



**Tecnológico
de Monterrey**

**Plastics and Composites
Engineering**

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Agenda

- **Welcoming**
- **Introducing ourselves to the group**
- **Assesment**
- **An overview of the course: Purpose and Scope**
- **Syllabus and Gantt Diagram**
- **Course Dynamics**
- **Course Policies**
- **Assignement #1**

Google Questionnaire

https://docs.google.com/forms/d/1A86Ascxl1zUQVJ6HTKSRA253M0eRgZT0umO5iq_2Zyw/

What is the Purpose of this Course...



\$\$\$\$\$\$\$\$\$\$\$

How do Companies Satisfy the 2020 customer ?

05

Circular Economy for P&C

Environmental Laws
Health Issues
Public Policies
Sustainable World
Carbon footprint



04

Applying technological breakthroughs

- Data analytics for decision making
- Digital Twins for processing new materials on customer facilities (based on models)
- ...



03

Excellence in Tech Service

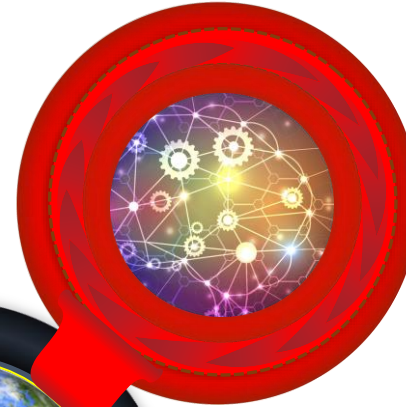
- Online services
- Data analytics
- Training



01

Offering Innovative products

- ESD
- Gas Permeability
- Insulating capacity
- ...



Fast prototyping guided by models

02

Tailoring resins for specific applications

- Thinner films
- Better fiber
- Improved Foams
- Composites

Improving existing resins using mathematical models based on phenomena fundamentals and/or doing it faster with genetic algorithms or neural networks

Training on phenomena fundamentals, use of models for faster decision making and Augmented & Virtual Reality



Innovation



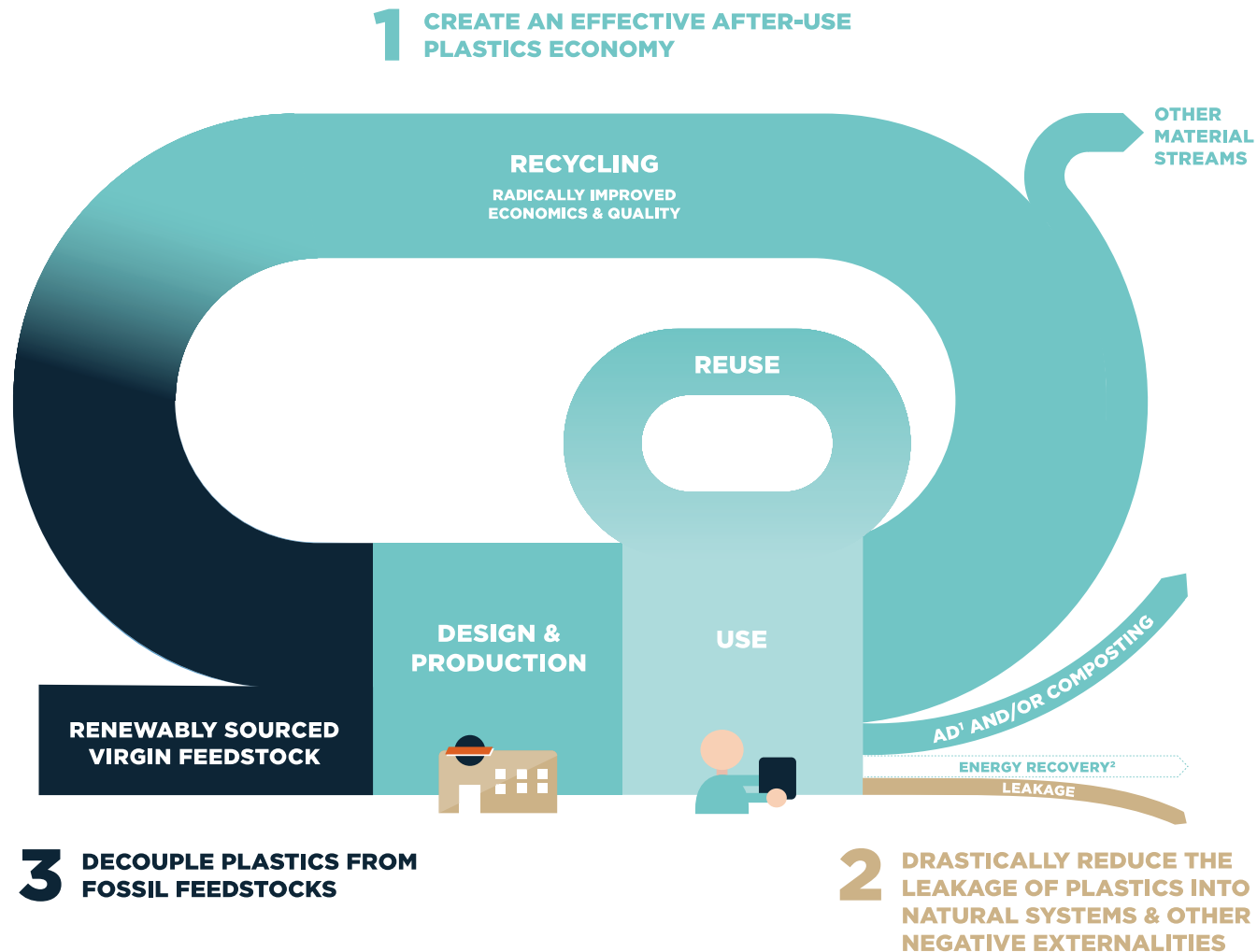
The lid on your coffee cup is way more important than you'd probably ever expect. And it's not just because it prevents your \$5 pour over from ending up on your pants. The lid actually constrains how you smell your coffee, so it can inhibit or enhance the taste. And, the truth is: You've probably been missing out on a lot of flavor.



Unocups, the brainchild of a product designer and an architect, are able to hold hot liquids without the use of a conventional plastic lid. Working on a six-week intensive innovation program, where students are challenged to design products that address a common need, students created some 800 prototypes for coffee cup, the result is the creation of the startup Unocups.

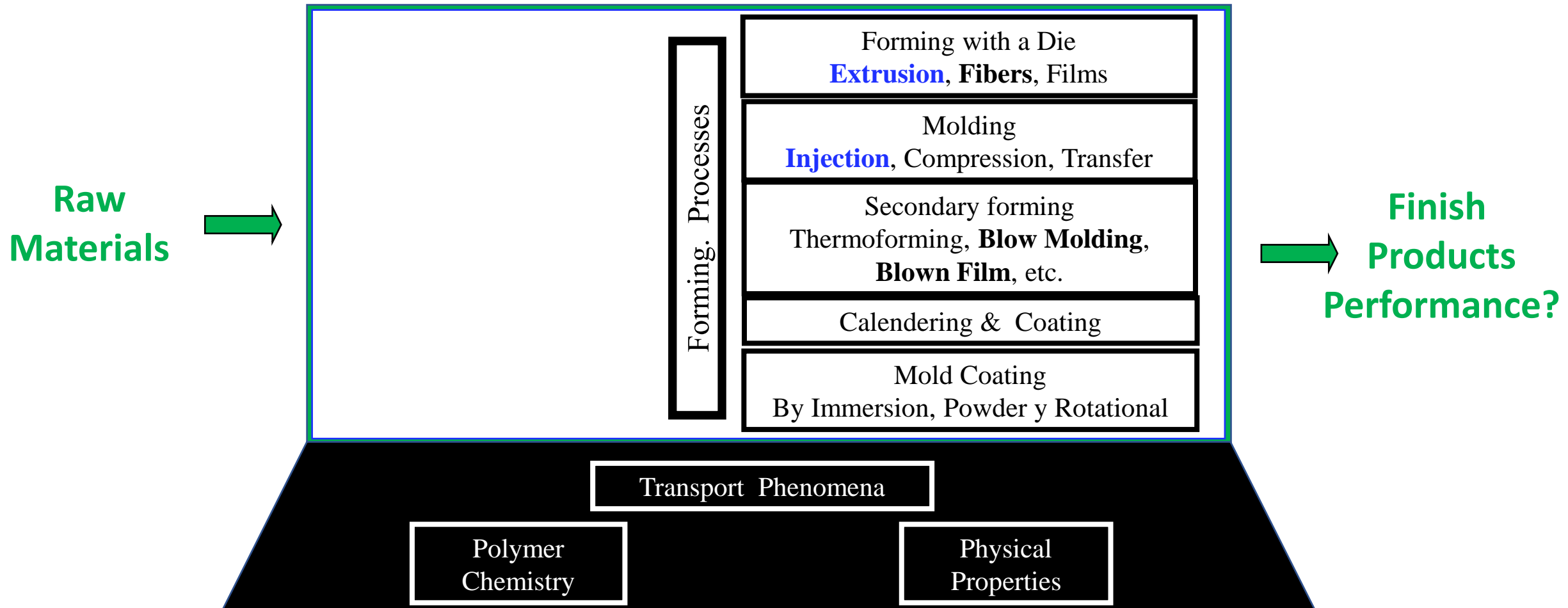
Towards a circular Economy?

FIGURE 1: THE NEW PLASTICS ECONOMY AND ITS THREE AMBITIONS

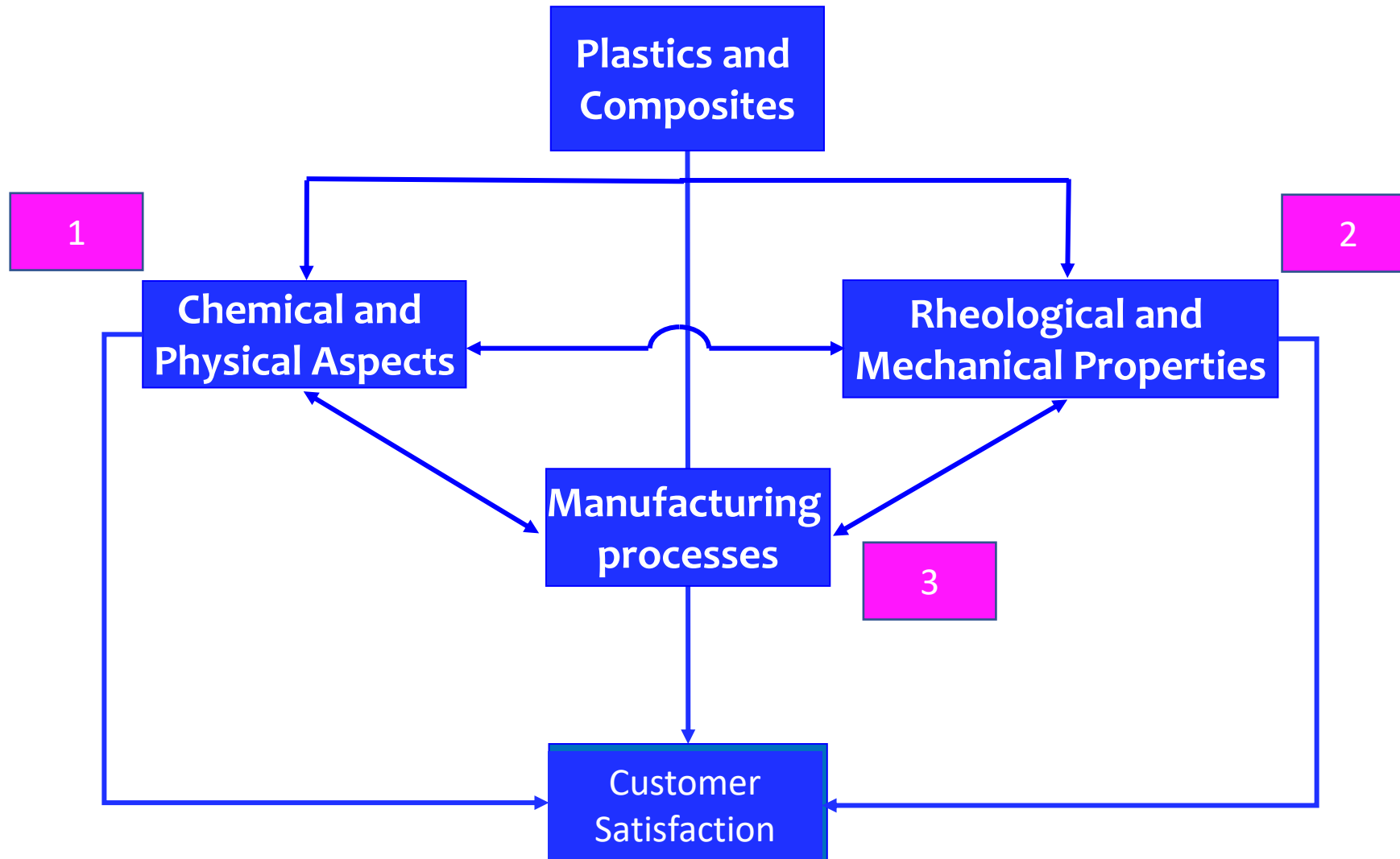


Source: *The New Plastics Economy – Rethinking the future of plastics*

What is in between...

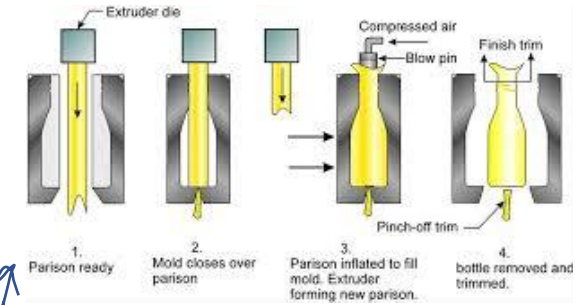
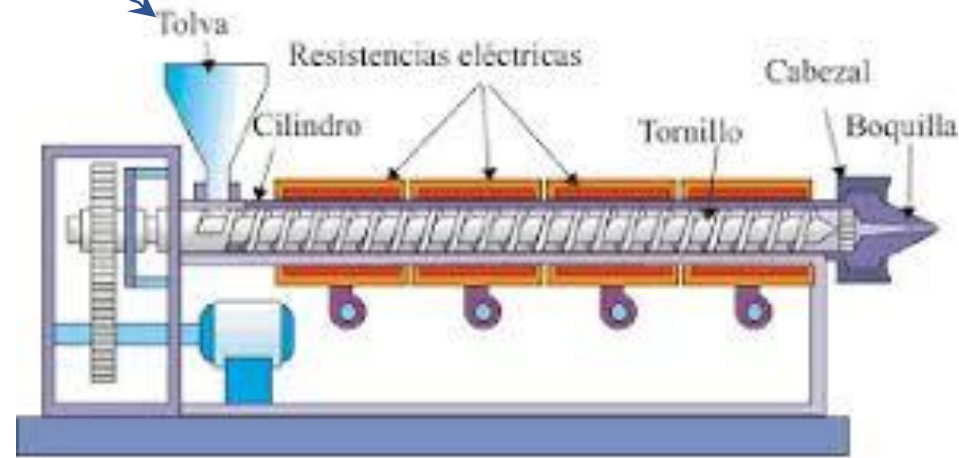


What is the Scope of this Course?



Manufacturing Processes

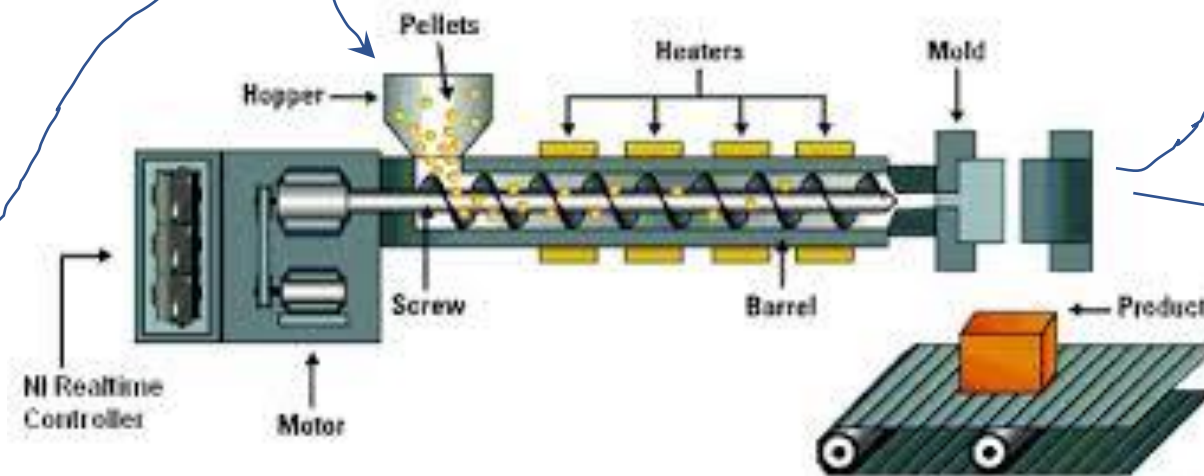
Extrusion



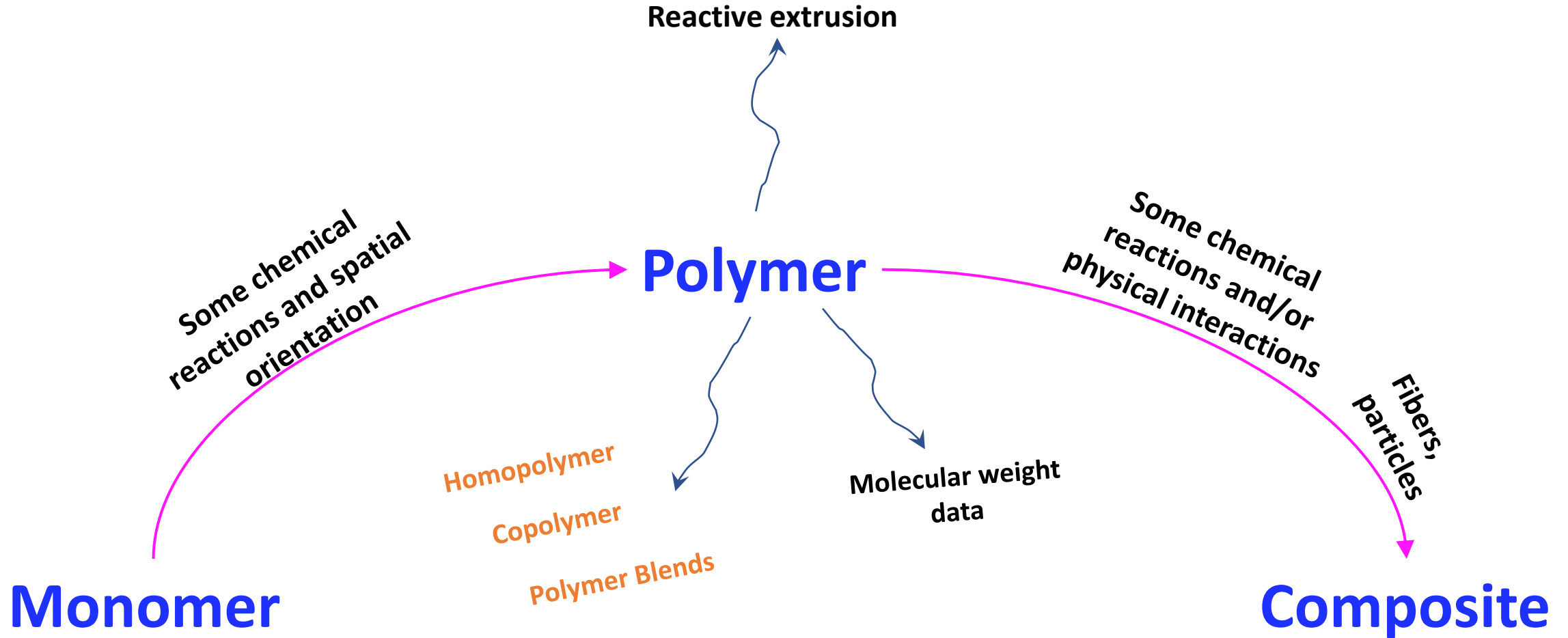
Injection



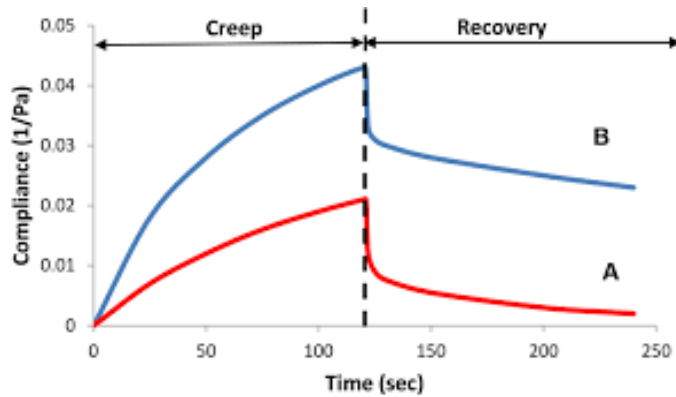
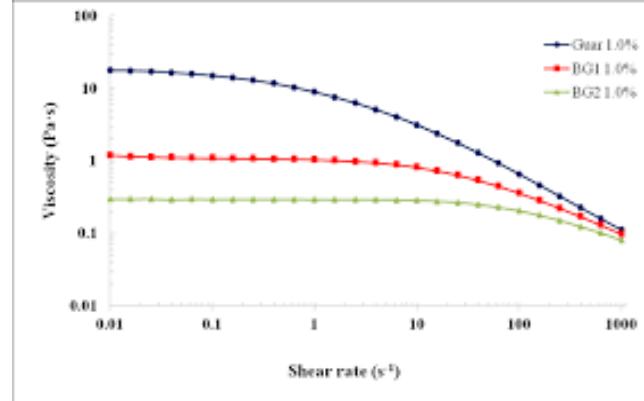
pellets



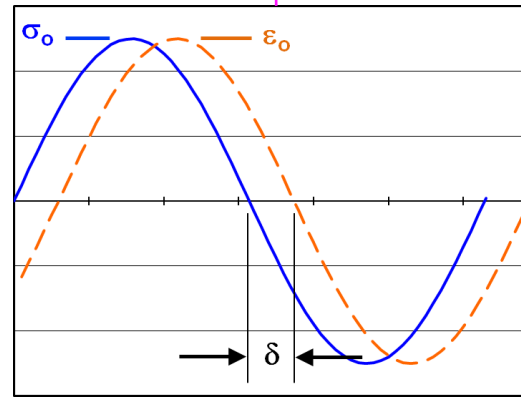
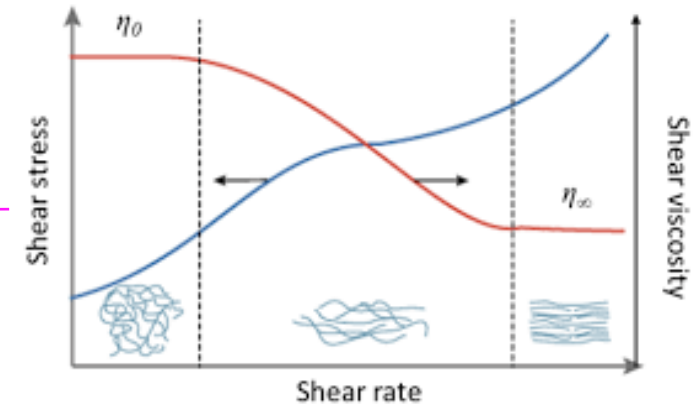
Chemical and Physical Aspects



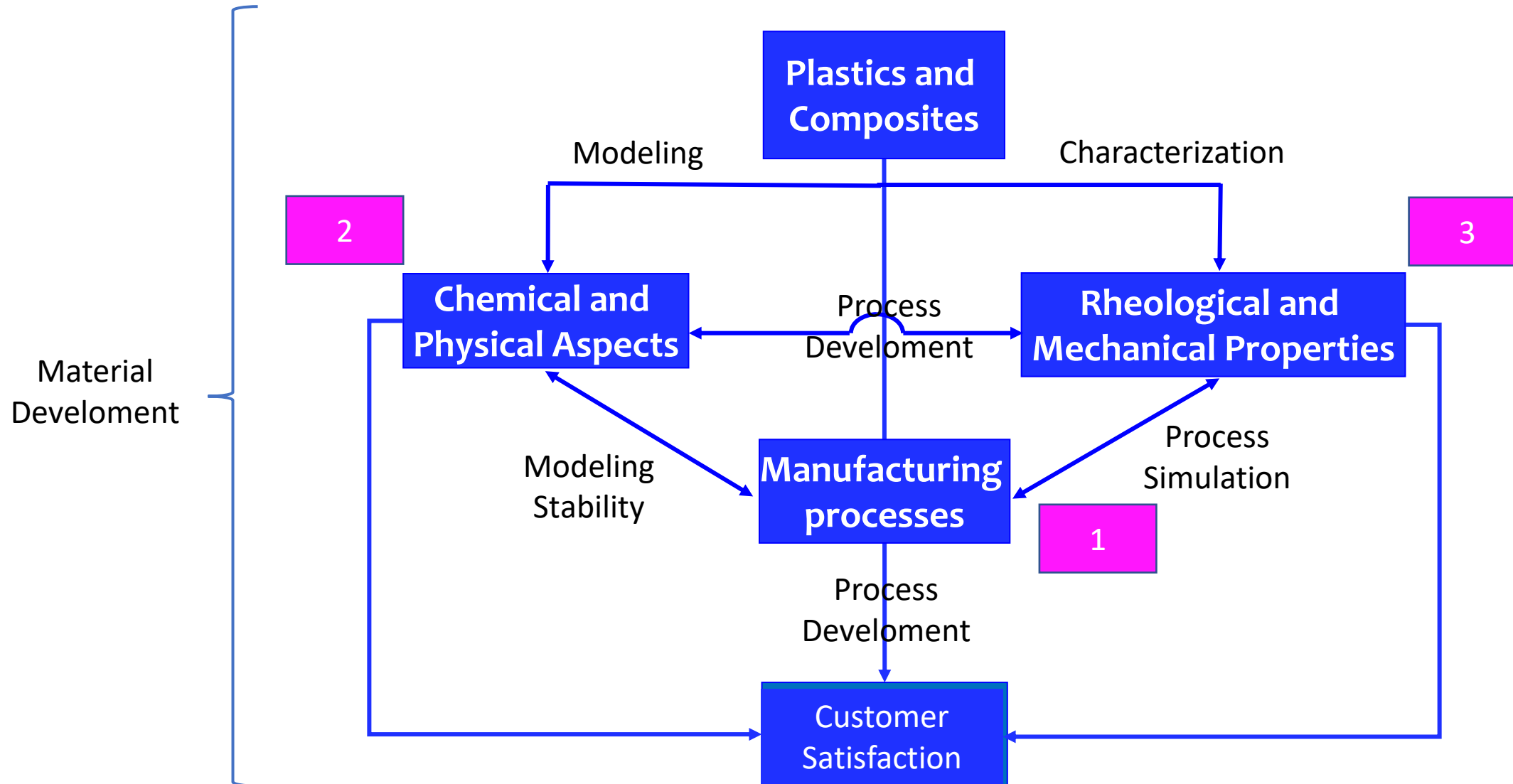
Rheological and Mechanical Properties



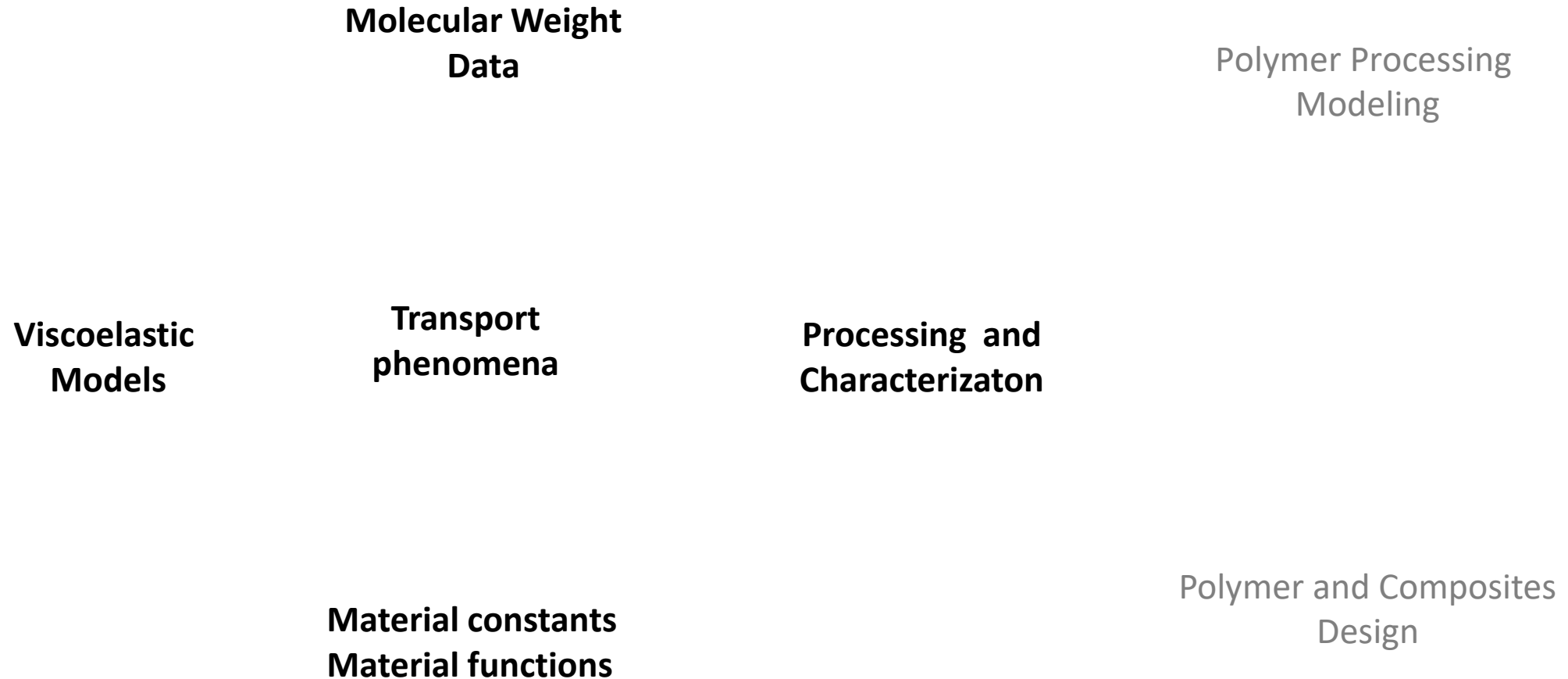
Material constants
Material functions



How to use the learning



Main Elements and their Impact on...



General Syllabus

1. Introduction to polymer processing. (6hrs)
2. Intimate nature of polymers. (6hrs)
3. Flow and deformation of polymers (9hrs.)
4. Linear viscoelasticity (6 hrs.)
5. Introduction to the non-linear viscoelasticity. (3hrs).
6. Flow of polymers at transient state. (3hrs)
7. Mechanical behaviour of plastics and composites (6hrs)

Course Gantt Diagram

[illegible]

General Course Dynamics

Expected time to invest in this course: 4hrs/day

- Before Class (90-110 min)
 - Watch some videos (30 min at the most)
 - Reading a paper and highlight specific sections (60 min)
 - Writing a reflection in your Journal (30 min)
 - Reflection on *What you learned, What applications you foresee and Questions you might have*
- During class (90-110 min)
 - Discussing of the reflections (30 min)
 - Lecturing (30 min)
 - Challenge Activity (15 min)
 - Closure (15 min)

Journal Format in Spreadsheet (1)

The summer course format is a very fast pace learning environment and in order to have the best out of this experience, I have created the Journal for you keep up with the rhythm of the topics.

This Journal is a repository of the reflections you have on each of the topics and has to be updated every day. The information can help the professor to guide the conversation and to focus on topics the group is interested.

Your reflection will be shared with the rest of the group and also you should have your own sheet.

The Journal is posted in a share google drive:

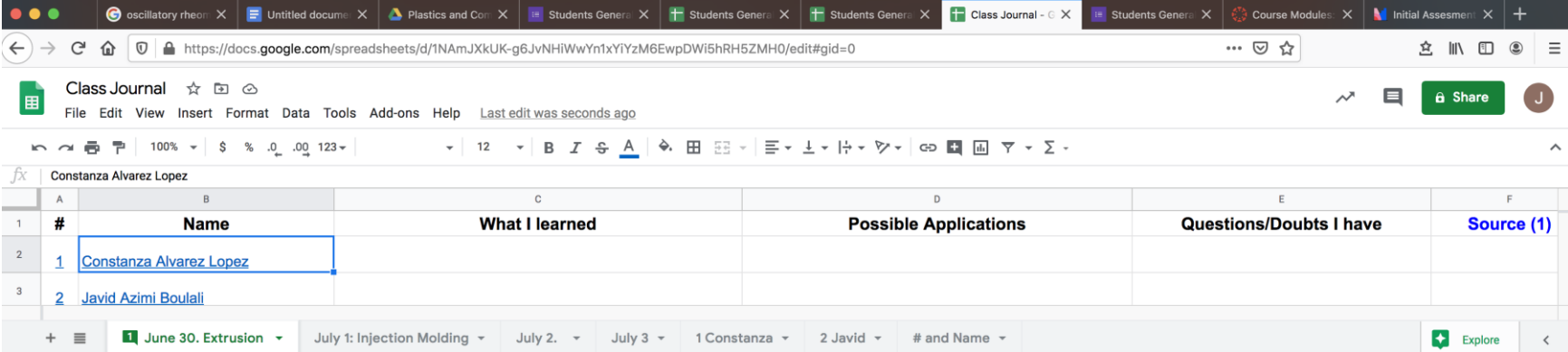
<https://docs.google.com/spreadsheets/d/1NAmjXkUK-g6JvNHiWwYn1xYiYzM6EwpDWi5hRH5ZMH0/edit#gid=242089187>

This requires of your full commitment to your learning on the topics of this course

Journal Format in Spreadsheet (2)

There are 2 views of the Journal

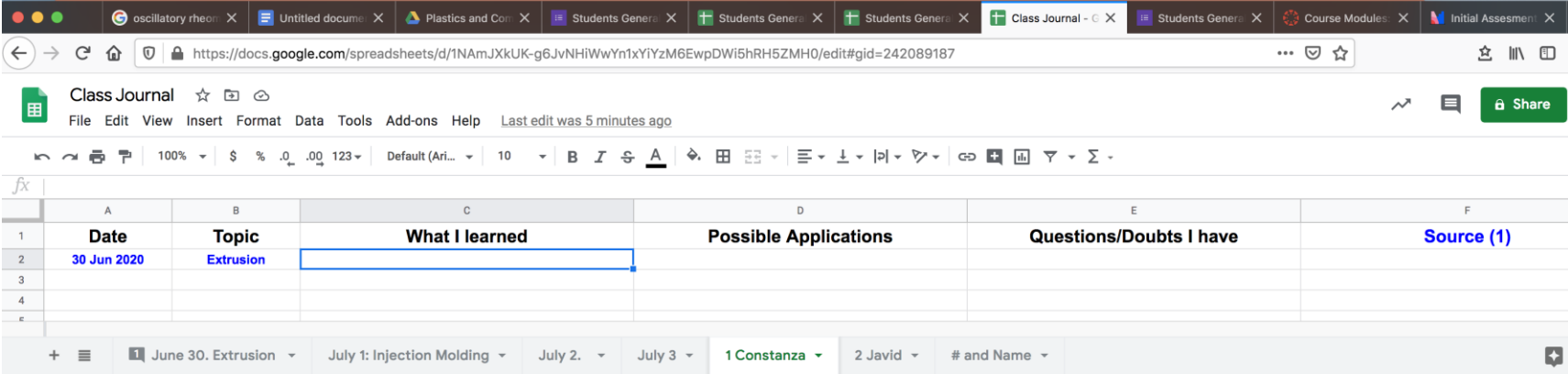
Class Journal:



The screenshot shows a Google Sheets interface for a 'Class Journal'. The spreadsheet has columns for Name, What I learned, Possible Applications, Questions/Doubts I have, and Source. The first row is a header, and the second row contains the name 'Constanza Alvarez Lopez' in the 'Name' column. The bottom of the screen shows a sidebar with a list of dates and topics, including 'June 30. Extrusion' and 'July 1: Injection Molding'.

#	Name	What I learned	Possible Applications	Questions/Doubts I have	Source (1)
1	Constanza Alvarez Lopez				
2	Javid Azimi Boulali				

Personal Journal:



The screenshot shows a Google Sheets interface for a 'Personal Journal'. The spreadsheet has columns for Date, Topic, What I learned, Possible Applications, Questions/Doubts I have, and Source. The first row is a header, and the second row contains the date '30 Jun 2020' in the 'Date' column and the topic 'Extrusion' in the 'Topic' column. The bottom of the screen shows a sidebar with a list of dates and topics, including 'June 30. Extrusion' and 'July 1: Injection Molding'.

Date	Topic	What I learned	Possible Applications	Questions/Doubts I have	Source (1)
30 Jun 2020	Extrusion				

Sources should have the appropriate references:

- Power Point Presentation: Write down title and author's name
- Video: Write down title and internet address
- Paper: Write down reference
- Other sources

Course Policies

Evaluation Tools	Score
Journal* ¹	20
Class activities* ²	20
Assesment 1	20
Assesment 2	20
Assesment 3	20
Final Grade	100

Attendance is mandatory, since there are activities in which you have to participate and missing them jeopardize your learning and final grade. In any case you might skip up to 3 sessions.