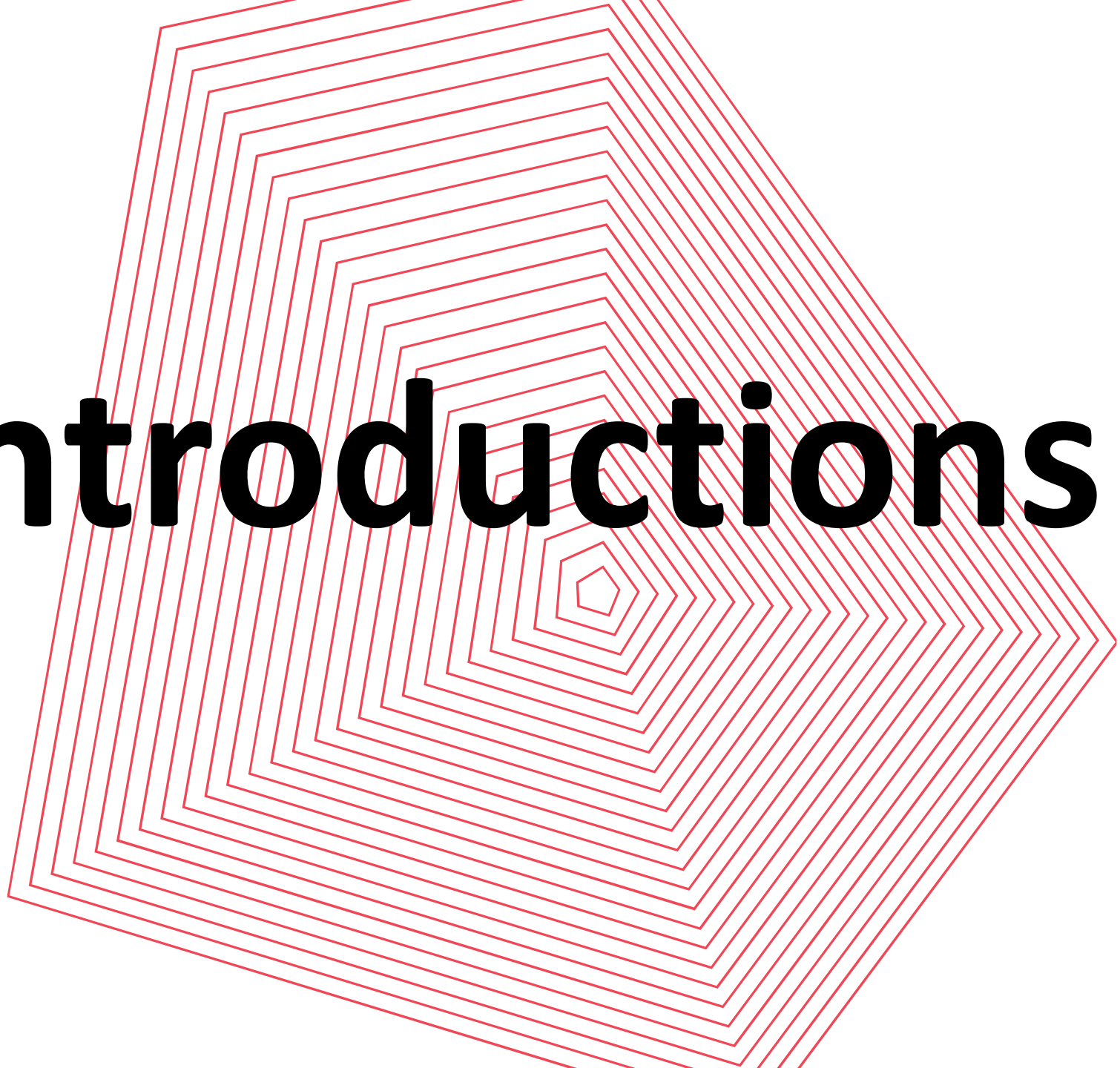
Week 1

GSOE9820 Engineering Project Management
Term 1 2025
Dr Imrana I Kabir

UNSW SYDNEY



Introductions

GSOE9820

Convener:

Imrana Kabir

Project Manager : Refurbishment of Pyrmont Bridge

ACADEMIA:

Ph.D. ***Materials Sci. and Eng., UNSW Sydney***
- Photocatalytic ceramics

B.E. (Hons)/Commerce, ***UNSW Sydney***
Materials and Mechanical/Finance
Project management degree, USA

INDUSTRY: (> 7 years experience)

Project Engineer , *Garlock Sealing Technology*, (Sydney/New York/Quebec)

Project Manager, *Sydney Harbour Foreshore Authority*
Pyrmont Bridge Rectification

Research:
- Fire, defence and project management

Fire engineering research 2019

Winner of ARC Hub for Fire Safety

Head Demo – Yingbo Sun

- Class 2 Division 1 Honors Bachelor Degree in ME
- 7 terms demo experience
- 3 terms admin experience
- Industrial experience in Fire Services

Demonstrators











- Yingbo Sun (Head Demonstrator)
- Archana Govindarajulu
- Bernard Hayes (Wind Farm Sponsor)
- Ramya Kumar (IT Sponsor)
- Dylan Sanusi-Goh (Transport Sponsor)
- Anita Cheah
- Kiran Jeet Kaur
- Fangzhou Wang
- Jiaying Liang
- Janhavi Jain
- Vandit Sadaphale

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Guest lecturers

Bernard Hayes – 38 year career as an engineering executive in major global infrastructure and engineering organisations in the power industry

Ibrahim Dani – Worked in multiple roles in Optus and Macquarie Bank in Sydney and in Abu Dhabi Investment Authority in the UAE, among other organisations in Sydney and overseas.

What is a Project?

'A project is a temporary endeavor undertaken to create a unique product, service or result'

- Software Development
- Systems Engineering
- Aerospace, Defence
- Nuclear Engineering
- Civil Engineering, Construction
- Demolition
- Media, Film, Advertising
- New Business Systems And Processes
- Events
- Research And Development
- Company Restructuring
- Change Management

PMBOK Guide (6th Ed) Part 1, Sec. 1.2.1.

The project economy

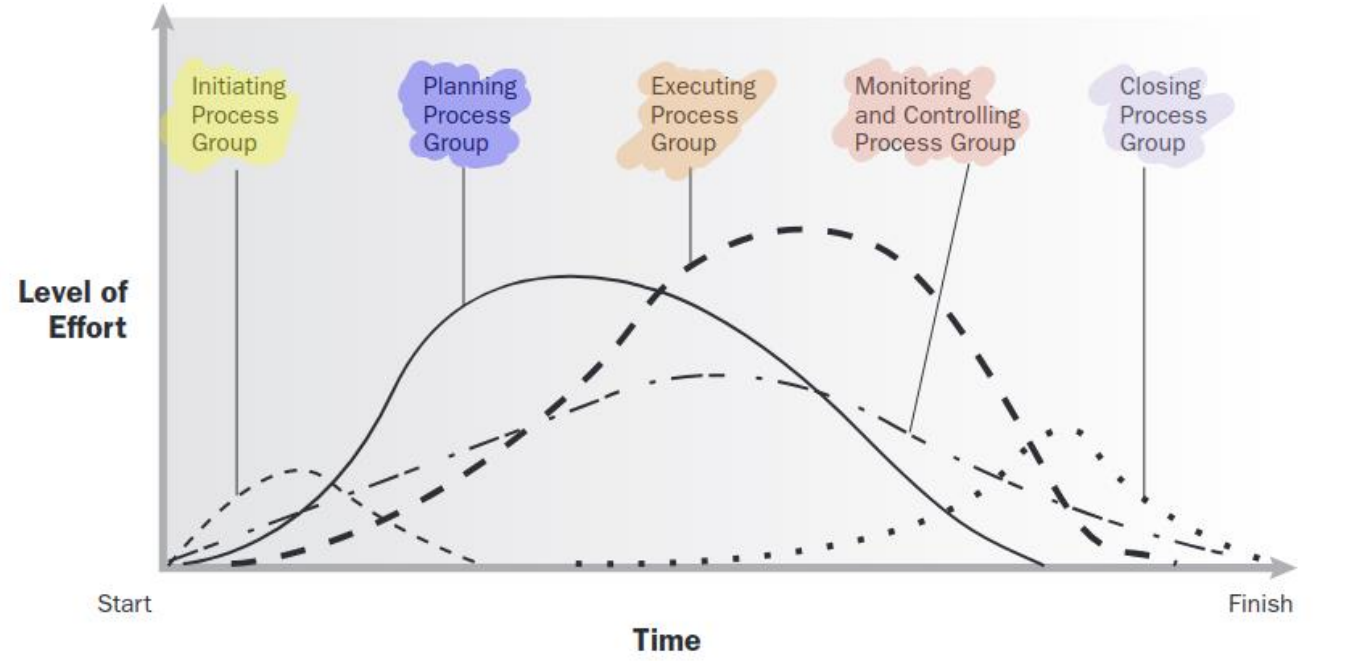
Project as driver of change

- Organisations that do not change (i.e. “that is always how we’ve done it”) are sinking.
- Change is an essential business asset and is only realized through projects.
- Innovation and change through projects is disrupting industries and elevating businesses to new heights!

Yet: managing change is one of the most challenging aspects of being PM!

PMI Pulse of the Profession Report 2020 Link

The Project lifecycle



Starting the project

Organizing & Preparing

Carrying out the work

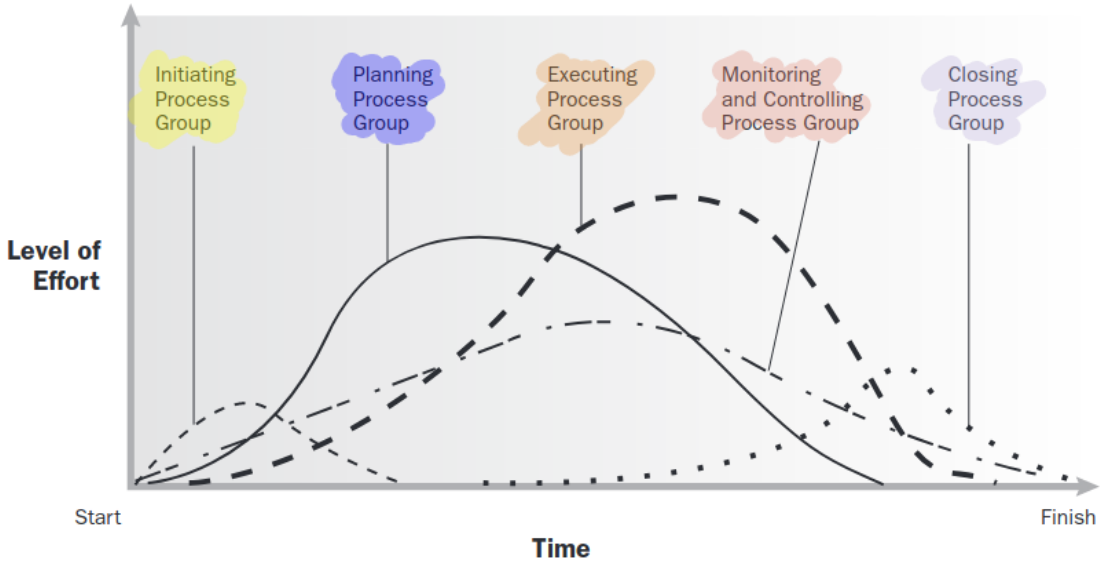
Ending the Project

PMBOK Guide (6th Ed) Part 2, Sec. 1.5 – 1.9
(Figure 1-5)

Initiation

Weeks 1-2 in this course

- Defining a new project or phase of a project
- Translate organisational strategy to project deliverables
- Defining the project's scope
- Developing the project objectives
- Identifying stakeholders
- Aligning scope with stakeholders expectations
- Appointing a PM
- Developing the Project Charter
- Authorizing the project
- Committing resources



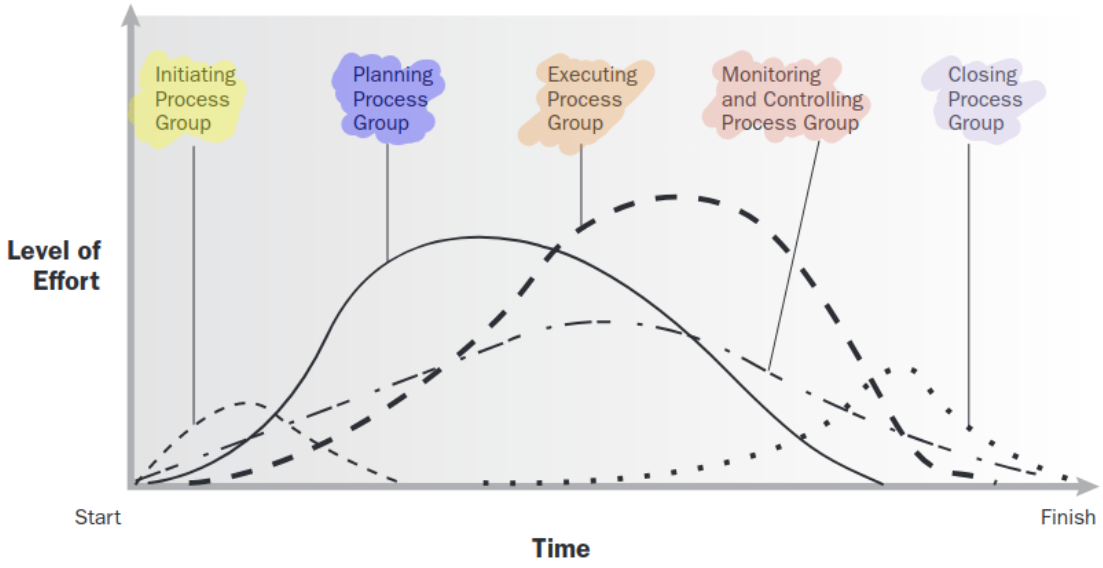
*Deciding **what** you are going to do, showing **why** this is beneficial, and seeking **authorization** to get started*

PMBOK Guide (6th Ed) Part 2, Sec. 2.

Planning

Weeks 2-6 in this course (most of the course)

- Carefully define the project's objectives
- Solicit all requirements
- Gather information
- Formulate project scope
- Select project management methods
- Analyse uncertainly, risk and opportunity
- Analyse options and make decisions
- Make decisions about how to proceed
- Integrate and justify project plans
- Plan work, resources and communications
- Develop the Project Management Plan



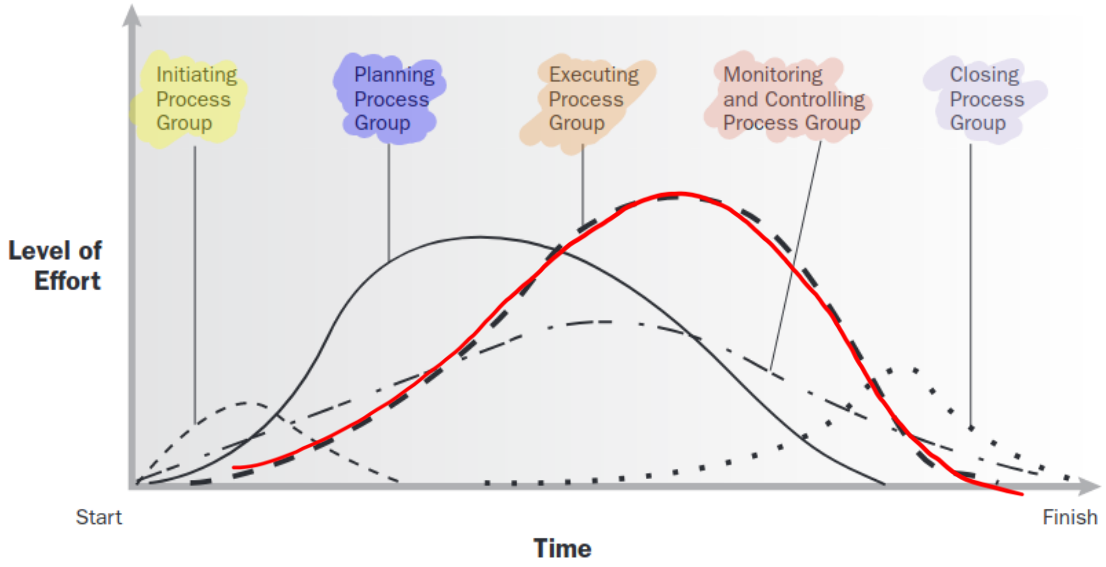
*Deciding **how** you are going to achieve the objectives and **designing** the project that will do this for you.*

PMBOK Guide (6th Ed) Part 2, Sec. 3.

Executing

(less important in this course)

- Directing project work
- Completing work
- Coordinating resources
- Managing stakeholders
- Integrating activities
- Conduct Procurements
- Manage and develop the team



Managing *people and work, directly using up resources to create the product.*

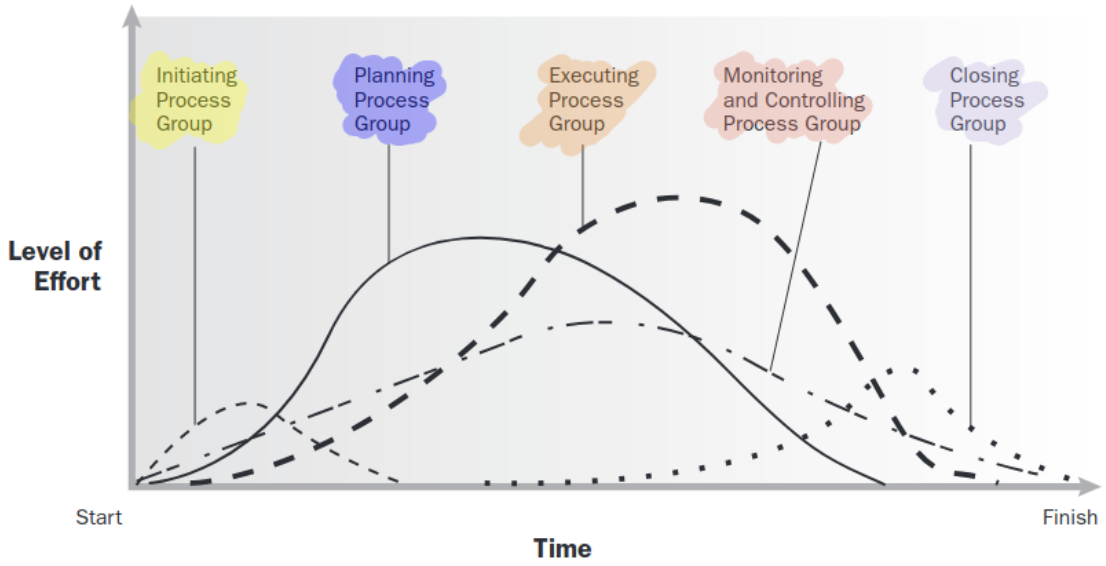
PMBOK Guide (6th Ed) Part 2, Sec. 4.

Monitoring & Controlling

Weeks 7-8 in this course

- Evaluate progress
- Control change
- Report progress
- Analyse performance
- Validate scope
- Control schedule, cost quality
- Monitor risks
- Control procurements
- Monitor stakeholder engagement

PMBOK Guide (6th Ed) Part 2, Sec. 5.

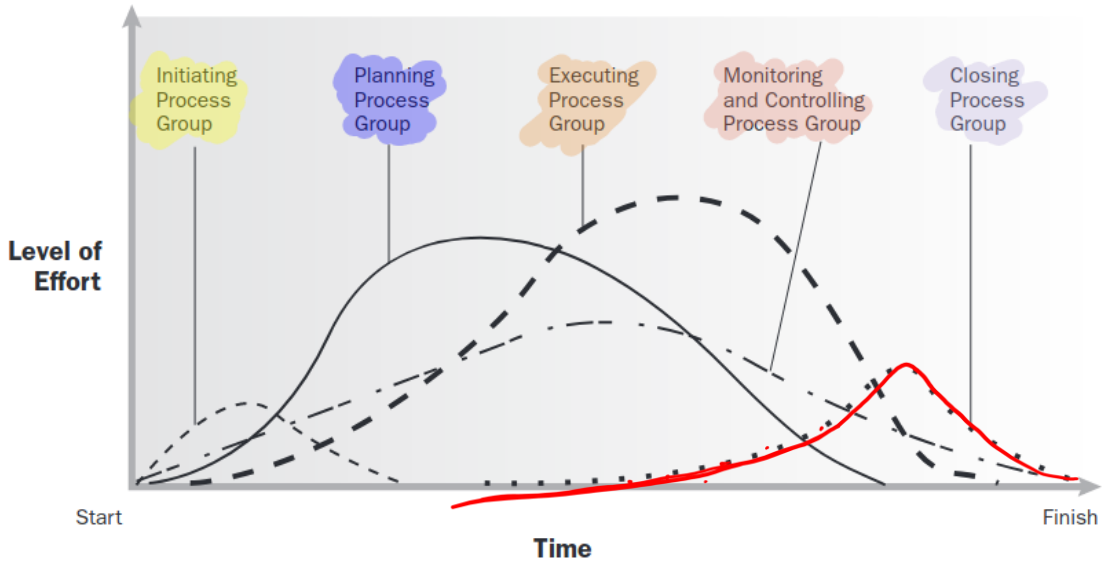


Monitoring, Evaluating *and* ***correcting*** *project activities.*

Closing

(week 9 in this course)

- Interpret success
- Identify lessons learned
- Manage and record project knowledge
- Measure stakeholder satisfaction
- Finalise costs
- Formally close out project activities
- Give recognition for achievements



Finalizing project activities, but also evaluating success and celebrating achievements

PMBOK Guide (6th Ed) Part 1, Sec. 4.7.

What is the PMBOK Guide?

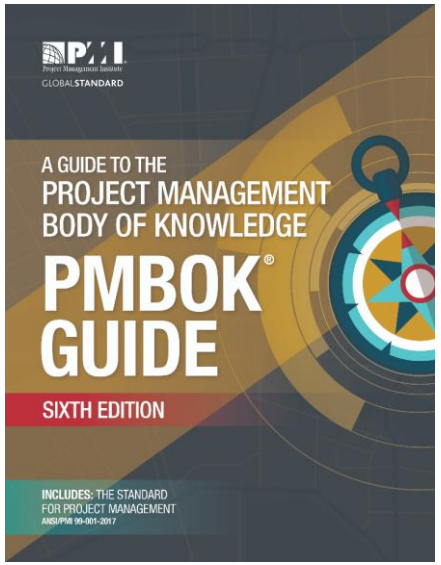
‘PMBOK’ stands for the ‘Project Management Body of Knowledge’.

The textbook for this course is the ‘Guide to the PMBOK’

‘This PMBOK Guide identifies a subset of the project management body of knowledge that is *generally recognized** as *good practice***.’

*Applicable to most projects most of the time.

**General agreement that application of these methods can enhance the chances of success.



PMBOK Guide (6th Ed) Part 1, Sec. 1.1.

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PMBOK Vocabulary

- **Methodology.** A system of practices, techniques, procedures, and rules used by those who work in a discipline
    - **Technique.** A defined systematic procedure employed by a human resource to perform an activity to produce a product or result or deliver a service, and that may employ one or more tools.
        - **Tool.** Something tangible, such as a template or software program, used in performing an activity to produce a product or result.

Because there is often overlap in the meaning between a Tool and a Technique, in this course, I have used ‘Methods’ to mean the same as ‘Tools & Techniques’ in The PMBOK Guide.

PMBOK Guide (6th Ed), Glossary.

PMBOK Guide (6th Ed) Part 1, Sec. 1.1

PMBOK Guide (6th Ed), Appendix X6 ‘Tools & Techniques

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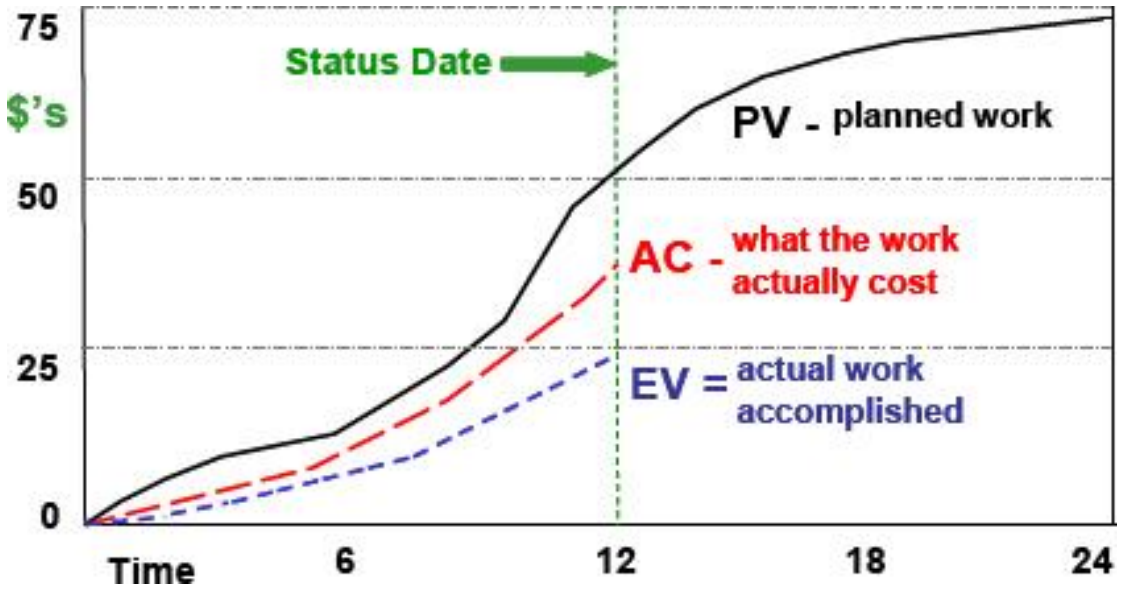
Example of a Technique

- Earned Value **Analysis** (EVA) is a technique for comparing the expected progress of a project against the actual progress.
- **Plotting** the Planned Value (PV) of project work against time periods
- comparing this to a **plot of Actual Cost** (AC) of project work over the same time periods, allows identification of variance against the plan.
- As a Technique, EVA includes several Tools, including **charting**, **variance analysis** and **forecasting**, often implemented in a software Tool like Microsoft Project.



PMBOK Guide (6th Ed), Sec. 7.4.2.2

Lukas, J. A. (2012). How to make earned value work on your project. Paper presented at PMI® Global Congress 2012—North America, Vancouver, British Columbia, Canada. Newtown Square, PA: Project Management Institute.

Example of a Tool

- **Multicriteria Decision Analysis** is a tool to assist decision-making.
- Criteria are **prioritized** and **weighted** before being applied to all available alternatives to calculate a numerical score for each one. The alternatives are then ranked by their score.

Letting the preference score for option i on criterion j be represented by s_{ij} and the weight for each criterion by w_j , then n criteria the overall score for each option, S_i , is given by:

$$S_i = w_1 s_{i1} + w_2 s_{i2} + \ldots + w_n s_{in} = \sum_{j=1}^{n} w_j s_{ij}$$

PMBOK Guide (6th Ed), Sec. 8.1.2.4

Ch. 6 “Chapter 6 Multi-criteria decision analysis” in “Multi-criteria analysis: a manual” 2009 Department for Communities and Local Government: London

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Example of a Methodology

- **Different** project management Methodologies.
- Some larger organisations document their **own methodology** and make **standard procedures** so it is applied to all the projects conducted inside the organisation.
- **Example:** - R&D engineer at Alstom A.G. (a large engineering company) used a methodology for all the corporate research projects; - nuclear engineer at ANSTO (a government agency) had a methodology that had to be applied to all the nuclear engineering projects.
- It was very long and had most of The PMBOK Guide inside…
- How about for GSOE9820? Let's make our own methodology called Coursework **Project Plan for Postgraduate Engineers (C3PE)** Methodology

PMBOK Guide (6th Ed), Part 1, Sec. 1.2.5

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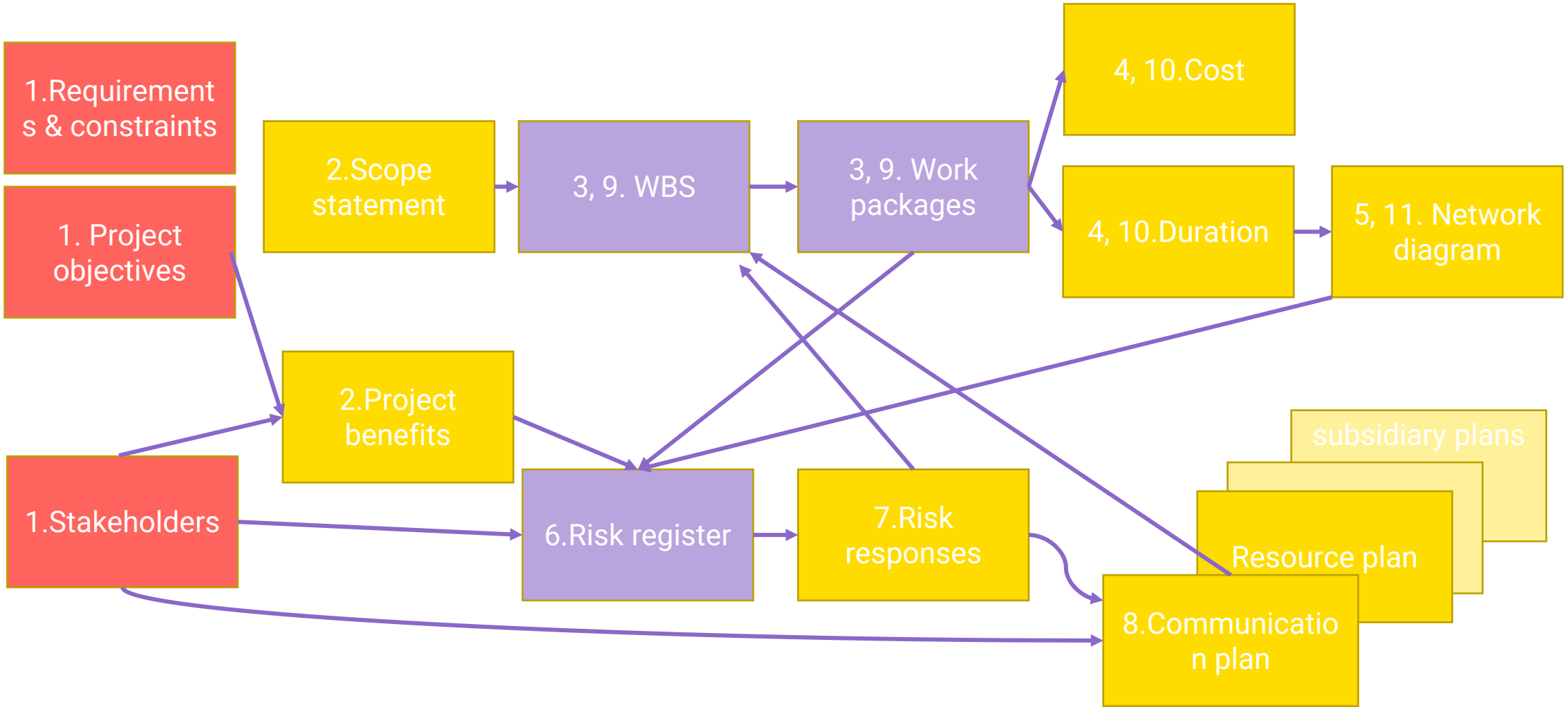
C3PE Methodology



PMBOK Guide (6th Ed) Part 2, Sec. 1.9 Table 1-1

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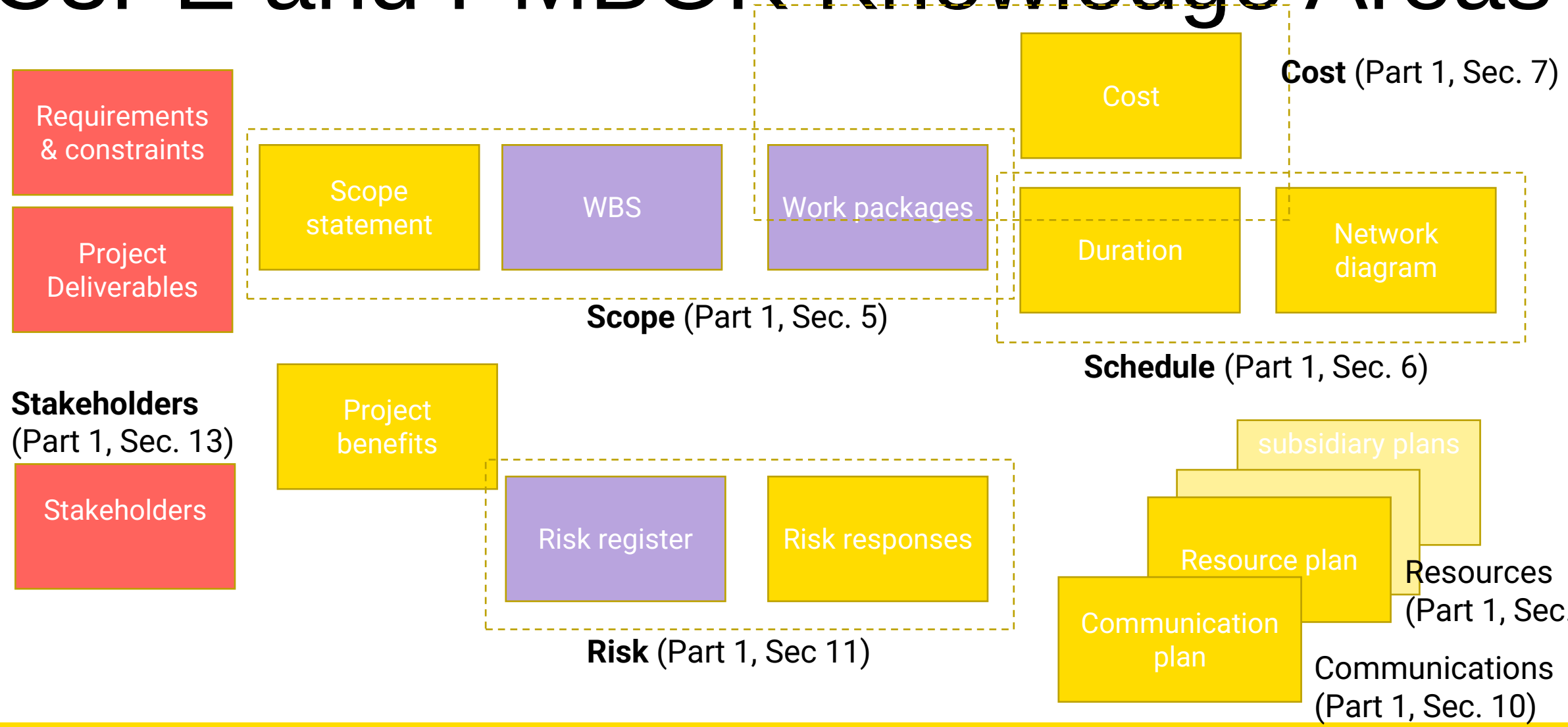
C3PE and PMBOK Knowledge Areas



PMBOK Guide (6th Ed) Part 2, Sec. 1.9 Table 1-1

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The C3PE Methodology as a list

Start Here

Project charter
Scope Statement
Stakeholder analysis
High level requirements
Constraints
Budget authorization
Scope
Deliverables
Scope statement
WBS
Work packages
Cost
Cost estimates
Resource estimates

Keep Going

Time
Duration estimates
Dependencies
Project schedule
Resource planning
Risk
Risk register
Contingency plans
Resource plan
Communication plan
Quality plan

Project Baseline

GO!!

The need to iterate:
Contingency,
Quality, and Communic
ation plans must
all become part of
Scope, and therefore
cost and schedule also.

Some other methodologies

Biafore, B. “Course Project Management Foundations: Small Projects accessed 16/02/2021, LinkedIn Learning accessed through UNSW

Gaekwad, K. “Agile Methodologies: Scrum and Kanban” in course “DevOps Foundations: Lean and Agile” accessed 16/02/2021, LinkedIn Learning accessed through UNSW

Agile Practice Guide, Annex A3. Overview of Agile and Lean Frameworks

Course Learning Outcomes

- Translate from organisational strategy into project deliverables
- Formulate project scope
- Select and apply project management methods
- Integrate and justify project plans
- Evaluate progress and interpret success in projects

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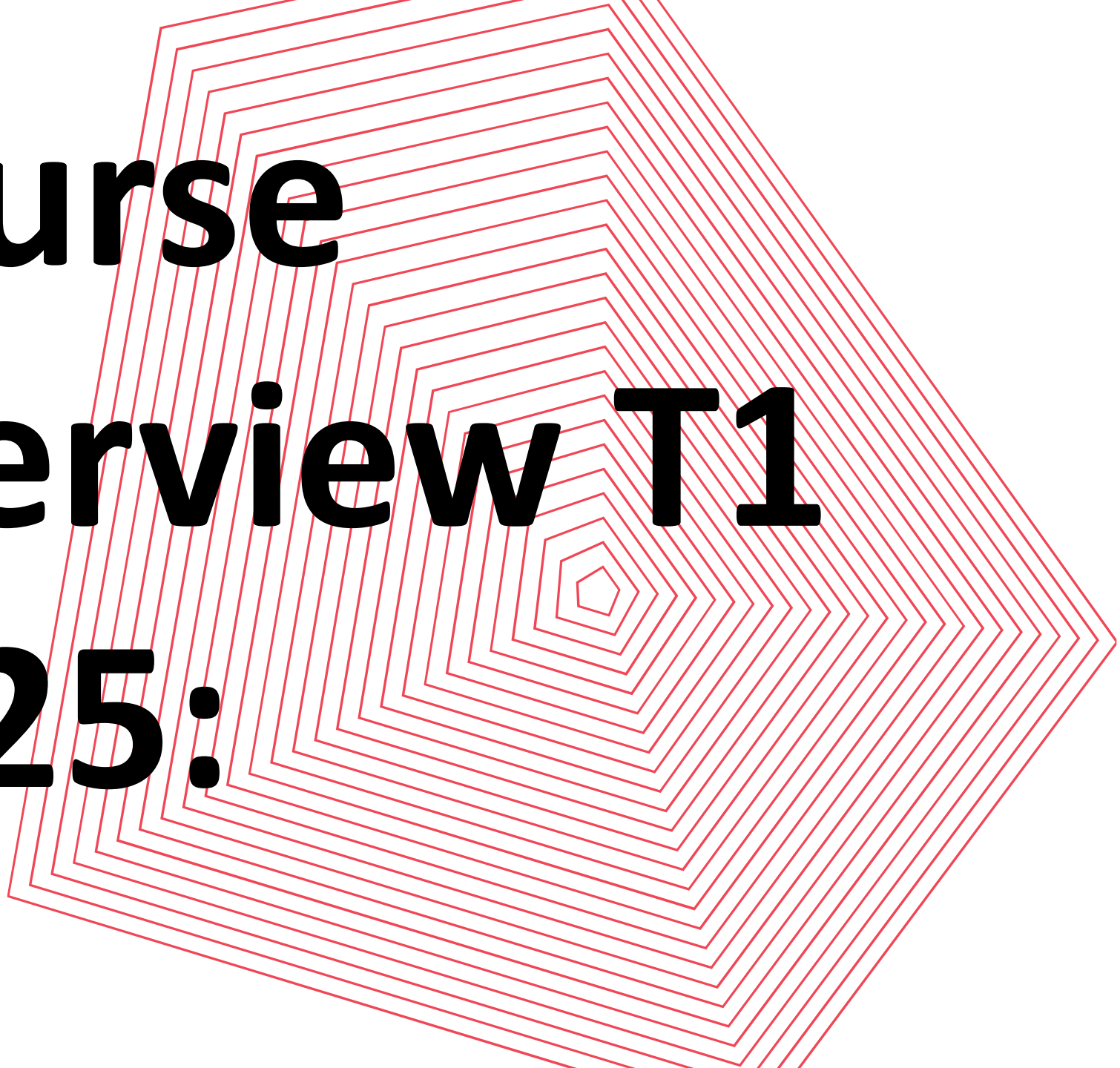
Course overview T1 2025:



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	Topics	Assignment hand-ins
Week 1	Intro/Scope	
Week 2	Developing Scope from Requirements	
Week 3	Agile and High Performing Teams	PMP Purpose, Scope, WBS (Individual)
Week 4	Project in Organisations Project Charter	
Week 5	Estimating and budget Scheduling Risk management	Revision quiz (TBL)
Week 6	PMP Integration (Online)	
Week 7	Project Controls	PMP (Group)
Week 8	Project Controls (Online)	Case Study (TBL)
Week 9	Project success and interview preparation	
Week 10	Revision (Online)	Practice Exam (TBL) Interviews (Individual)

Project 1 on Web Development, UNSW Sydney

Develop a AI-powered career guidance and skill mapping platform to provide UNSW students with personalized advice and address the unique profiles and aspirations of students from diverse backgrounds

Project 2 on Wind Farm Construction, UNSW Sydney

Construct a small commercially sized windfarm in rural NSW to provide UNSW with renewable energy and provide students with the opportunity to study wind emergency utilization and facilitate research and development into advancing wind emergency technology

Project 3 on Transport, Transport for NSW

Develop a smart transport network with smart sensors, AI based intelligent system and new data sources to help Transport for NSW gain deeper insights into how their customers interact and occupy Metro platforms over time

Example Project - UNSW Parking App

Students and staff are coming back to uni. However, difficulty finding parking lots or not being aware of the parking cost causes inconvenience for students and staff.

Plan a project that provides a parking system where users can pay online, check for vacancies and costs based on the different roles of the users, and register or buy a parking permit online.

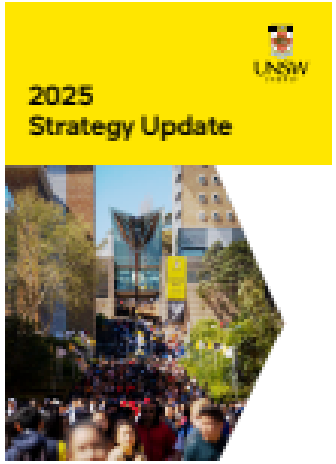
The project should demonstrate alignment with the UNSW 2025 Strategy, and offer significant improvement over current system.

The scope of this project include stakeholder engagement and feedback during this process, any further work required to commission and operate it, and consideration of how to facilitate its integration with other existing platforms.

Duration: 1 year
Budget: $250,000
Scope: optimize

UNSW Strategic Priorities

- Academic Excellence
  - Research quality
  - Educational excellence
  - Student experience
- Innovation and Engagement
  - Entrepreneurship
  - Partnerships
  - Knowledge exchange
- Social Impact
  - Equity, diversity and inclusion
  - Thought leadership
  - Sustainable development



See the 2025 Strategy document

Teamwork

- Set shared **goals**.
- Make a **plan**
- Agree on **tools**
- Encourage **innovation**
- Allow different **roles**
- Picture **success** (include a part for everyone)

How we facilitate teamwork

- **Pick** a project, and **self-enrolment tool on Moodle** (group allocations)
- Assignment Task 1 is **individual**
- Meet your **team** week 2
- Weekly **check-in** with your demonstrator, with planned activities
- Project Management Plan is **group based**, incorporating your individual work
- Staged assignment with **opportunities** to refine your work
- Lot's of **peer review** and **feedback** opportunities.

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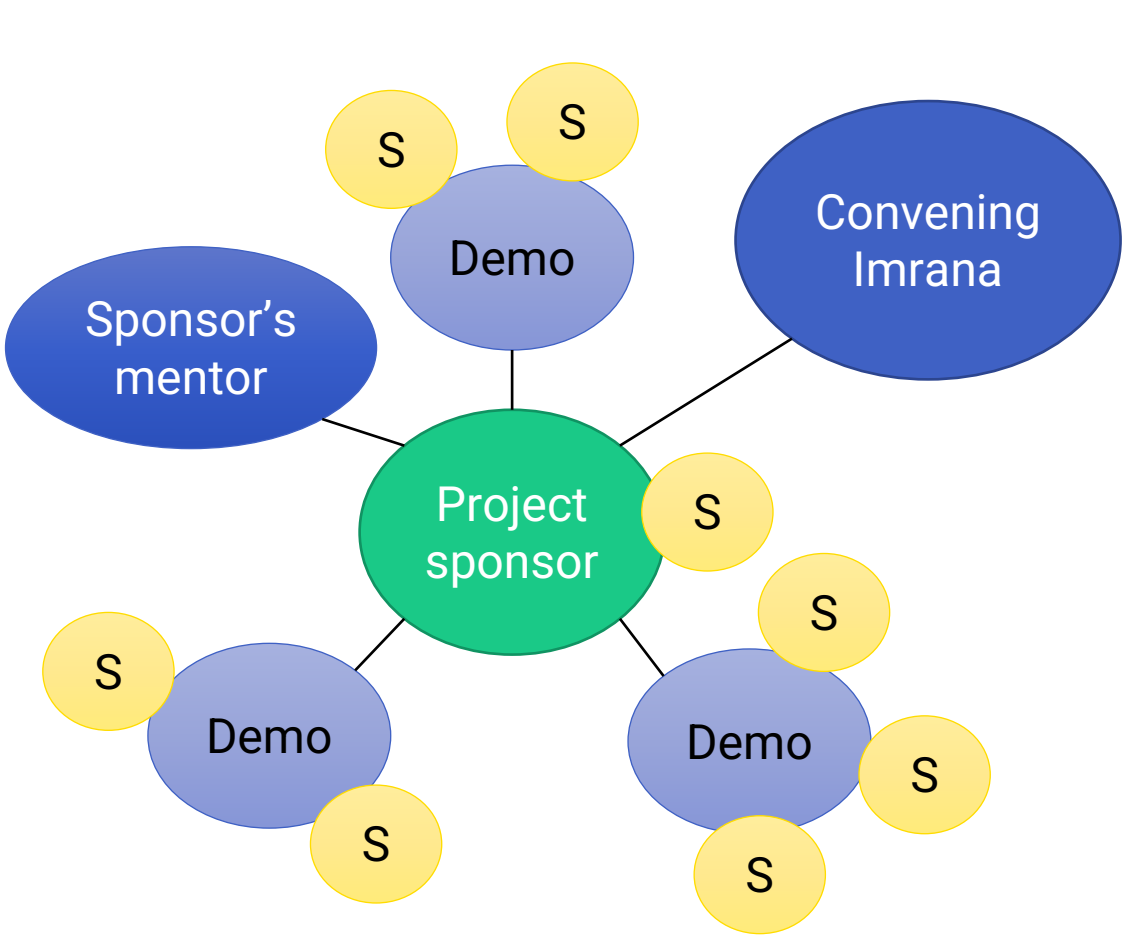
Your assignment support network



- Each assignment project was created by a Sponsor for that project (also think of them as a client)
- The sponsor has the help of an experienced PM Mentor from external industry
- Student teams are assigned to Demonstrators and maybe project Sponsor

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Workshop

Group Enrolment:

- Enroll yourself in a group on Moodle before week 2
- Groups with fewer than 6 students might be reorganized

Workshop:

- Starts week 2, ends week 9.
- Completely online via Teams.
- Each group will be assigned to a demonstrator.
- Assigned demonstrator will contact you to schedule a time for weekly workshop early week 2

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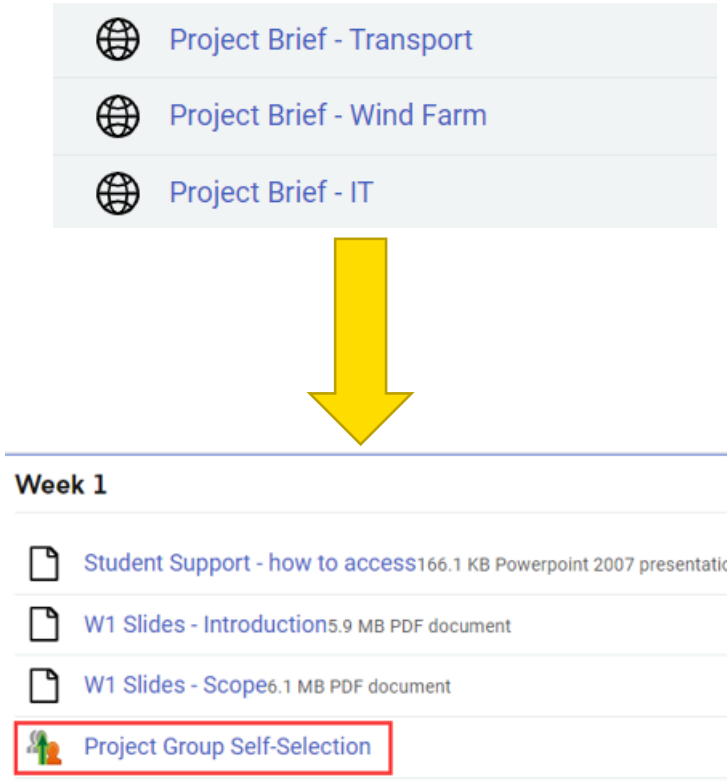
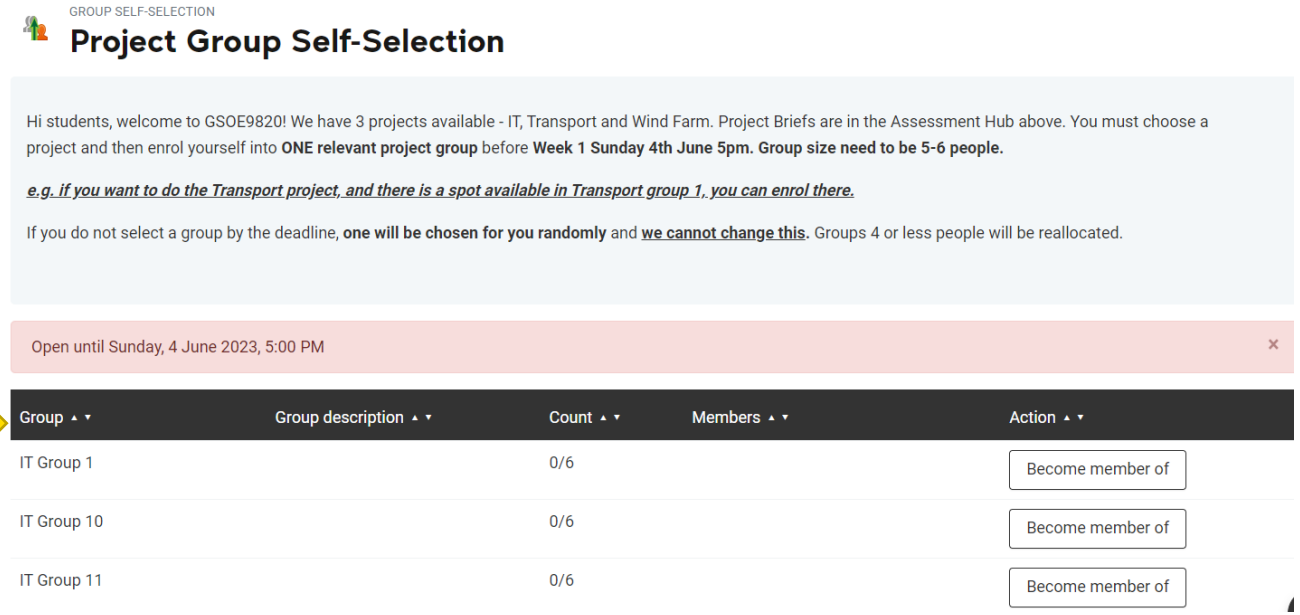
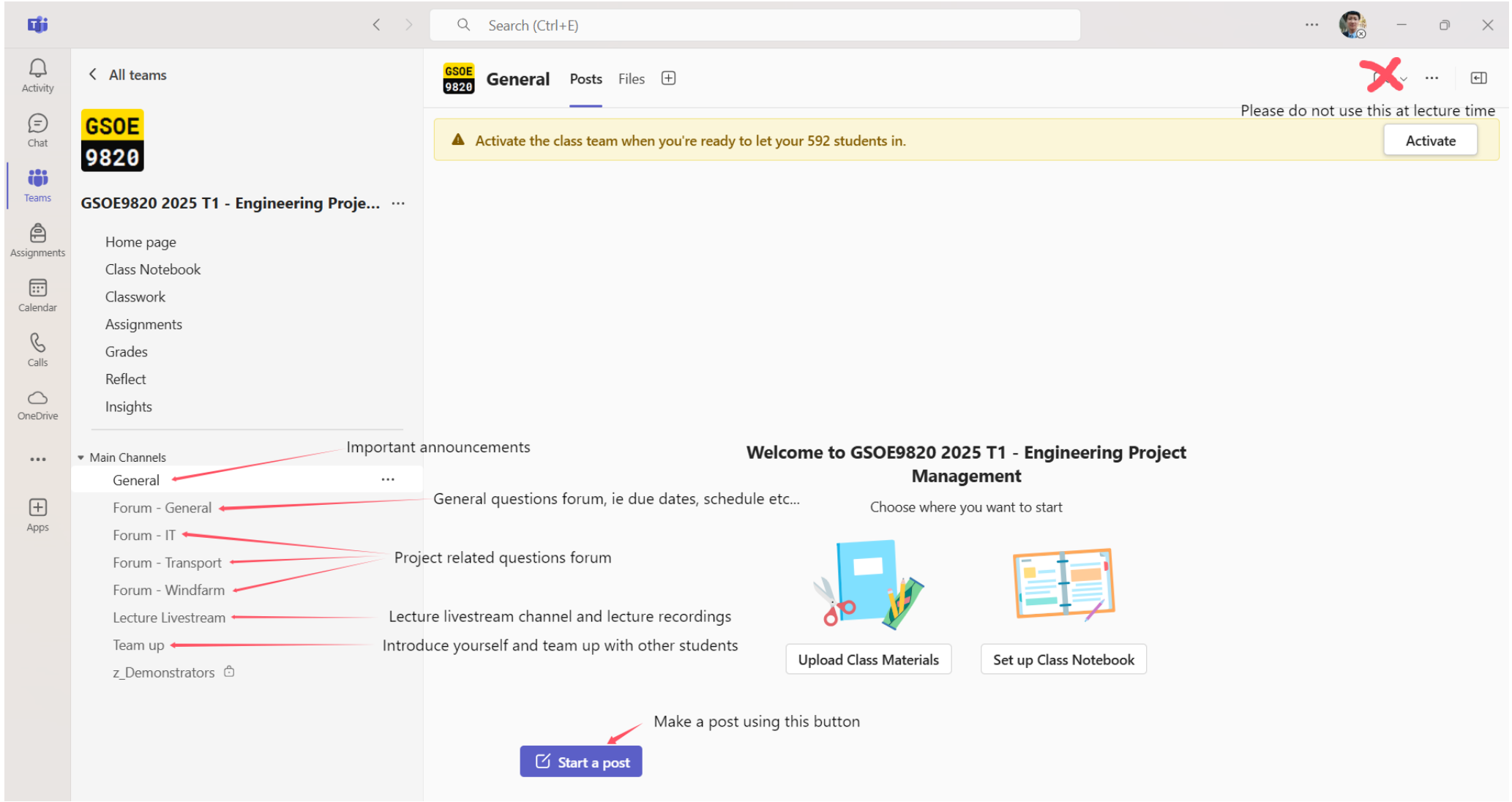
How to enroll in a group - Moodle





Microsoft Teams

Course Content



Microsoft Teams

Workshops and Assignment