Università di Genova | DCCI DIPARTIMENTO DI CHIMICA E CHIMICA INDUSTRIALE

SUSTAINABLE POLYMER AND PROCESS CHEMISTRY (SMART)

- LM 71 - Class of the Master's program SCIENCES AND TECHNOLOGIES OF INDUSTRIAL CHEMISTRY

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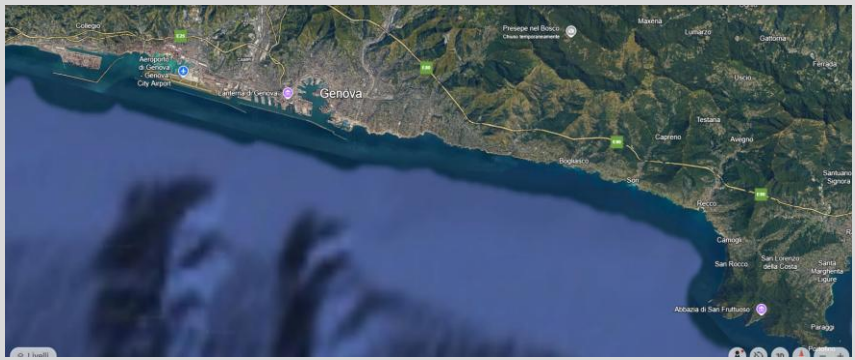
https://chimica.unige.it/node/1816

In collaboration with

SMART: NEW OPPORTUNITIES

SMART (Sustainable polyMer And pRocess chemisTry)

- **Where we are?**
- International training environment.
- **Strongly connected to Civil Society and Industry.**
- **Strong local scientific background, dedicated infrastructures and labs**, according to the local tradition (Rossi 1952).
- Several Research projects running.
- Background for future developments (green industrial processes, environment management, functional polymers, water treatments, formulations, rheology, H_2 management…).



Corriere della Sera, 09.11.2024

NEL «SECOLO DELLE UNIVERSITÀ» SARÀ DECISIVA LA FORMAZIONE DEI GIOVANI TALENTI

APRIRSI AI NUOVI STUDENTI DEL MONDO

di **Francesco Billari** *

Il XXI secolo è il secolo dell'università. Oggi come non mai, le università sono al centro del nostro futuro. A livello globale siamo ad un picco: non vi sono mai stati così tanti giovani: gli anni tra il 2027 e il 2030 saranno gli unici della storia dell'umanità con più di due miliardi di persone con meno di vent'anni, secondo gli scenari delle Nazioni Unite. Da lì in poi il numero di giovani inizierà a scendere, rimanendo sempre più o meno ai livelli dell'inizio di questo secolo. Come già tracciato dai *Sustainable Development Goals*, tutti questi giovani dovranno poter studiare. Ma rispetto al XX secolo, che potremmo definire il secolo della scuola, vi è una novità: nei prossimi decenni, la maggioranza dei giovani dovrà poter aspirare realisticamente a frequentare una università. Non è un'idea irraggiungibile. Se guardiamo ai paesi OCSE, quasi la metà dei giovani già oggi ottiene un titolo di studio universitario (47,4% in età 25-34 anni nel 2022): anche questa è una novità storica.

E non si tratta solo dei paesi OCSE, che sono i più ricchi. Già oggi, quasi un quarto dei giovani a livello mondiale ha un titolo universitario: 23,8% (età 25-34 anni nel 2020), secondo le stime per la popolazione, del *Wittgenstein Centre for Demography and Global Human Capital* di Vienna. Lo stesso centro disegna gli scenari per il futuro, combinando il ricambio delle generazioni e l'espansione del sistema educativo. Considerando uno scenario di sviluppo medio, alla fine del XXI secolo più della metà dei giovani della popolazione mondiale avrà ottenuto un livello di istruzione post-secondario (53,4% nel 2100). Una vera e propria rivoluzione. L'università sarà quindi al centro del futuro delle imprese, delle istituzioni e dell'intera umanità. A prosperare saranno solo i Paesi e le società che investiranno nello sviluppo delle università, dell'alta formazione e della ricerca, mettendole al centro delle politiche sia nel breve sia nel lungo periodo.

Le università assumeranno inoltre una funzione chiave nel promuovere una maggiore circolazione dei talenti. Il picco di giovani dei prossimi anni è un'opportunità straordinaria per i paesi che sapranno integrare questi potenziali talenti nei propri sistemi educativi e produttivi. Per questo, l'Europa deve avere il coraggio di aprirsi sempre più a studentesse e studenti provenienti dal mondo intero. Dovremo farlo con una formazione di impronta globale in campus vivi e brulicanti, dove si sviluppano reti di relazioni forti che durano per tutta la vita. Solo una formazione in presenza contribuisce infatti a sviluppare le capacità comportamentali, emotive e sociali, che secondo Yann Algan ed Élise Huillery forniscono un «triplo dividendo», agevolando l'apprendimento in generale, migliorando le prospettive professionali e di carriera, e migliorando benessere e salute per tutti. Capacità troppo importanti per essere definite solo «soft skills».

Con le prospettive di ulteriore aumento della durata della vita, in un mondo caratterizzato da rapidi cambiamenti tecnologici e dall'evoluzione continua delle esigenze del mercato del lavoro, le università dovranno inoltre diventare punti di riferimento per il *lifelong learning*. La capacità di adattarsi, di apprendere nuove competenze e di reinventarsi professionalmente è diventata essenziale in un contesto dove le innovazioni tecnologiche rendono obsolete molte competenze in tempi rapidi. Le università, quindi, non saranno più solo luoghi di alta formazione per i giovani, ma centri aperti a tutte le età. Le università svolgeranno così un ruolo cruciale nel costruire ponti tra le generazioni.

Il futuro prossimo
Gli atenei non saranno più solo luoghi di alta formazione, ma centri aperti a tutte le età, con un ruolo cruciale nel costruire ponti tra le generazioni

Le rivoluzioni tecnologiche hanno tendenzialmente migliorato la nostra vita, costruendo benessere e migliorando la nostra salute. Nel secolo delle università, saranno decisive la ricerca e l'innovazione tecnologica che nascono dal, e attorno al, mondo accademico. Le *research universities* dovranno avere un ruolo centrale. In una serie di studi, Philippe Aghion e i suoi collaboratori hanno dimostrato che le migliori università, soprattutto quando in costante dialogo sia con il settore privato sia con quello pubblico, possono contribuire a generare innovazione, promuovere la crescita tecnologica e rafforzare il tessuto economico e sociale. Non a caso i rapporti sul futuro dell'Europa di Mario Draghi ed Enrico Letta parlano dell'importanza dell'università e della ricerca nella costruzione dell'Ue, finora ancora poco enfatizzata. Dobbiamo costruire sul successo dello *European Research Council*, per generare una massa critica di ricerca e innovazione, che consenta anche al nostro continente di essere in prima linea nelle grandi scoperte e nelle loro applicazioni.

Siamo di fronte ad una trasformazione globale che coinvolgerà sempre più giovani e talenti di tutte le generazioni. Questa trasformazione richiede conoscenze di frontiera ma anche diffuse, innovazione e capacità di scalare verso l'alto l'impatto della ricerca e della formazione, attenzione alla formazione di base ma anche alle capacità comportamentali, emotive e sociali. Mettere l'università al centro del nostro futuro è già oggi essenziale per costruire società inclusive e pacifiche, sostenibili e innovative.

* *rettore Università Bocconi*

https://www.corriere.it/opinioni/24_novembre_08/aprirsi-ai-nuovi-studenti-del-mondo-b3e436cb-2114-40b7-b2c4-b35d5e661xlk.shtml

INTERNATIONAL EDUCATION

…The years between 2027 and 2030 will be the only ones in the history of mankind with **more than two billion people under the age of twenty**…

…… As already outlined by the Sustainable Development Goals, **all these young people must be able to study…**

…In the coming decades, **THE MAJORITY OF YOUNG PEOPLE MUST BE ABLE TO REALISTICALLY ASPIRE TO ATTEND A UNIVERSITY**…

…Only Countries and Societies that invest in the development of universities, higher education and research, putting them at the center of policies in both the short and long term, will prosper…

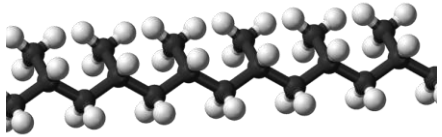
… The peak of young people in the coming years is an EXTRAORDINARY OPPORTUNITY for countries that will be able to integrate these potential talents into their educational and production systems. For this reason, EUROPE MUST HAVE THE COURAGE TO OPEN UP MORE AND MORE TO STUDENTS FROM ALL OVER THE WORLD.

SMART: THE HISTORICAL TRADITION

The Nobel Prize in Chemistry

1963 was awarded jointly to Karl Ziegler and Giulio Natta

"for their discoveries in the field of the chemistry and technology of high polymers"



http://www.nobelprize.org/nobel_prizes/chemistry/laureates/1963/

Giulio Natta

1903: Born in Porto Maurizio (Imperia, Italy)

1924: Graduated in Industrial Engineering (Chemistry) at Polytechnic of Milan (Italy)

1925-1932: Professor of **Analitical Chemistry** (Polytechnic of Milan)

1929-1933: Professor of **Physical Chemistry** (University of Milan)

1933-1935: Professor of **General Chemistry** (University of Pavia)

1935-1937: Professor of **Physical Chemistry** (University of Rome)

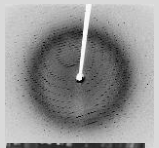
1937-1938: Professor of **Industrial Chemistry** (Politechnic of Turin)

1938-1973: Professor of **Industrial Chemistry** (Polytechnic of Milan)

SMART: THE HISTORICAL TRADITION

GIULIO NATTA: A MULTIDISCIPLINAR SCIENTIST

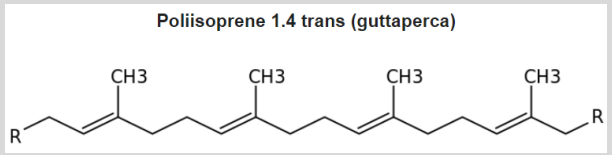
- Studies on **X-ray structures** (Freiburg, Hugo Seeman).

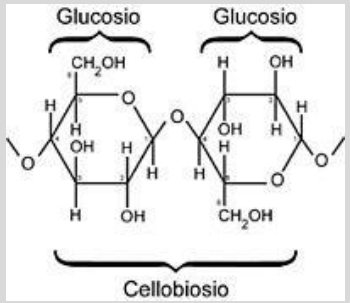


- Meets **H. Staudinger, Nobel 1953,** who invented the concept of **MACROMOLECULE**
- The chemistry of **carbon monoxide**, **of alcohols and of formaldehyde** (C1 chemistry)

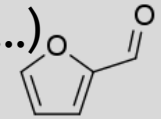
$$CO + 2H_2 \rightleftarrows CH_3OH \quad (\Delta H_{RT} = -90{,}7\ kJ/mol)$$

- The first research on **high polymers**





- **Hydrogenation of furfural and carbohydrates** (glycerol, isooctane, **hydrogen from methane…**)



The Nobel Prize in Chemistry 1963

Karl Ziegler
Giulio Natta

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Giulio Natta Facts

https://www.giulionatta.it/ENG/archivio.html
https://www.nobelprize.org/prizes/chemistry/1963/natta/facts/

Photo from the Nobel Foundation archive.

Giulio Natta
The Nobel Prize in Chemistry 1963

Born: 26 February 1903, Imperia, Italy

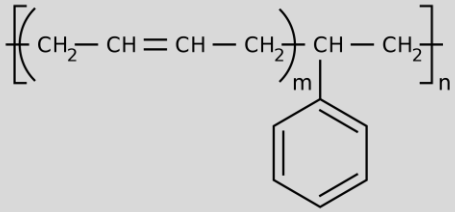
Died: 2 May 1979, Bergamo, Italy

Affiliation at the time of the award: Institute of Technology, Milan, Italy

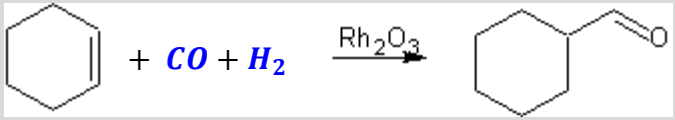
Prize motivation: "for their discoveries in the field of the chemistry and technology of high polymers"

Prize share: 1/2

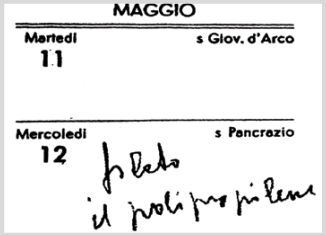
- Research on **synthetic rubbers**

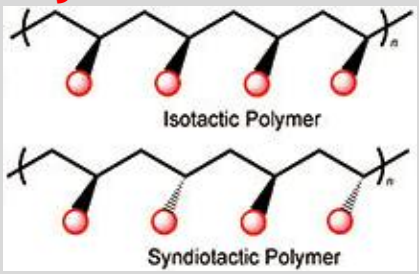


- **Oxosynthesis** (Hydroformilation): Aldehydes, Alcohols, Acids and their derivatives



- **The Stereospecific polymerization**





SMART: THE HISTORICAL TRADITION

- Sixties

The Nobel Prize in Chemistry 1963

Karl Ziegler
Giulio Natta

Share this

Giulio Natta
Facts

https://www.giulionatta.it/ENG/archivio.html
https://www.nobelprize.org/prizes/chemistry/1963/natta/facts/

Photo from the Nobel Foundation archive.

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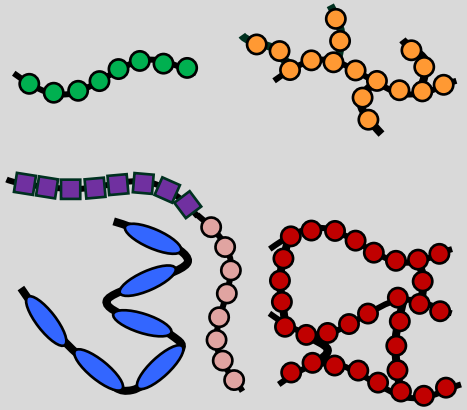
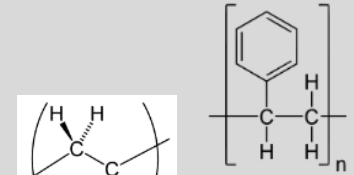
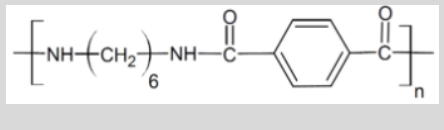
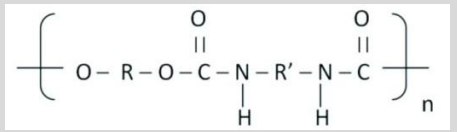
Prize share: 1/2

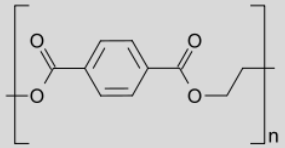
- Nowdays

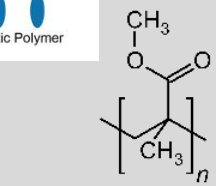




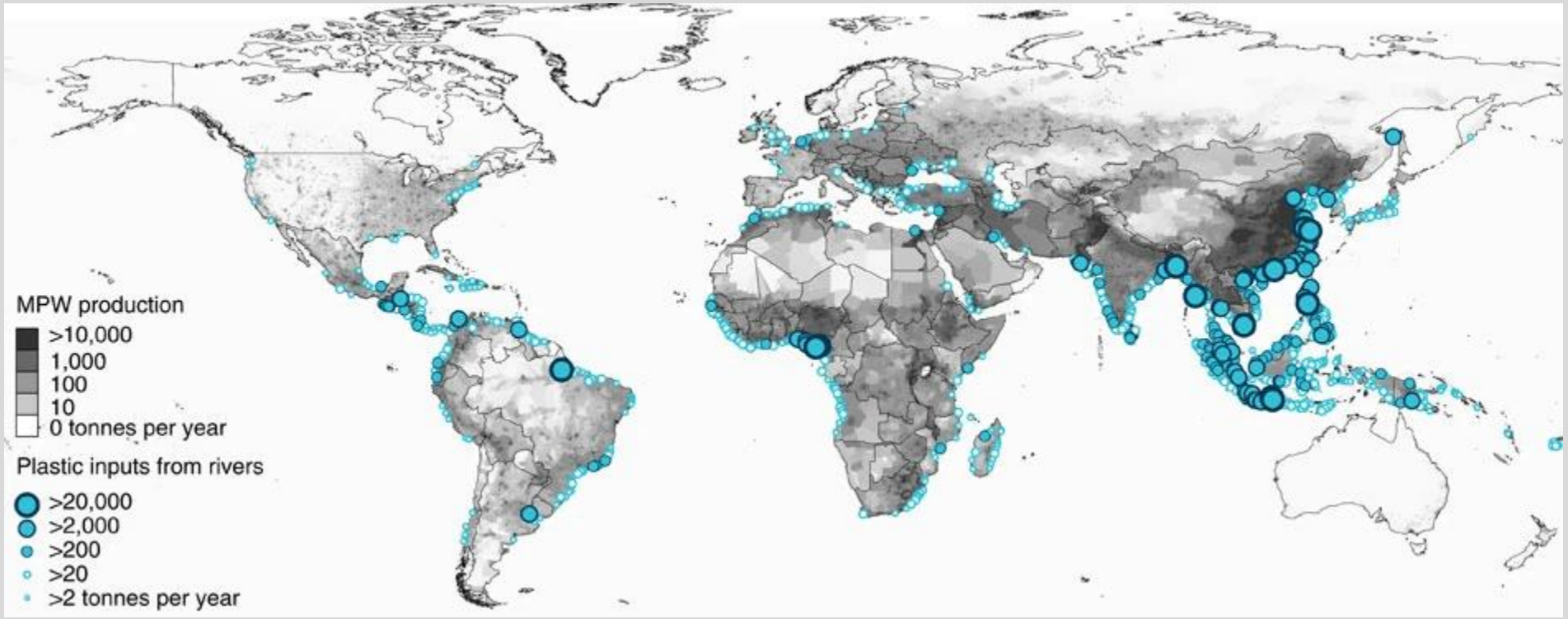








SMART: PLASTICS MANAGEMENT



- Nature Communications 8, 15611 (2017)
- Nature Communications 9, 2157 (2018)
- Scientific Reports volume 8, 4666 (2018)

SMART: PLASTICS MANAGEMENT

- "…five countries—China, Indonesia, the Philippines, Sri Lanka, and Vietnam—contribute more than half of ocean plastics…
- …**Improve waste infrastructure** (**and knowledge**) in these places, and significantly less plastic will escape into the ocean overall."

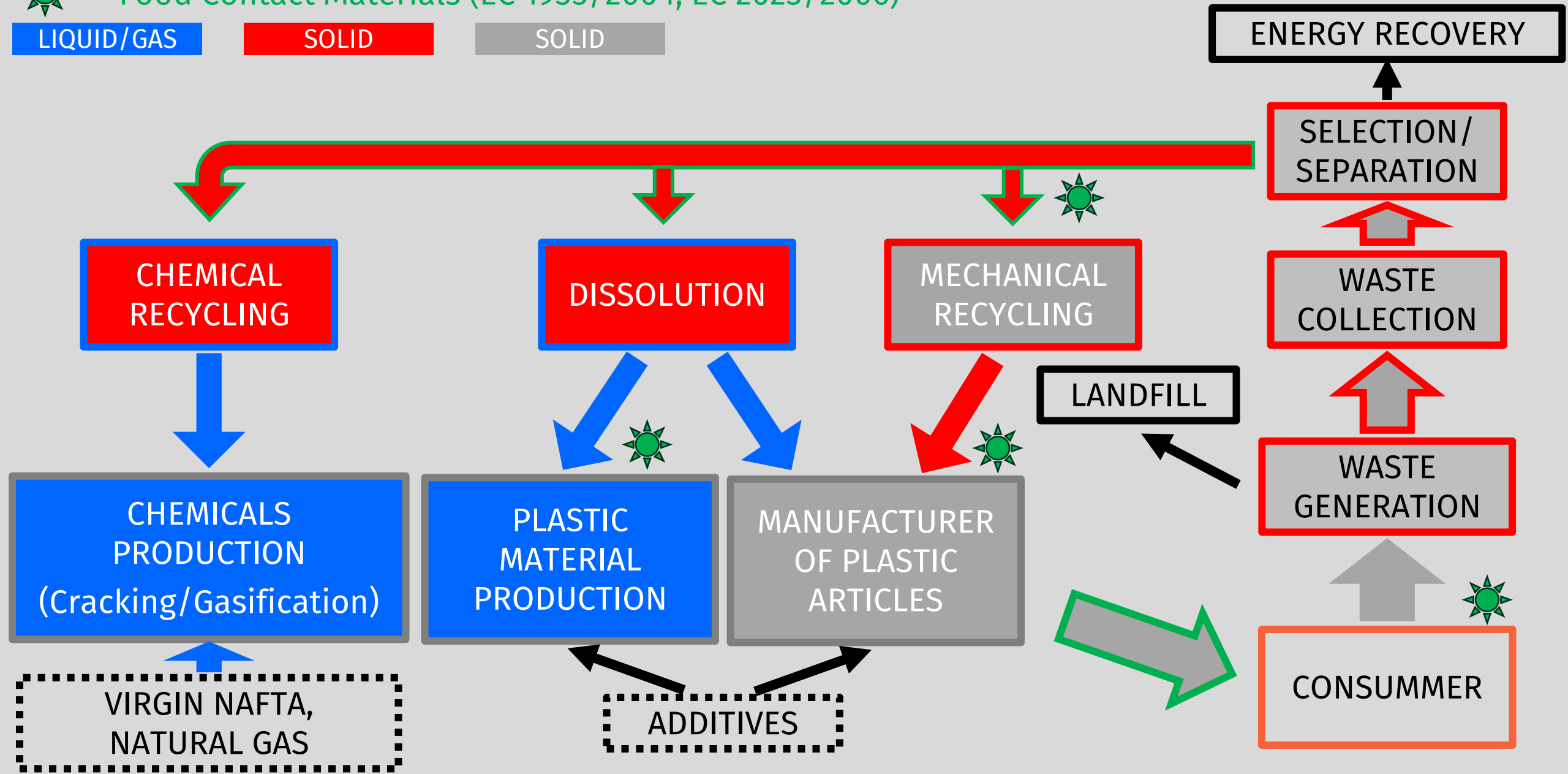
https://www.acs.org/content/dam/acsorg/membership/acs/benefits/discovery-reports/plastics.pdf
Bourzac, K. "Floods can flush microplastic pollution from rivers into the sea." Chem. Eng. News, 2018, 96(12); 5.

Università di Genova | DCCI DIPARTIMENTO DI CHIMICA E CHIMICA INDUSTRIALE

SMART: PLASTIC MATERIALS UPCYCLING

Food Contact Materials (EC 1935/2004; EC 2023/2006)

LIQUID/GAS | SOLID | SOLID



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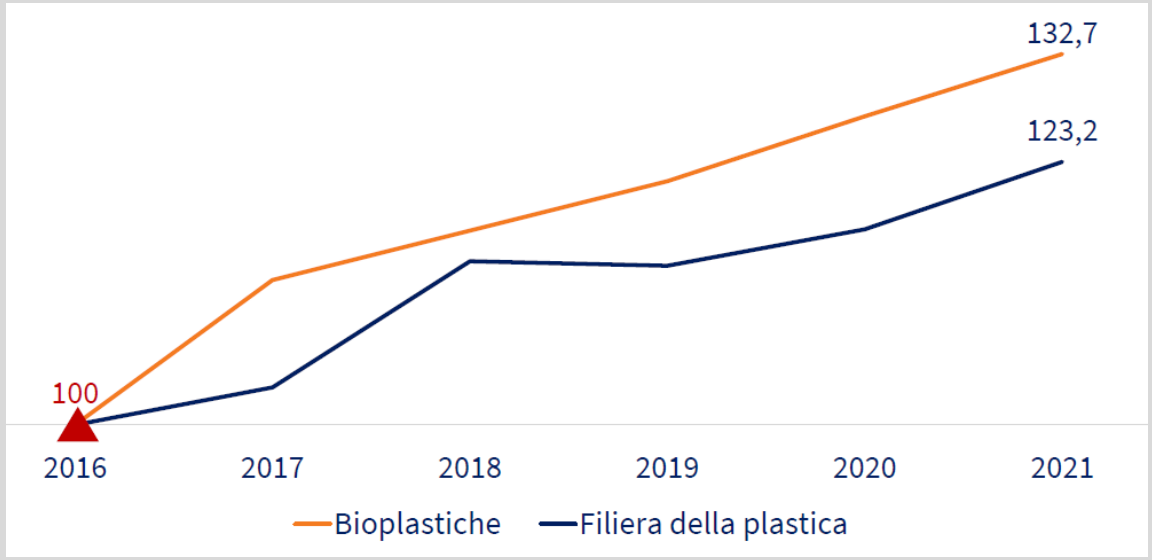
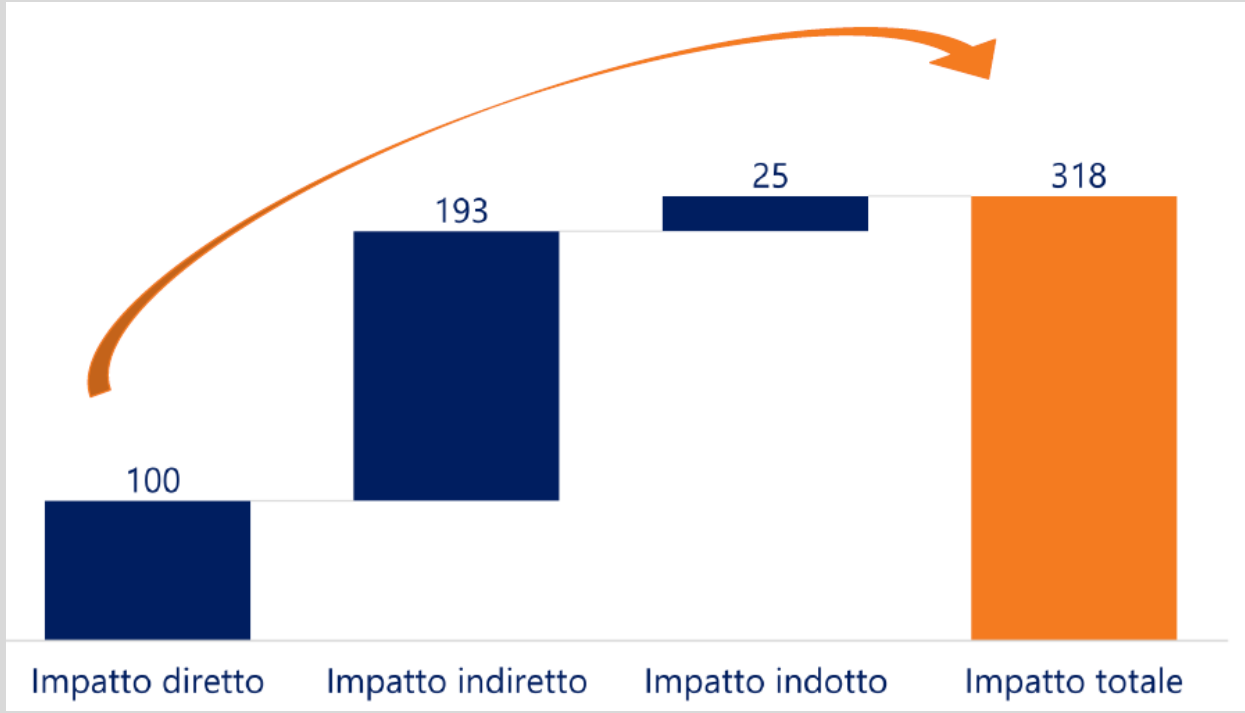
SMART: PLASTICS MANAGEMENT

- **THE ITALIAN PLASTICS SUPPLY CHAIN EMPLOYS ~ 180,000 PEOPLE**
- With a 12 share of total employment in the EU, **ITALY RANKS SECOND AMONG THE EUROPEAN Big 5**
- **Italy ranks 2nd in the EU in terms of value added by plastics**
- **The Italian plastics supply chain shows high growth rates in the recycling phase and in bioplastics**

- Employees trends (**EMPLOYEES multiplier: 2,77**)



- Economical impact generated by investments in plastics (**ECONOMICAL multiplier: 3,18**)



The European House Ambrosetti

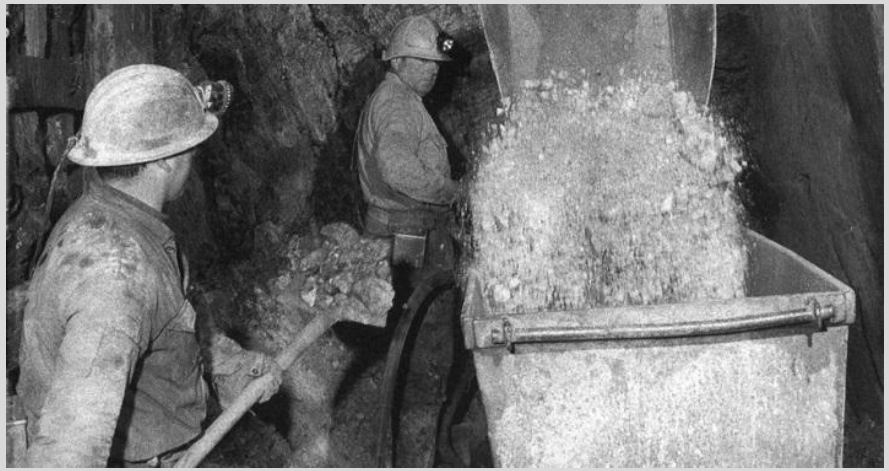
F. Galletti, PLAST2023, 06.09.2023

SMART: THE CORE BUSINESS

- **Huge problem to solve: A DEEP FUNDAMENTAL KNOWLEDGE ON CHEMISTRY AND CHEMICAL PROCESSES IS REQUIRED.**
- **SMART FOCUSES ON TRAINING MOTIVATED STUDENTS ABLE TO TACKLE SUSTAINBILITY, UPCYCLING AND CIRCULAR ECONOMY FOR MATERIALS as well as SUSTAINABLE CHEMICAL PROCESS MANAGEMENT.**

Università di Genova | DCCI DIPARTIMENTO DI CHIMICA E CHIMICA INDUSTRIALE

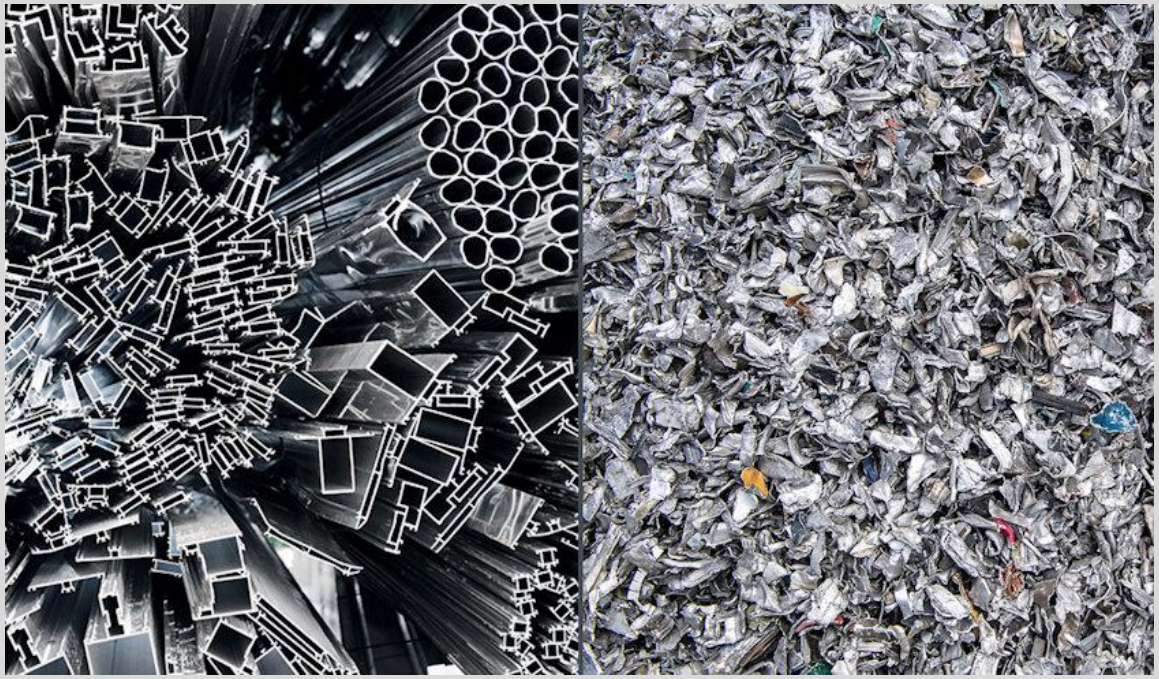
SMART: INORGANIC MATERIALS MANAGEMENT



SMART: GLASS – ALUMINUM UPCYCLING

- Inorganic Materials Upcycling: **ALUMINUM**

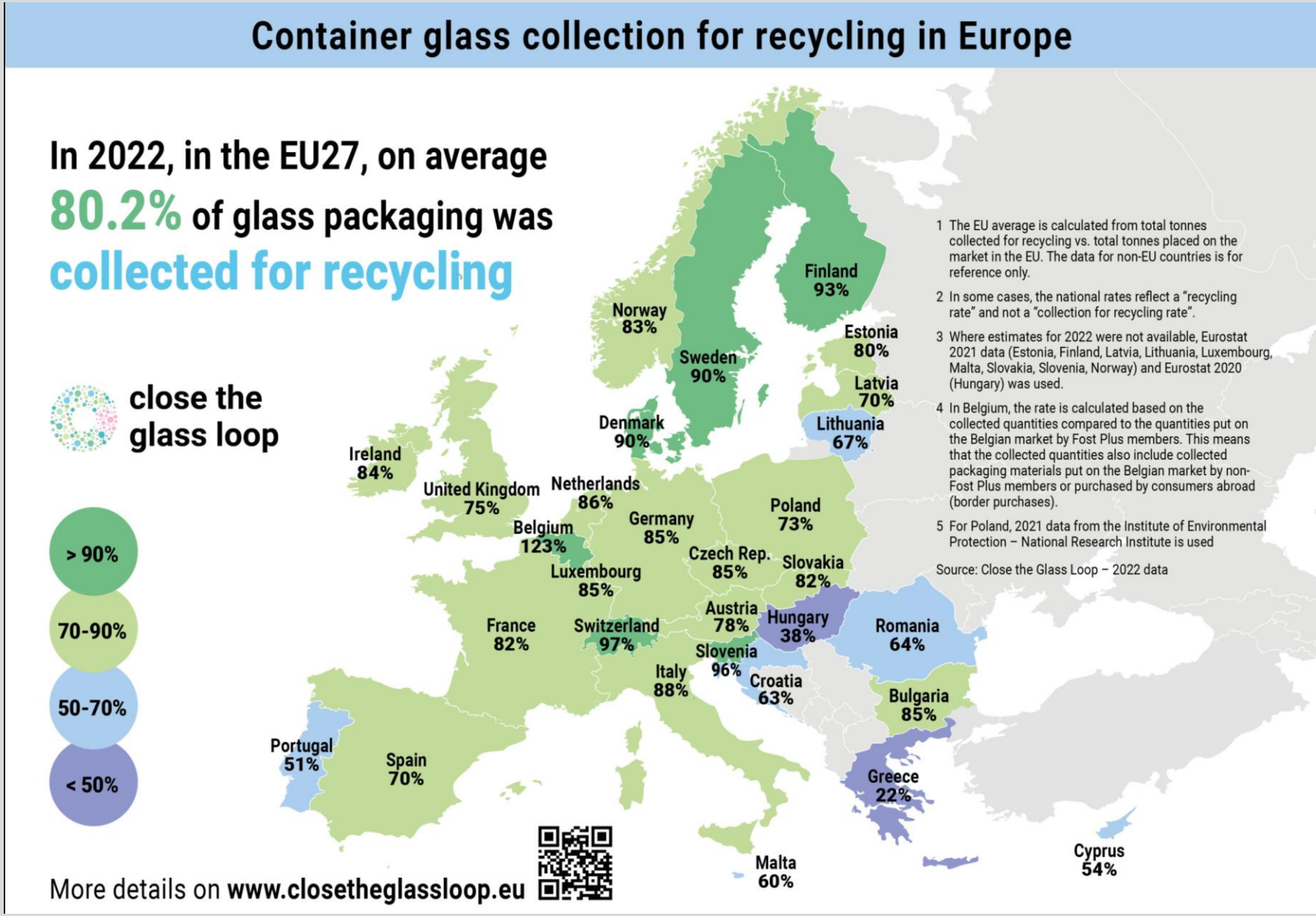
- …The recycling of aluminium scrap today utilizing a **REMELTING TECHNIQUE DOWNGRADES THE QUALITY OF THE ALUMINIUM**, and the final sink of this downgraded recycled aluminium is **ALUMINIUM CASTING ALLOY**.
- **To meet the demand for HIGH-GRADE ALUMINIUM in the future, a NEW ALUMINIUM RECYCLING METHOD CAPABLE OF UPGRADING SCRAP TO A LEVEL SIMILAR TO THAT OF PRIMARY ALUMINIUM IS REQUIRED….**



Xin Lu et al., *Nature* **606**, 511–515 (2022)
https://en.wikipedia.org/wiki/Aluminium_recycling

SMART: GLASS UPCYCLING

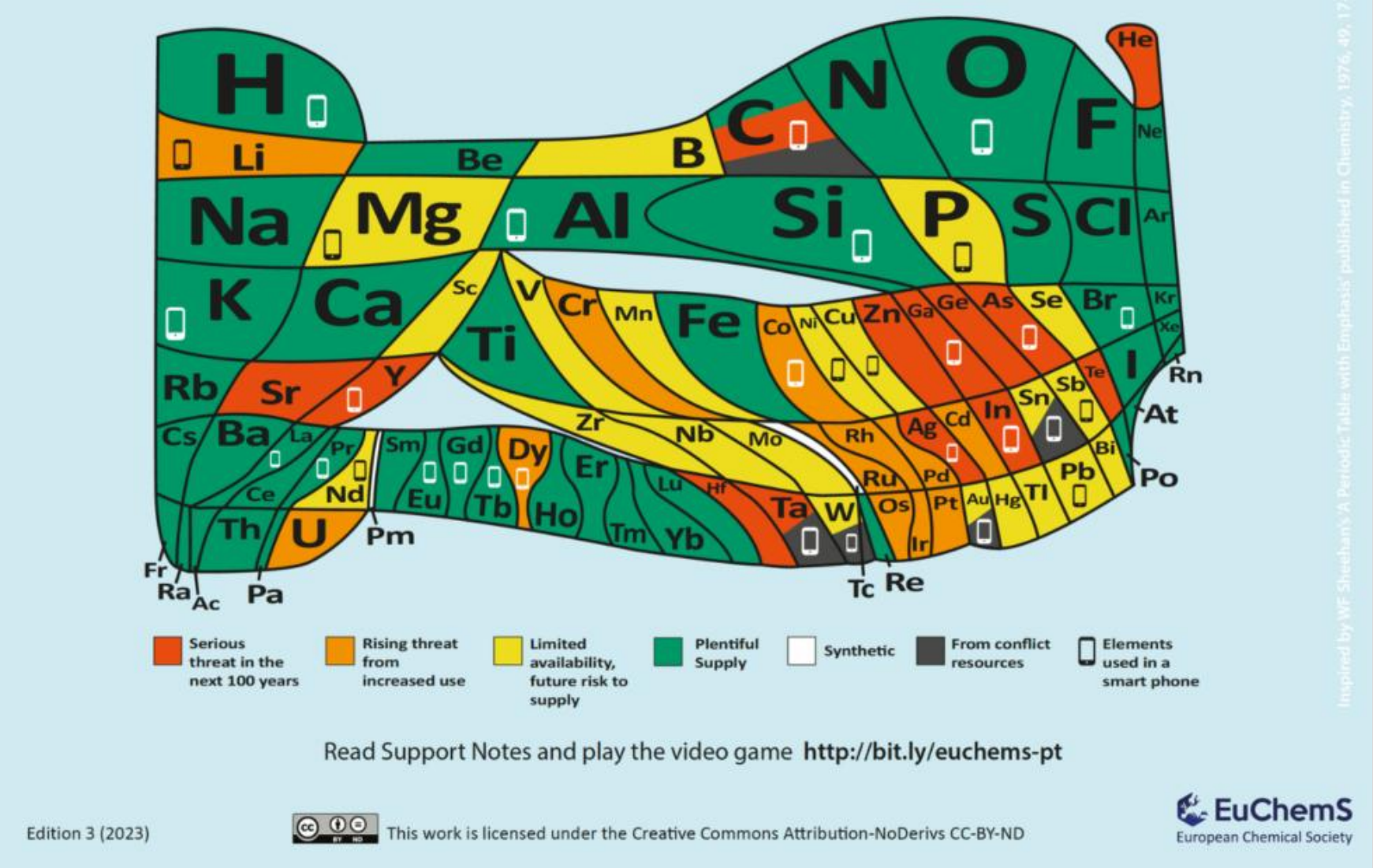
- Inorganic Materials Upcycling: **GLASS**



https://closetheglassloop.eu/
https://coreve.it/la-nuova-vita-del-vetro/
https://en.wikipedia.org/wiki/Glass_recycling

SMART: ECO-DESIGN OF MATERIALS AND SUSTAINABLE TECHNOLOGIES

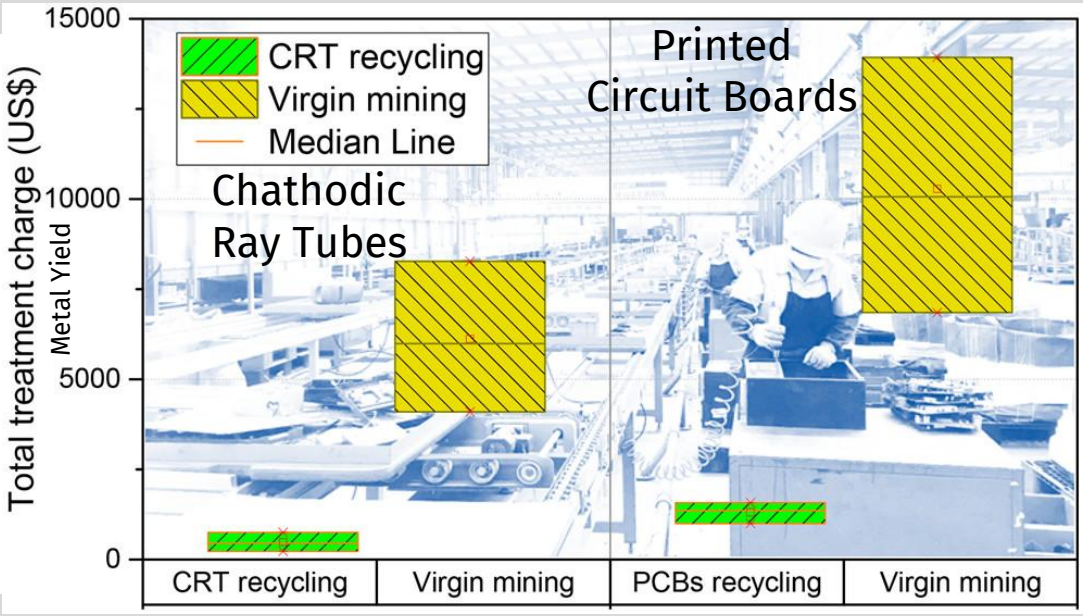
- Periodic table view on raw materials availability: **URBAN MINING**



SMART: ECO-DESIGN OF MATERIALS AND SUSTAINABLE TECHNOLOGIES

- **Urban Mining** and **NOBLE AND PRECIOUS WASTE**

- **WITHOUT GOVERNMENT SUBSIDIES**, the urban mining of precious metals like **copper and gold IS FINANCIALLY COMPETITIVE TO MINING FRESH MINERALS** the old-fashioned way.



https://www.alphr.com/environment/1008974/urban-mining-makes-financial-sense/

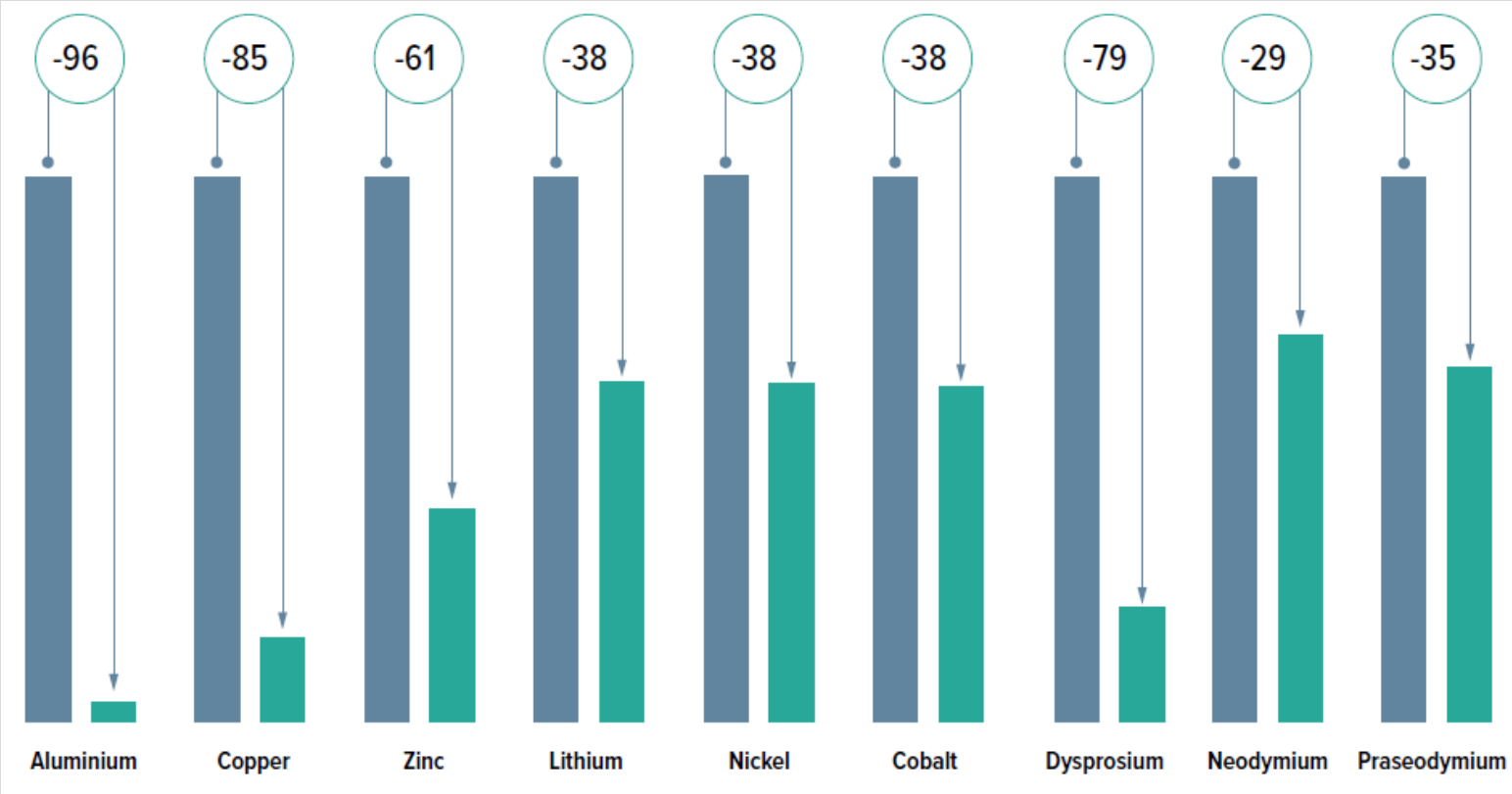
Environ. Sci. Technol. 2018, 52, 8, 4835–4841

SMART: INORGANIC MATERIALS UPCYCLING

- **URBAN MINING: WAEE (Waste Electrical and Electronic Equipment)**

- **REPLACING PRIMARY METAL WITH SECONDARY METAL: CO_2 SAVINGS BETWEEN 29-96%**, depending on the waste stream and its complexity.
- Recycling also **PREVENTS THE NEED FOR NEW MINING, SAVING RESOURCES AND AVOIDING THE ENVIRONMENTAL IMPACTS ASSOCIATED WITH EXTRACTION.**

CO_2 SAVINGS



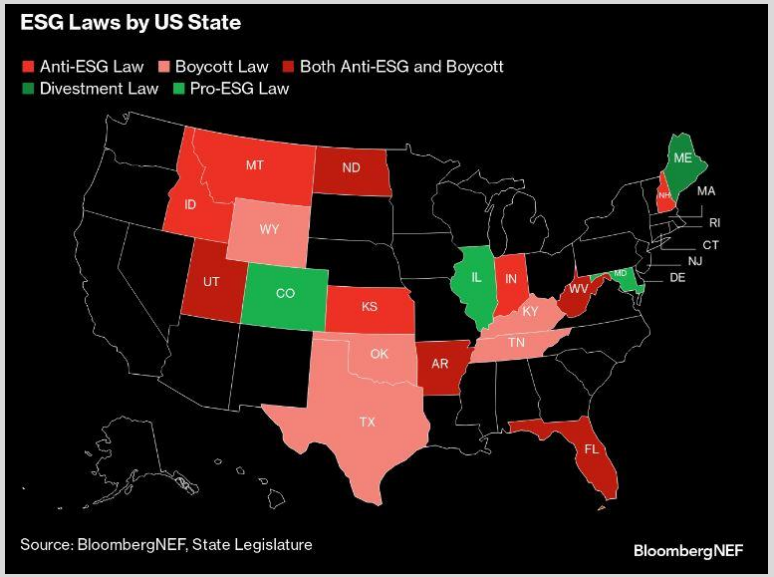
https://en.wikipedia.org/wiki/Electronic_waste
https://www.cdcraee.it/
https://eurometaux.eu/media/20ad5yza/2022-policymaker-summary-report-final.pdf

SMART: ESG CRITERIA

Environmental – Social - Governance

https://www.linkedin.com/pulse/esg-investing-opportunities-dinesh-bheema/
https://about.bnef.com/blog/anti-esg-crusade-in-us-sweeps-15-states-with-more-laws-in-works/

…Investing while keeping in mind **ENVIRONMENTAL, SOCIAL and GOVERNANCE** factors is becoming increasingly challenging in the US, with as many as 15 states enacting anti-ESG laws and over a dozen planning similar moves…

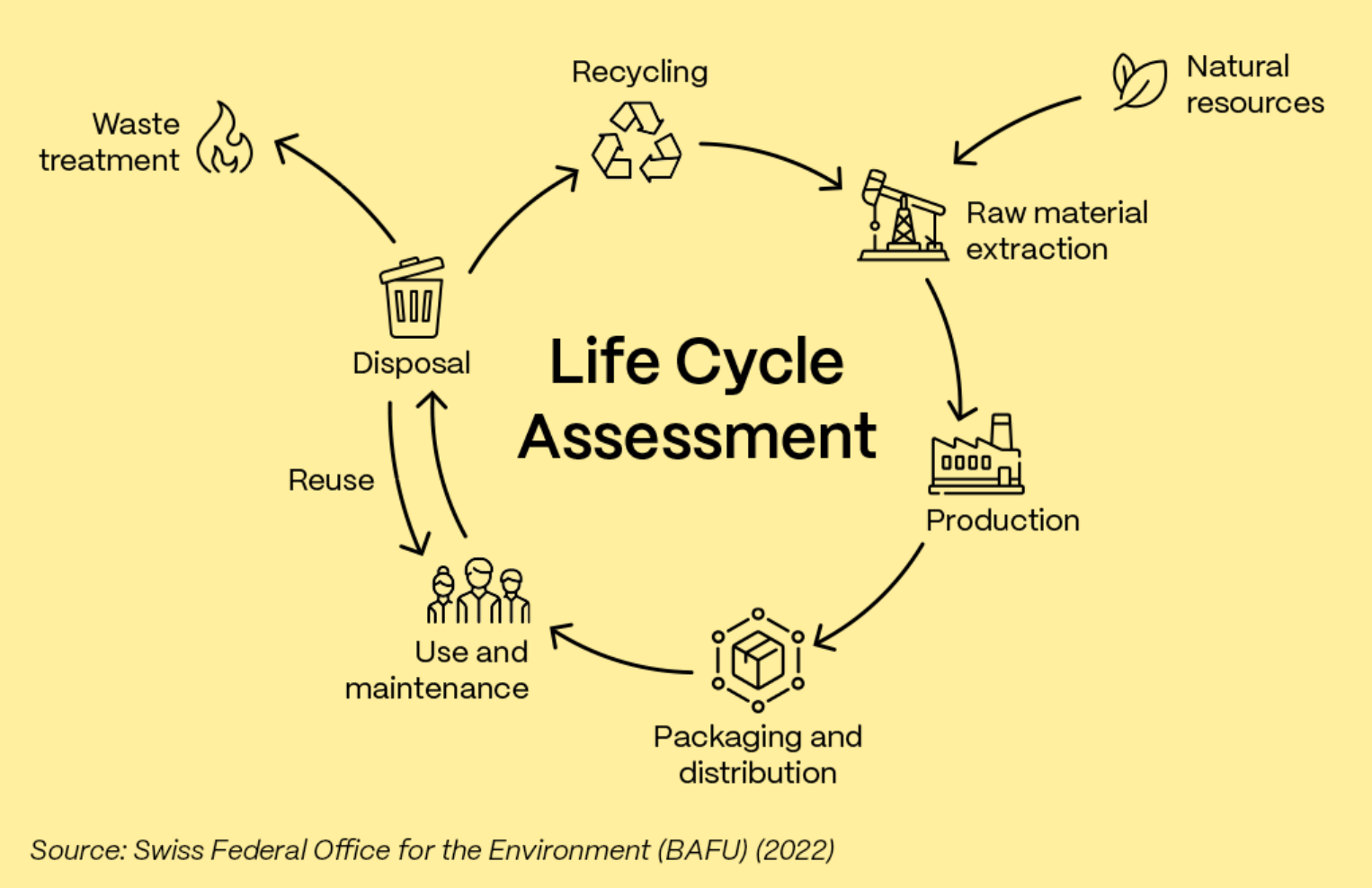


https://about.bnef.com/blog/anti-esg-crusade-in-us-sweeps-15-states-with-more-laws-in-works/ (June 2023)

- In order to find **a reasonable compromise between the different ESG requirements, multicultural skills are needed that are capable of taking a holistic view of the problem.**
- This is only possible with a **SOLID BASIC EDUCATION** that takes into account the **THREE LEGS OF SUSTAINABILITY with a PROFESSIONAL, CROSS-DISCIPLINARY AND NON-IDEOLOGICAL APPROACH** that only a **MULTIDISCIPLINARY EDUCATION SUCH AS SMART CAN PROVIDE.**

SMART: ECO-DESIGN OF MATERIALS AND SUSTAINABLE TECHNOLOGIES

- **Life Cycle Assessment (LCA)**



Source: Swiss Federal Office for the Environment (BAFU) (2022)

https://ecoinvent.org/life-cycle-assessment/
https://www2.deloitte.com/dk/da/pages/climate-and-sustainability/life-cycle-assessment.html
https://stich.culturalheritage.org/life-cycle-assessment-explained/

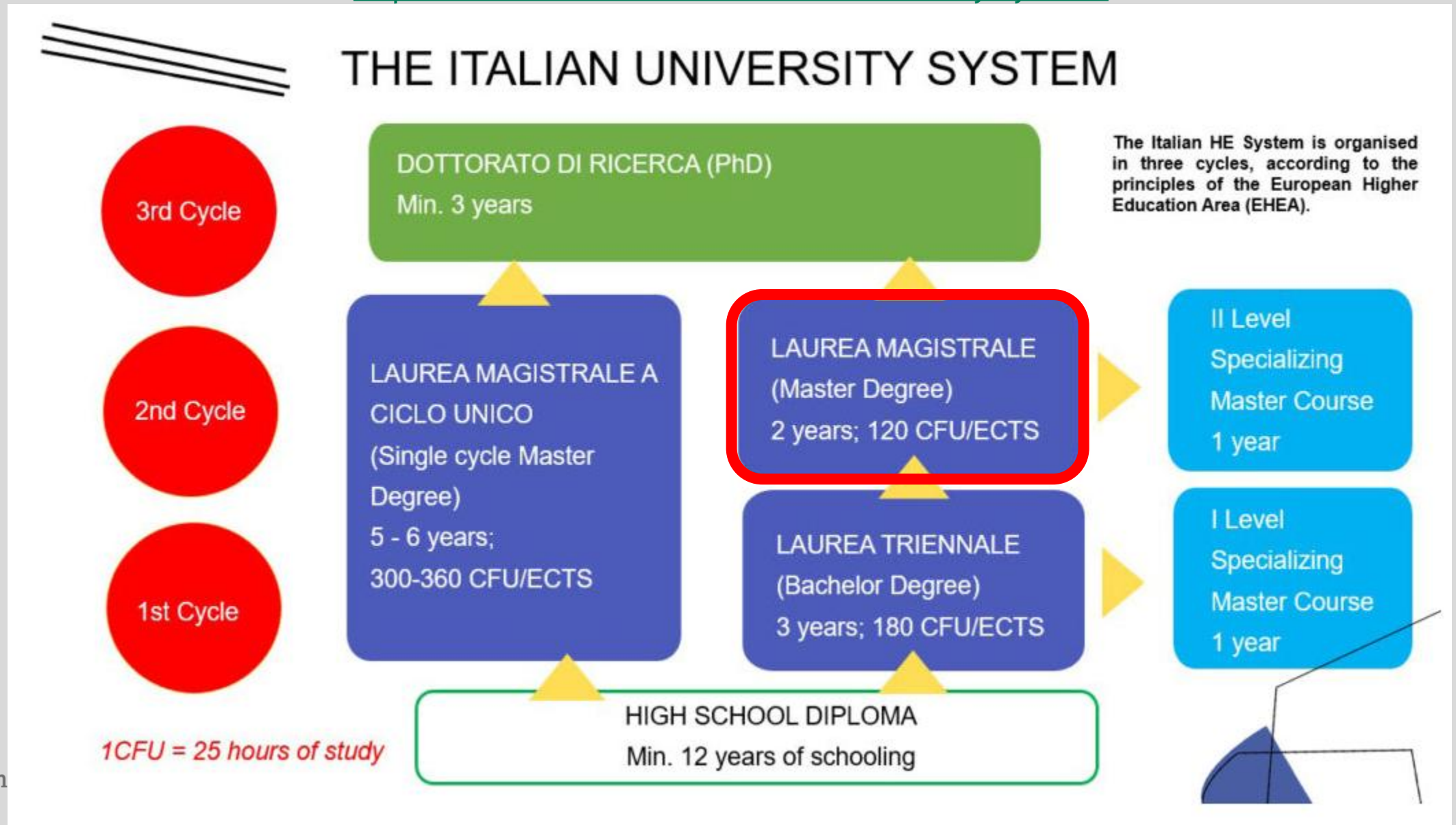
Meeting with SMART Students

1) The italian educational system
2) SMART@UNIGE: organization
3) SMART student problems
4) VISA problems
5) Any other business: Q/A

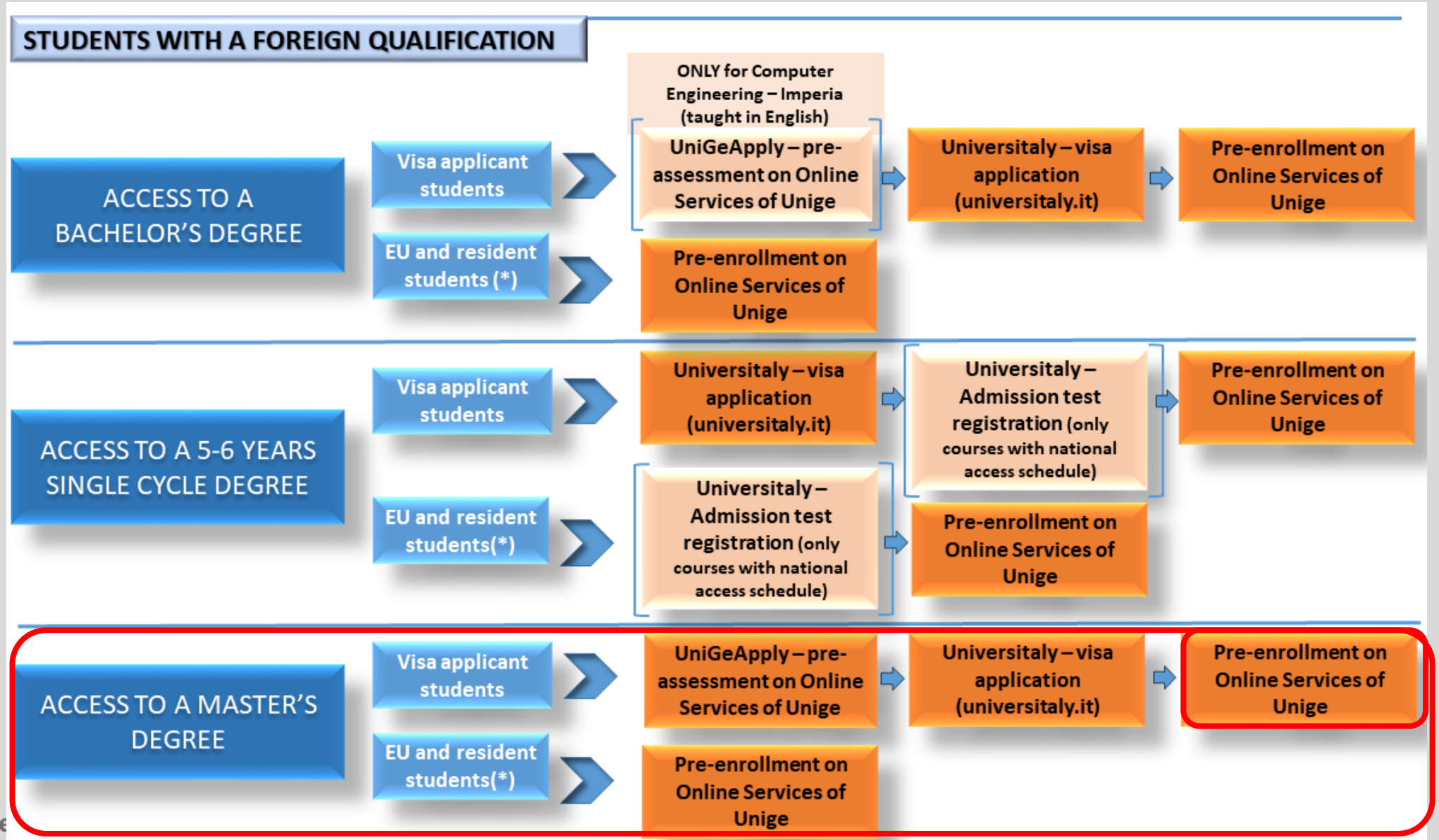
The Italian Educational System

https://uni-italia.it/en/students/the-university-system/

SMART



SMART organization



* Italian, EU and non-EU students already regularly resident in Italy

SMART organization

https://unige.it/en/international/enrolment-non-eu-students-residence-abroad-foreign-diploma

Enrolment for non-EU students with residence abroad and foreign qualification (visa applicants)

DEADLINES FOR NON-EU STUDENTS LIVING ABROAD A.Y. 2024/2025

Updates: check the deadlines, the modalities and the requirements to be able to confirm the enrollment - see the table below and the section STEP 3 - Enrollment

The deadlines shown in the table apply to students who enroll for the first time in the first year of their chosen course of study. If you are applying for a scheduled access course, always refer to the deadlines in the call.

If you are already a student at Unige: check the deadlines for enrollment to the years following the first, the deadlines for course transitions or transfers on the dedicated page

29th March 2024	Deadline for applications on UNIGEAPPLY for Master's degree courses taught in English for the A.Y. 2024/2025 (mandatory pre-evaluation) **UPDATING for two new activation courses (submission of applications on UNIGEAPPLY):** Electronic Engineering and Sustainable Polymer and Process Chemistry (SMART), opening: **7th May 2024**; closing: **7th June 2024** (mandatory pre-evaluation).

Enrollment steps

Before leaving for Italy
UniGeApply (if required), Universitaly, pre-enrollment

When you arrive in Italy

Enrollment documents

Knowledge of the language (Italian/English): certificates and tests

If you choose a course with admission test and limited

SMART @ UNIGE

SMART organization

- **ADMISSION RECEIPT**

Università di Genova

UniGeApply - OUTCOME OF ADMISSION

A.Y. 2024/25 Student Number: [redacted]

Name: [redacted] Fiscal code: [redacted]
Date of Birth: [redacted] City: [redacted]

Dear [redacted],

we are very pleased to inform you that, at the end of the assessment of your documentation, your application to Master degree course in SUSTAINABLE POLYMER AND PROCESS CHEMISTRY (2 years - GE) has been accepted. Congratulations and a warm welcome to the UniGe community!

We are confident that this represents the first step of an exceptional human and professional training adventure, and we are happy that you have chosen us to do that together!

The next steps to complete your enrollment are as follows:

1. Registration on the Universitaly portal (https://www.universitaly.it). In case of a master's degree taught in Italian, you could already apply on Universitaly before the outcome of the evaluation on UniGeApply (your application can however be validated from now on, that is after a positive evaluation of the pre-selection process). You can check the opening and closing dates of the Universitaly.it portal for the A.Y. 2024/25 consulting the table on the web page: https://unige.it/enrolment-non-eu-students-residence-abroad-foreign-diploma. If the application is submitted before or after the opening/closing dates, the application will not be accepted by the University and cannot be validated and sent to the Embassy/Consulate. This step is compulsory both for your study visa application and later for your pre-enrolment at UniGe. Considers that Universitaly is an external portal to Unige. Please, once you have registered with your personal data (enter your personal data exactly as shown on your passport), upload to Universitaly the mandatory documents you already uploaded in the pre-assessment procedure on UNIGEAPPLY. The documents are listed below:
i) Passport;
ii) Bachelor's degree diploma;
iii) Bachelor's degree transcript;
iv) **If you have been selected for a course in English**: certificate of English knowledge, level B2 (or a document certifying that your Bachelor's study program was held in English);
If you have been selected for a course in Italian: certificate of knowledge of Italian language, level B2;
For information on language certificates and any tests to be passed if the certificate is not presented, check information starting from the web page https://unige.it/enrolment-non-eu-students-residence-abroad-foreign-diploma;
v) Diploma and transcript of any additional degree you have uploaded in the pre-assessment procedure.

Please upload the most up-to-date versions of these documents to Universitaly. If you already have the Declaration of Value (DOV) or the certification of comparability issued by CIMEA (Academic Equivalence Mobility Information Center, cimea.it), also upload one of the two documents. Always consult the web page https://unige.it/enrolment-non-eu-students-residence-abroad-foreign-diploma for more information and updates on Universitaly, pre-enrolment, enrolment and useful information.

2. Once you have submitted your application to Universitaly, the UniGe Admission Office will check the information and documentation you have entered. Once your application has been verified, you will be able to download your Letter of Acceptance (by printing out the "university pre-enrolment application" summary) to be signed and presented to the relevant diplomatic-consular representations. Please note, this letter is for visa application, it is not related to the successful completion of your pre-enrollment at Unige.

3. After validating your application on Universitaly you will be allowed to enter the UniGe web portal for students and complete your online pre-enrollment with the same access keys you used for your application on UNIGEAPPLY (go to Online Services > Online Services for Students). For updates on the enrollment procedure always check the page: https://unige.it/enrolment-non-eu-students-residence-abroad-foreign-diploma.

4. While your visa is being processed, you can apply for a scholarship and accommodation at our Regional Agency Aliseo (for info and deadlines visit https://www.aliseo.liguria.it/foreign-students/). You can complete the enrolment only after arrival in Italy. For more details see: https://unige.it/enrolment-non-eu-students-residence-abroad-foreign-diploma.

Please note that the above mentioned steps (from 1 to 3) are mandatory: if you miss one of them your admission will be invalid

For any information on the enrollment and living in UniGe, you can visit the webpage:
https://unige.it/en/usg/en/welcoming-international-students
or write to the UniGe Welcome Office at: admissions@unige.it.

For any information regarding Master degree course in SUSTAINABLE POLYMER AND PROCESS CHEMISTRY (2 years - GE) , please write to .

Looking forward to meeting you in person, we thank you again for your trust in UniGe!

Best regards,

Prof.
Head of Program, Master degree course in SUSTAINABLE POLYMER AND PROCESS CHEMISTRY (2 years - GE) , University of Genoa

Date: 11/06/2024 09:15:24
(id: 201270)

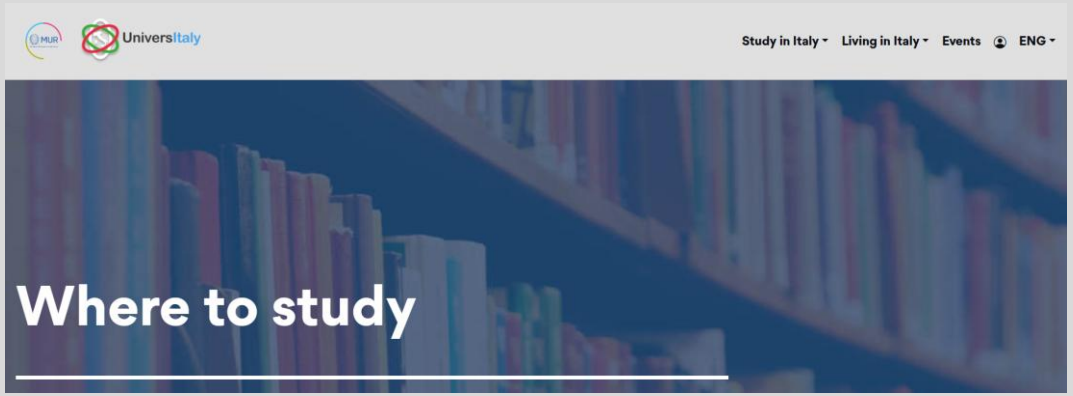
- - - - - - - - - - - -
Please do not reply to this message.

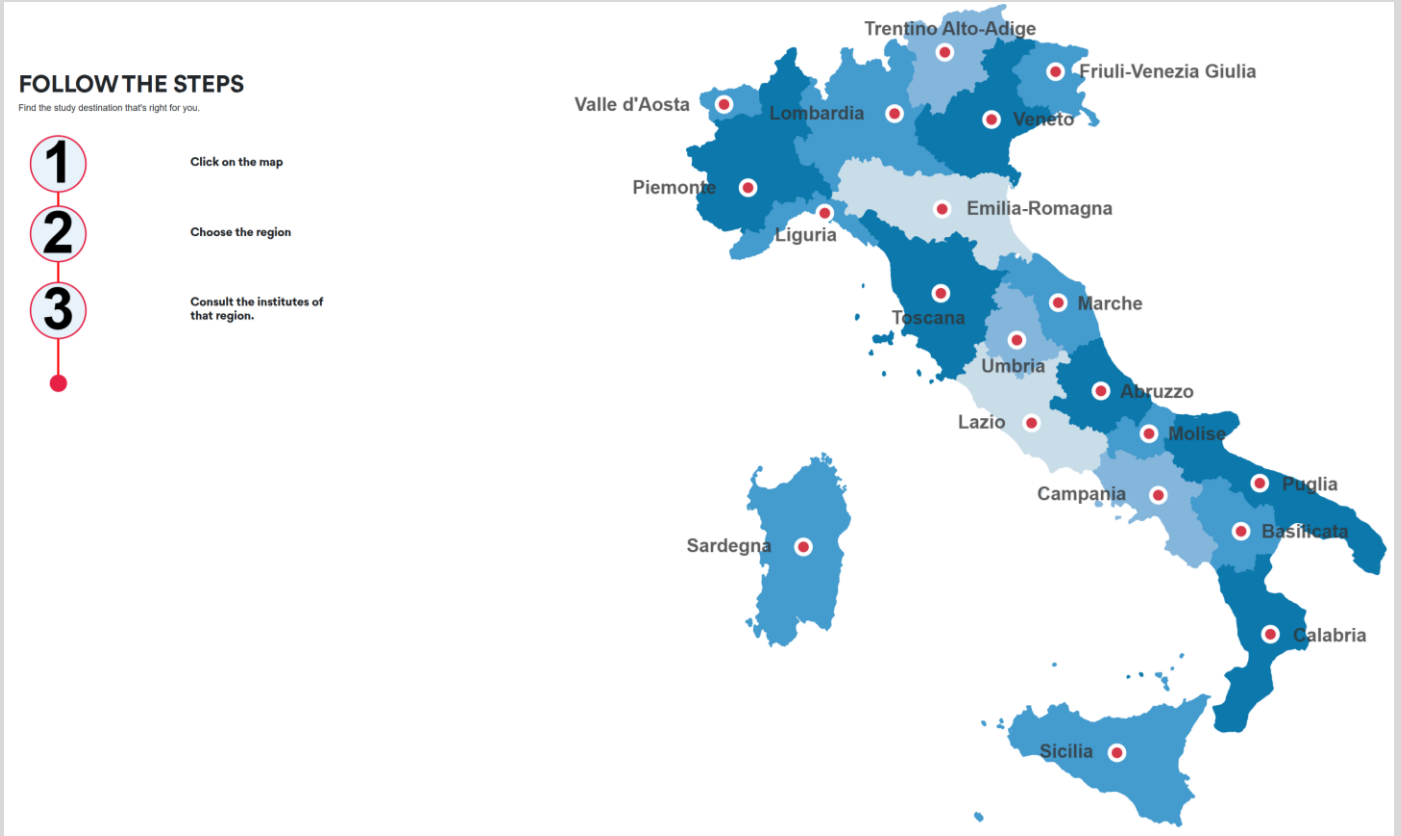
- **Read carefully documents and e-mail you receive, including web sites there embedded!**
- Answer to most of your questions are already there.

SMART @ UNIGE

SMART organization

- **After SMART admission, register on UNIVERSITALY** (https://www.universitaly.it/cerca-istituzioni)**!**
- Registration on Universitaly allows you to select the university where you want to study.
- **Deadline: June 20th, 2025.**
- **After your submission on Universitaly has been accepted, the VISA request will be sent to the Embassy you selected.**





Pre-ENROLLMENT

- **When your application to Universitaly has been accepted, YOU'LL RECEIVE**

Università degli Studi di GENOVA

PRE-ENROLMENT APPLICATION
A.Y.: 2025/2026

ID Domanda:	[redacted]

Personal data

Name:	[redacted]
Surname:	[redacted]
Gender:	[redacted]
Date of birth	[redacted]
Country of birth:	[redacted]
City of birth:	[redacted]
Current citizenship:	[redacted]
Residing in [street, number, city, ZIP code, Country]:	[redacted]
Telephone:	[redacted]
Email:	[redacted]
Italian tax code:	[redacted]
Passport number:	[redacted]
Expiry date:	[redacted]

Pre-enrolment application

The reason for the visa application:	I want to enrol in a study course
Where will you apply for a visa?:	AMBASCIATA [redacted]

Course information

Institution:	Università degli Studi di GENOVA
Course:	Sustainable polymer and process chemistry
Course Type:	Laurea Magistrale
Language:	Inglese
Class of degree course (according to Italian law):	LM-71 R
Official length of the course:	2 anni
Course location/Campus:	GENOVA

Submitted to Università degli Studi di GENOVA on: [redacted]

ACADEMIC ELIGIBILITY

Università degli Studi di GENOVA

the student is admitted to the course
it is not necessary to verify the knowledge of the language

Documents assessed for admission
CIMEA Statement of comparability
CIMEA certificate of comparability
The qualification was assessed and deemed suitable

Certification of English language proficiency
IELTS and MOI
The qualification was assessed and deemed suitable

Transcript
B.Sc. in Engineering Transcript
The qualification was assessed and deemed suitable

CV of academic/school career
Europass CV

CIMEA Statement of verification
CIMEA certificate of verification
The qualification was assessed and deemed suitable

Other
Higher Secondary School Certificate and Transcript

Other
Acceptance Letter from Genoa
The qualification was assessed and deemed suitable

Provisional certificate
B.Sc. in Engineering Certificate
The qualification was assessed and deemed suitable

Altro
Cimea certificates already attached. The deadline for arriving in Italy and submission of any missing document required for enrollment is 31st January 2026. The student can find full information on deadlines and enrollment process on the following web page which is currently being updated: https://unige.it/en/international/enrolment-non-eu-students-residence-abroad-foreign-diploma. The next step will be pre-enrollment on Unige Online Services. Check the details at the link provided

Further information
Expected start date of teaching activities: 22/09/2025
tuition fees (annual amount €): -
The student is guaranteed support in finding accommodation

- **The Embassy/Consulate you selected also receive all your documents.**
- Be aware, sometime different Embassies/Consulates – even in the same country – ask for ADDITIONAL DIFFERENT DOCUMENTS.

Submitted to AMBASCIATA [redacted]

Signature

_____

Pre-ENROLLMENT

- **After your submission on Universitaly has been accepted, YOU MUST PRE-ENROLL TO UNIGE.**
- https://unige.it/en/iscrizione-studenti-non-eu-residenti-estero-con-titolo-studio-non-italiano

STEP 2-A: Submission of the application

- **Use UniGePass credentials to authenticate and start pre-enrollment application**

Read the notes carefully to correctly fill in the application:

- Click "submit a new application" to get started.
- **Courses section**: the chosen course must coincide with the application submitted on Universitaly and in the case of pre-selection (if required), with the course for which you have received a positive result. Information for all students: in case of a degree program (Bachelor's degree or single cycle 5-6 years degree), mark in the options "verification exemption" > no exemption. In the case of a master's degree course, mark in the options "date verification" > select the first available date; "curriculum requirements" > to be verified; "exemption verification" > no exemption.
- **Profile Section: as a student applying for a visa**, you will have to tick the option: **"I declare to have submitted visa application for the current academic year on ministerial portal Universitaly.it"**. If it is not true, make sure to submit the application on Universitaly first and then start your pre-enrollment application".
- **Section Education**: the fields that will be automatically filled in the case of selection of foreign diploma (or Italian diploma obtained abroad) or foreign degree must not be modified, indicate that the qualification is obtained in a foreign institution.
- **Documents section**: upload only any documents expressly requested by the selected course of study. The documents necessary to finalize the enrollment will be provided with another method upon arrival in Italy.
- **If all the sections in the top row are no longer marked in red when you view your application, the information is complete and you can save your pre-enrollment.**

Pre-ENROLLMENT

- **AFTER your submission on UniversItaly has been accepted, YOU MUST ENROLL TO UNIGE.**
- https://unige.it/en/iscrizione-studenti-non-eu-residenti-estero-con-titolo-studio-non-italiano

STEP 2-B: Final submission of pre-enrollment

Check the status of your application and whether an action is required, depending on the wording that will appear after saving:

- ***complete***: means that the application has been submitted correctly, no action is required.
- ***pending approval of the Welcome Office***: the application must be viewed by the office as a check with the data on Universitaly is required. Wait for an automatic email that warns you of the unblocking. The procedure is not immediate, wait the necessary time. Once you have received the email, go back to your pre-enrollment application on Unige Online Services and press the "save" button. The application will pass to the "complete" state, see above.
- ***incomplete***: your action is required. For example, the application will be incomplete if it has been unlocked (see previous point) but you have not yet saved it again for final confirmation.
- ***with errors***: the application is not submitted correctly, there is one or more errors in the compilation. An error message is reported. The errors may be due to inconsistencies found by the system on your data (for example, you are a student applying for a visa and you have incorrectly marked as a student already legally resident in Italy). Once the error has been corrected, the application must be saved again.

Please note: you will always receive an automatic email that notifies you that the update (save) action you performed on your pre-enrollment application has been successfully completed.

Attention: if you declare the fake and submit a pre-enrollment application without having previously submitted an application on Universitaly (for the visa application), the pre-enrollment application will be ANNULLED.

Sustainable polyMer And pRocess chemisTry: Applications

- Already pre-Enrolled

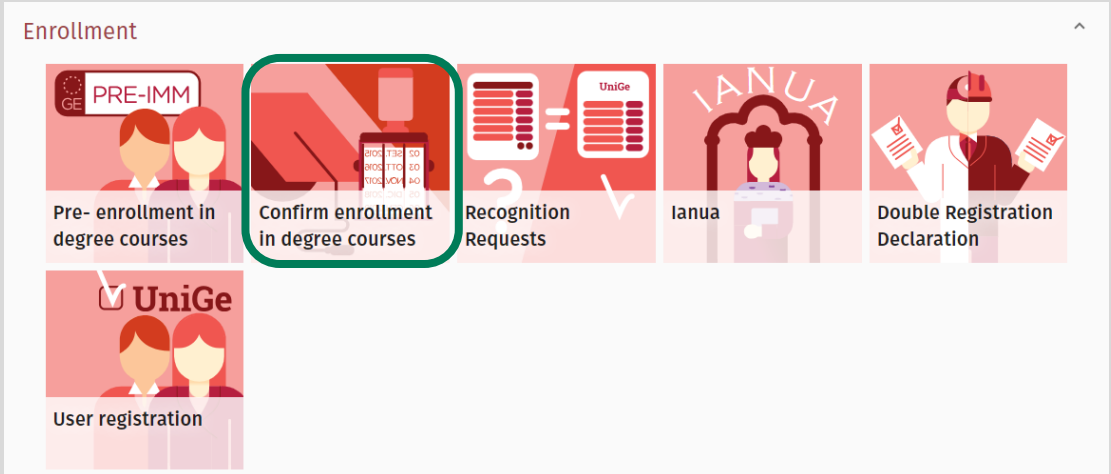
Matricola:	8113216
Candidato:	SIDDIQUE AHMAD
Matricola:	8135546
Candidato:	IMRAN AHMED
Matricola:	9851227
Candidato:	ABDERRAOUF BENTOUNSI
Matricola:	10196758
Candidato:	ALSAYED MAHROUS ABDELNASER IBRAHIM
Matricola:	8328377
Candidato:	MUHAMMAD FAIZAN KHAN
Matricola:	9983393
Candidato:	AYMEN MAOUI
Matricola:	9829426
Candidato:	SHOEIB NIKPOUR
Matricola:	10172240
Candidato:	AHMAD QAYYUM
Matricola:	7234833
Candidato:	ABU BAKAR SADIQUE
Matricola:	8079446
Candidato:	MOHAMMAD AMIN SHOMEIL SHOSHTARI

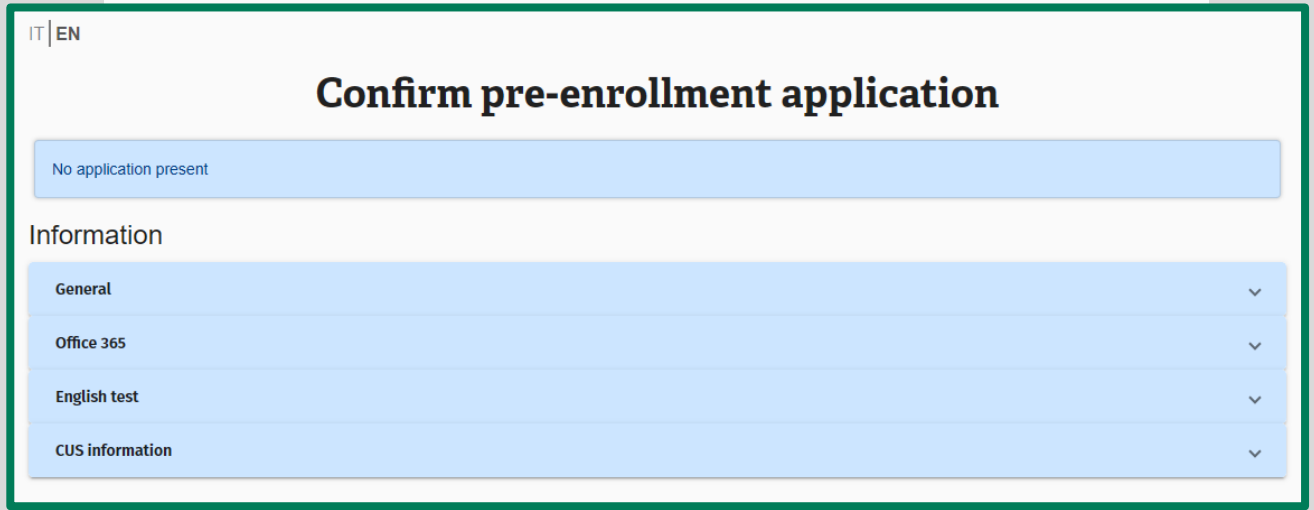
- Documents under final review

- **16 + 4**

DEFINITIVE ENROLLMENT

- The definitive enrollment @ UniGE will happen as soon as you arrive in Genova.
- You must go to the suitable office or try to do the procedure on-line.
- **You must arrive WITHIN JANUARY 25th, 2027 (?)**





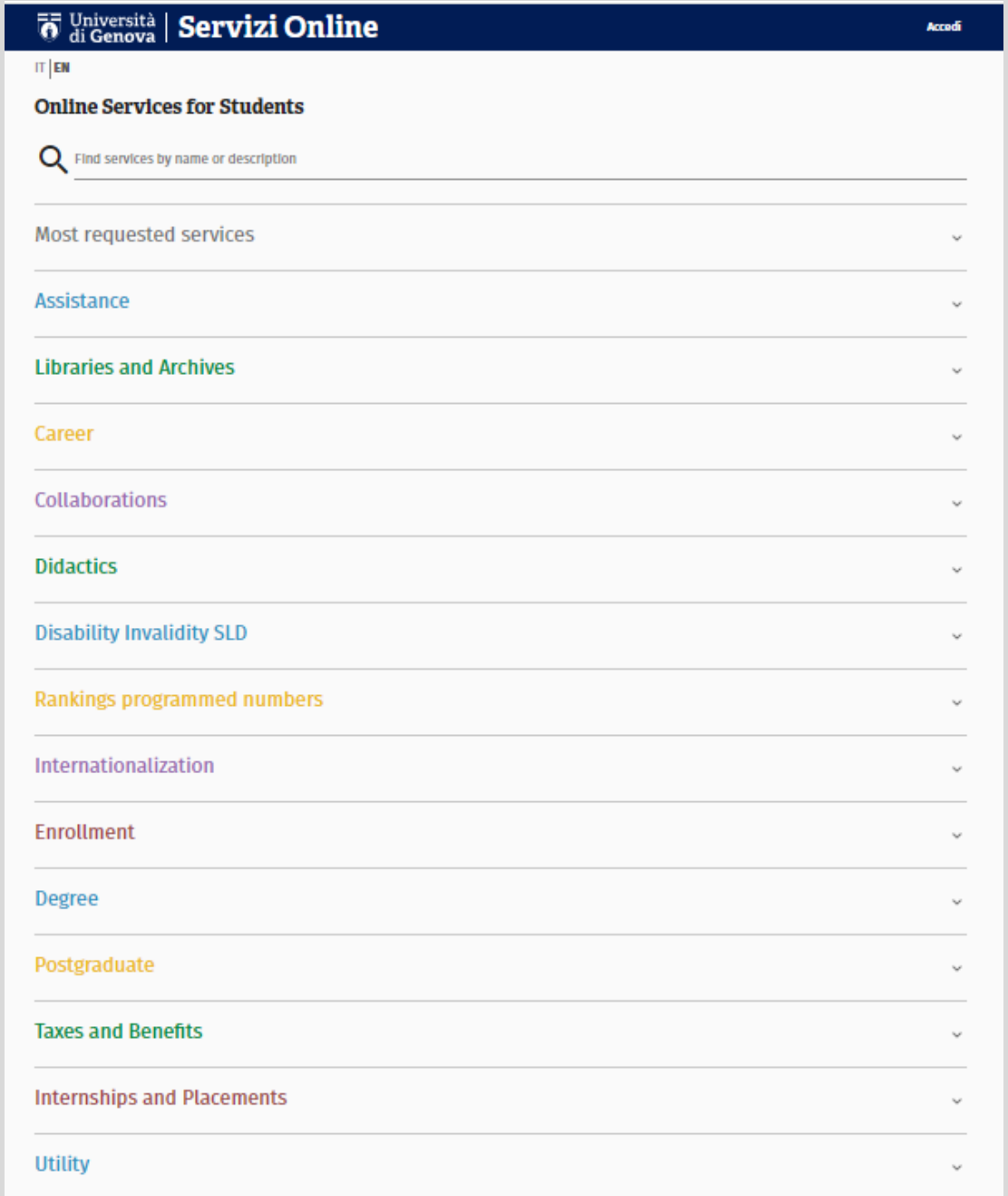
SMART @ UNIGE

SMART organization

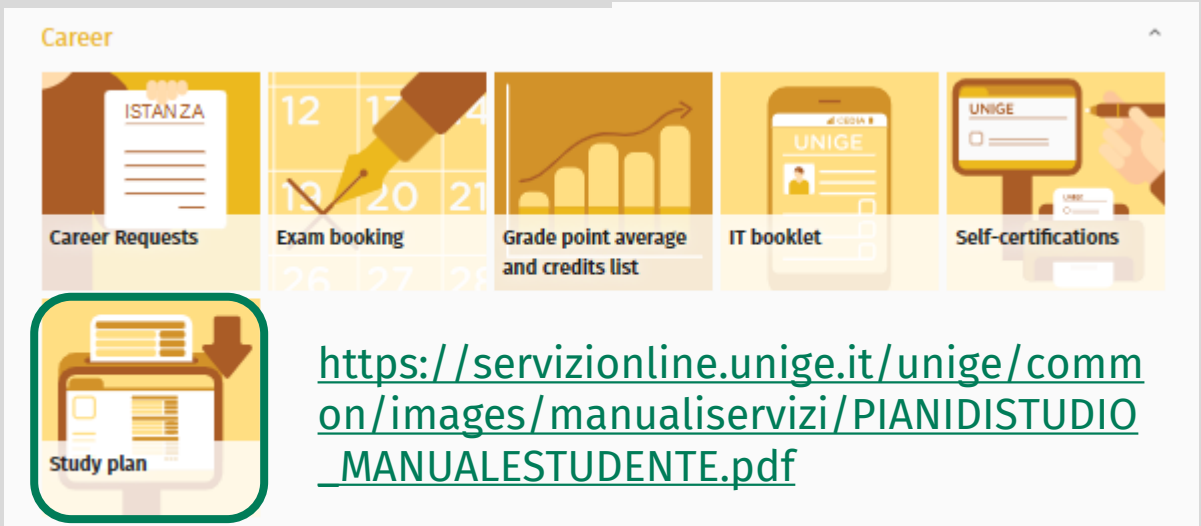
- Student on-line services

https://servizionline.unige.it/web-sol/en/#/

https://servizionline.unige.it/web-sol/en/#/indice/studenti

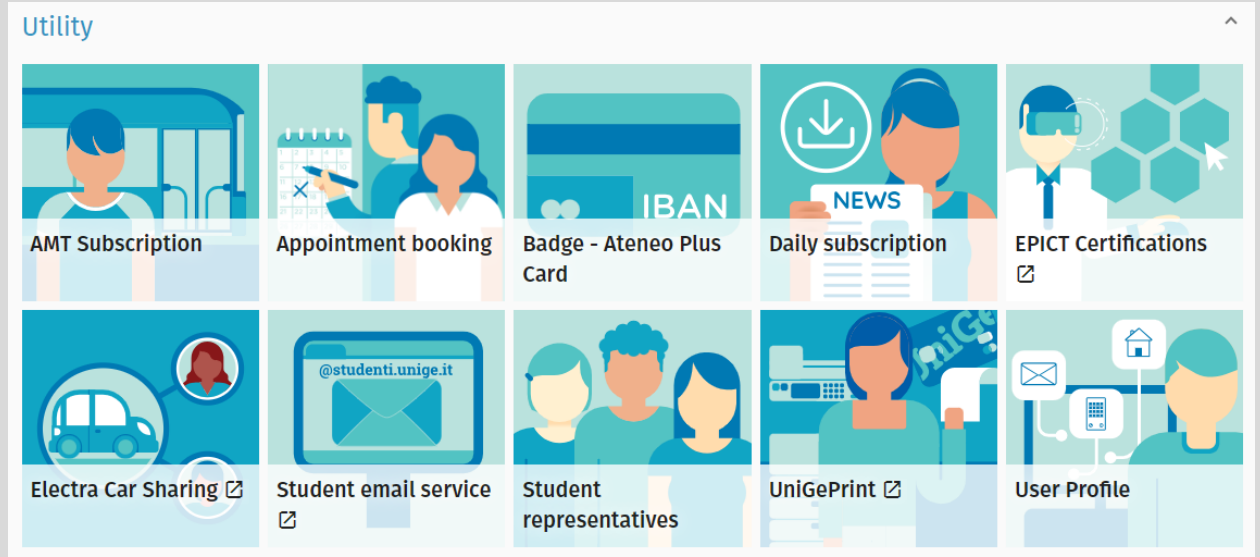


SMART organization

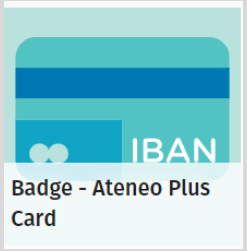


https://servizionline.unige.it/unige/common/images/manualiservizi/PIANIDISTUDIO_MANUALESTUDENTE.pdf

- The Study Plan (selection of I° year optional class) must be filled within 14 day from you arrival in Genova.
- Please, send me in advance your choice to organize the on-line teaching.

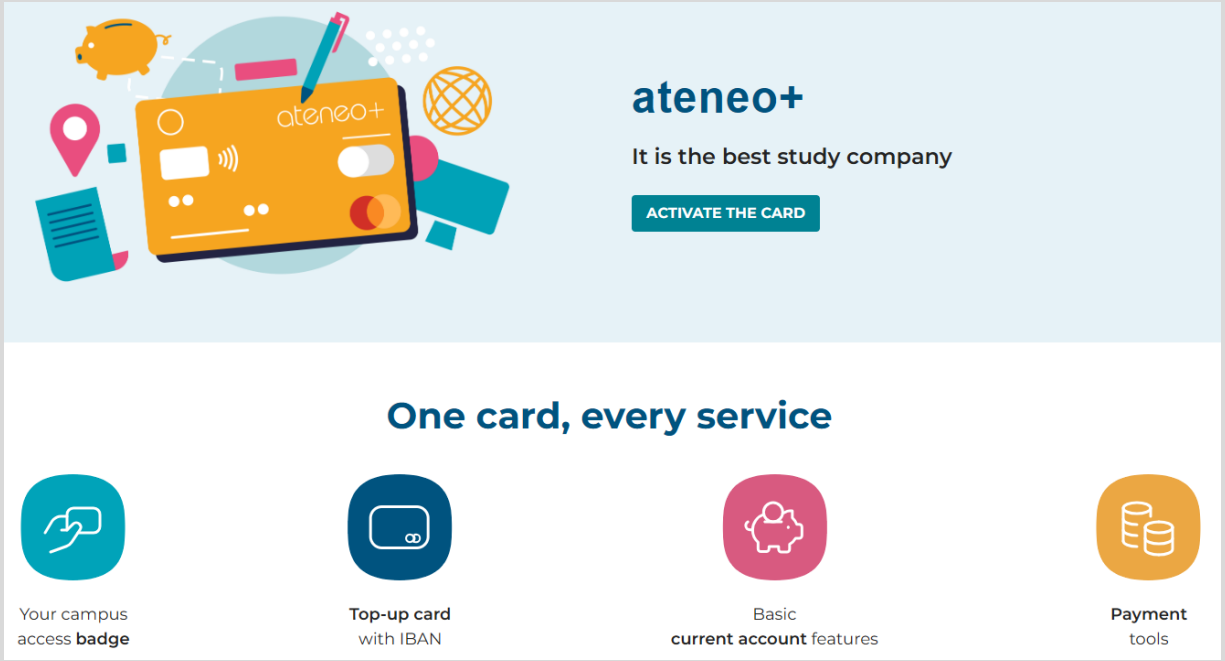


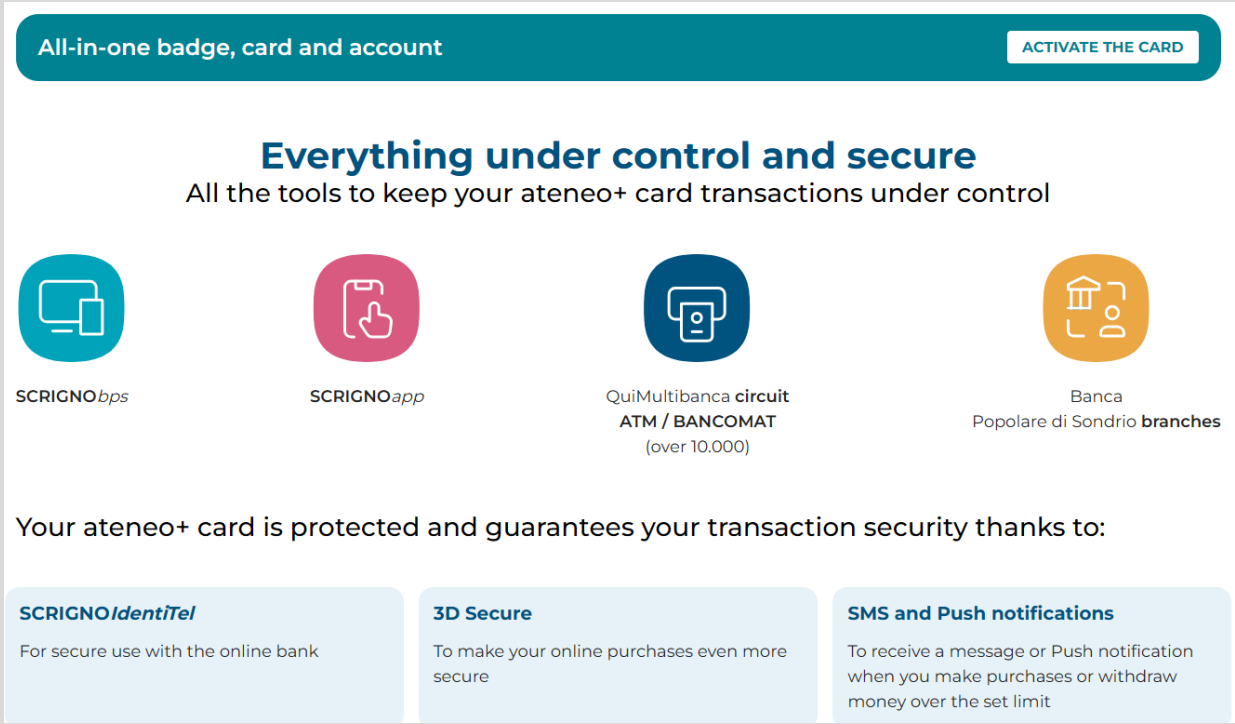
SMART organization



Badge - Ateneo Plus Card

https://www.ateneopiu.it/en/home?uniq=1c31910394b9275cdc07e3cf03fd19ec3



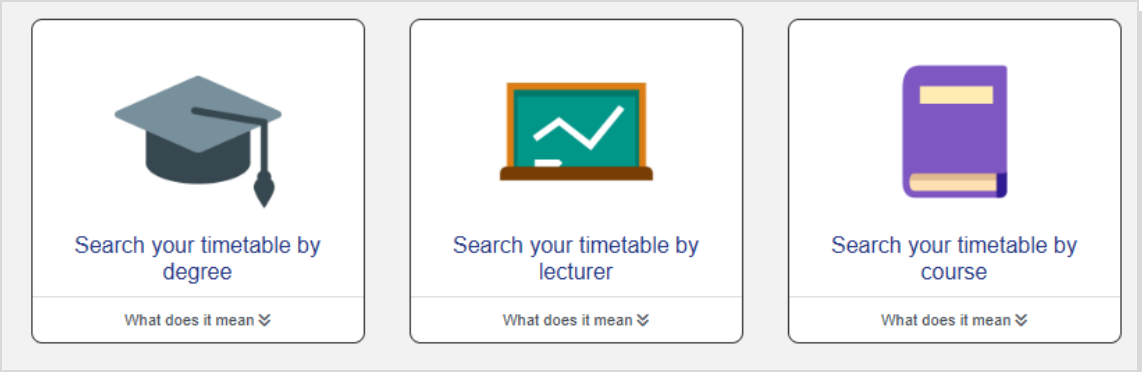


- After (residence) permit of stay has been issued

SMART organization

https://2024.aulaweb.unige.it/?lang=en

https://easyacademy.unige.it/portalestudenti/index.php?view=easycourse&include=homepage&_lang=en



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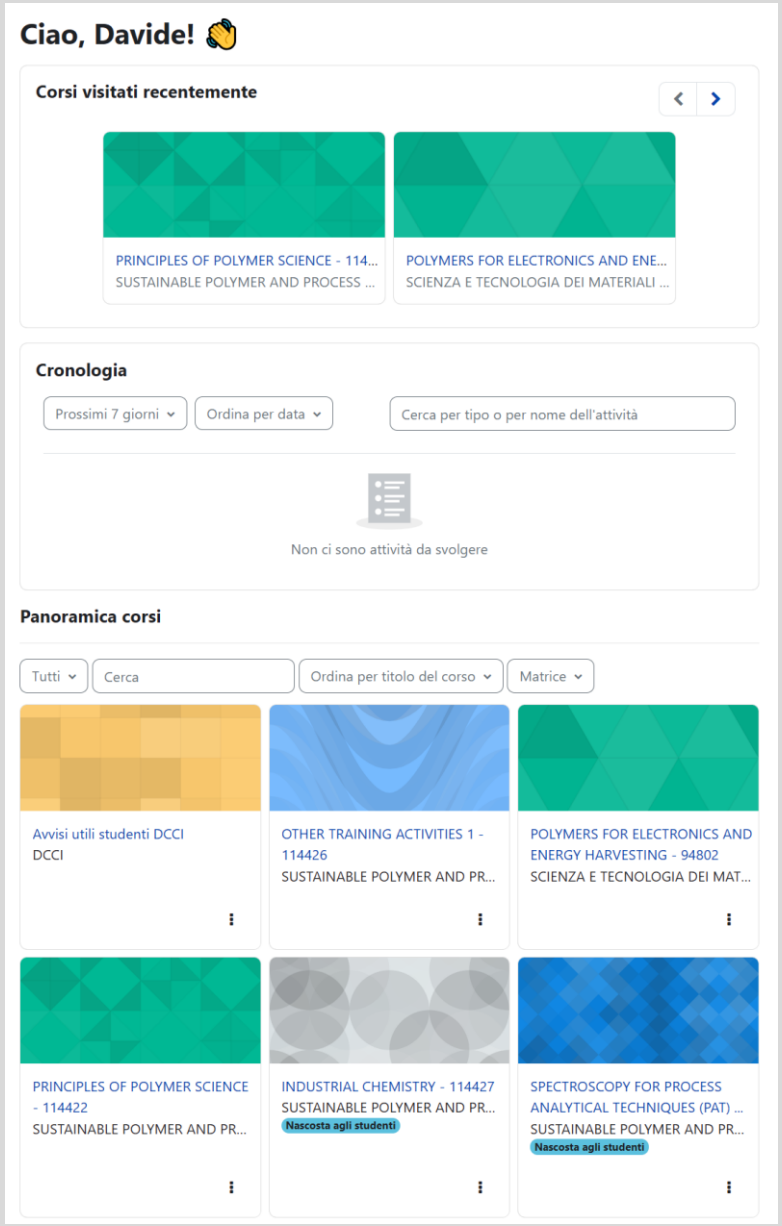
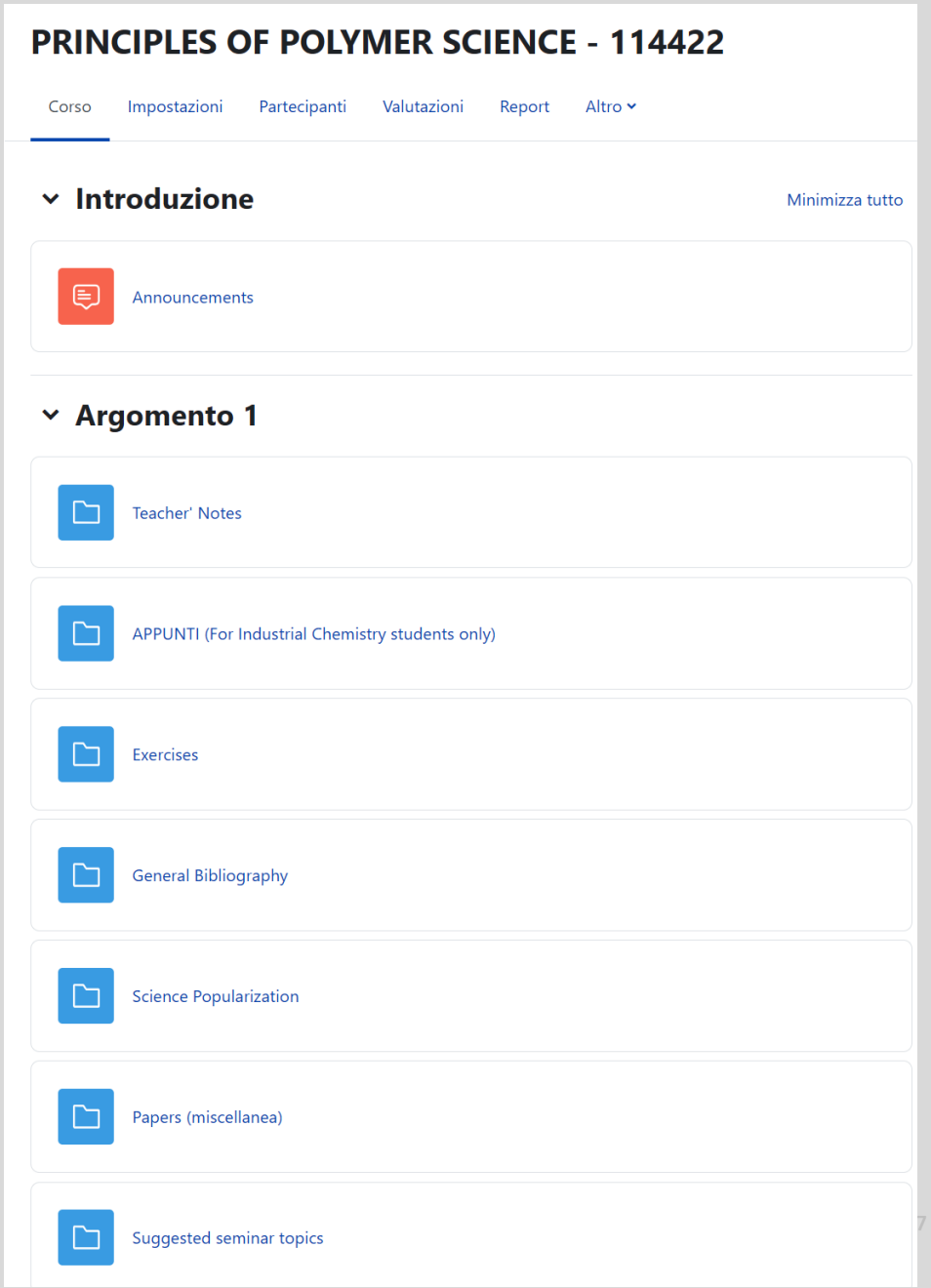
SMART organization

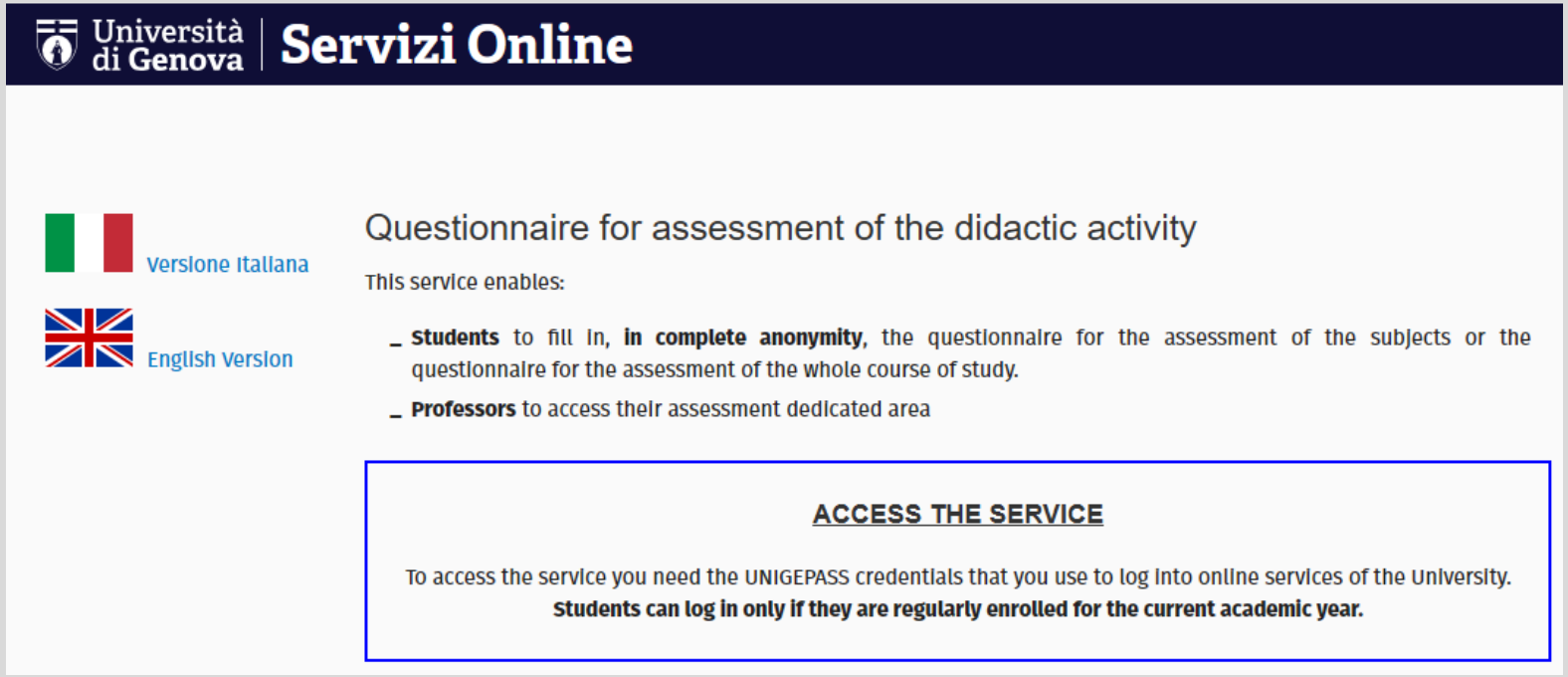
- AulaWeb





SMART organization

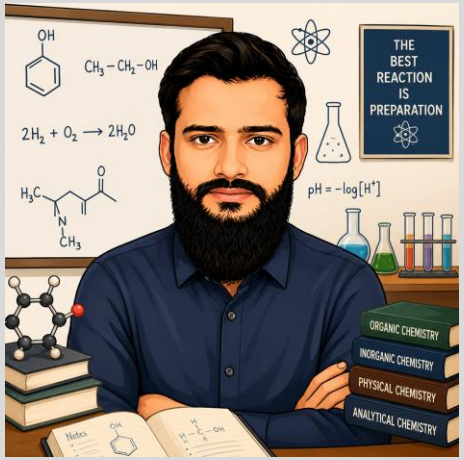
https://valutazione.servizionline.unige.it/insegnamenti/publics/info/index.jsp?lang=EN



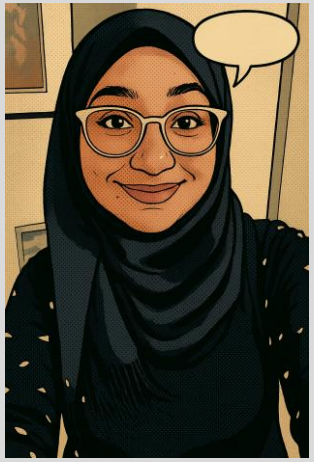
SMART: STUDENTS REPRESENTATIVES & TUTORS

- **Matilde Traverso,** 5161773@studenti.unige.it

- **Saleem Muhammad Asim,** 7647291@studenti.unige.it



- **Fatima Ressouk,** 5013241@studenti.unige.it

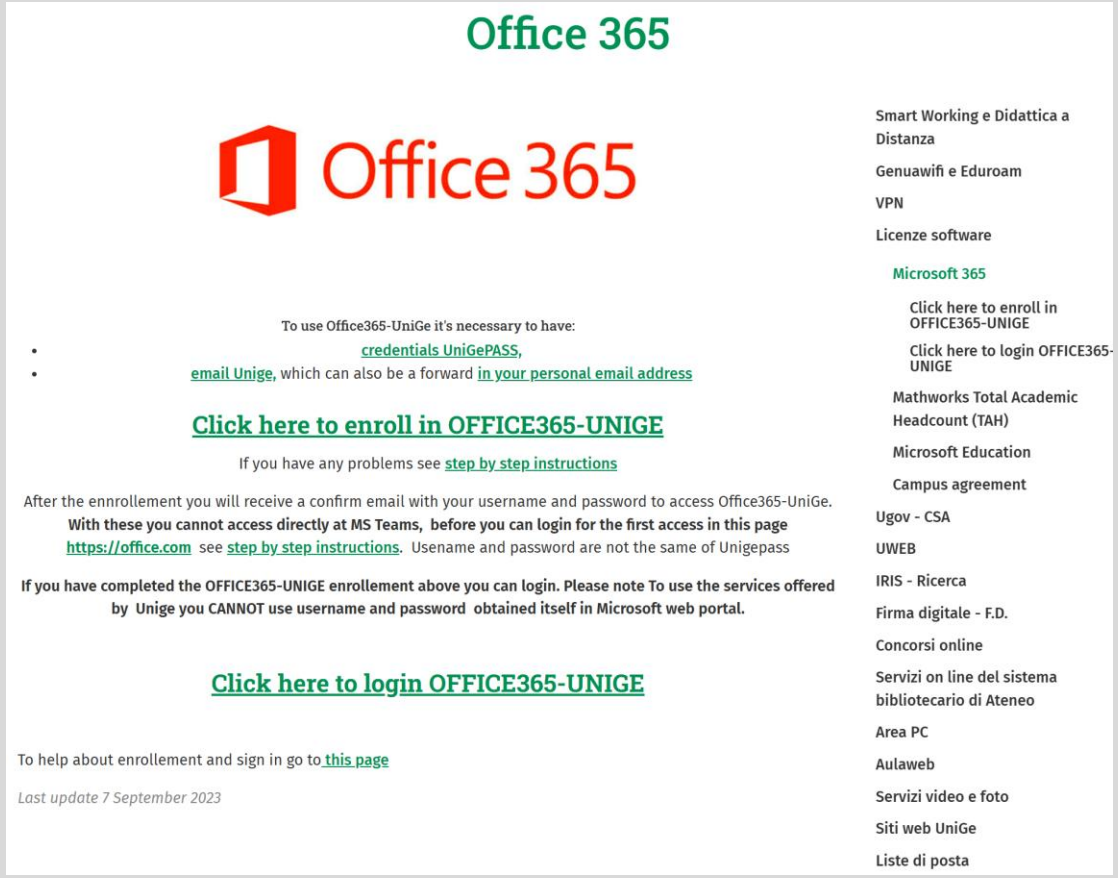


SMART organization

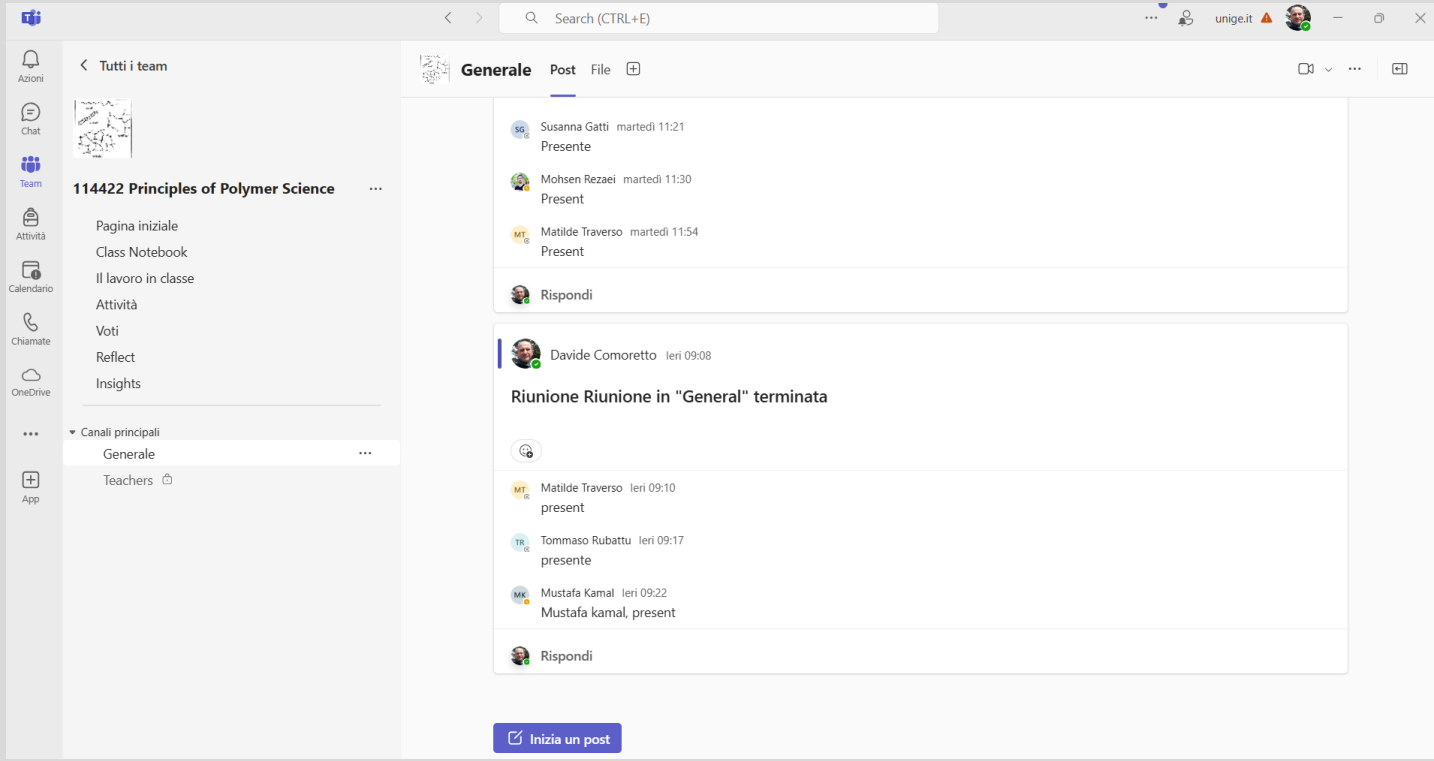
https://servizionline.unige.it/web-sol/en/#/indice/studenti

SMART organization

- **Office 365: registration through your own Unige account (matricula number and official UniGE e-mail)**
- https://ict.unige.it/en/office365

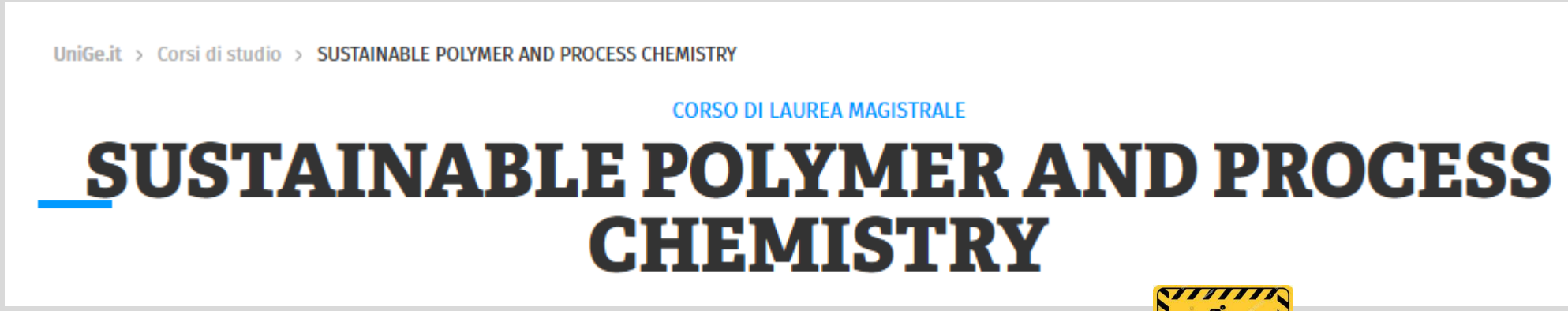


- Microsoft Teams



- On-line lessons (first semester, only)
- Lesson recordings (first semester, only)
- Student-teacher interactions
- ....

Sustainable polyMer And pRocess chemisTry Master of Science organization



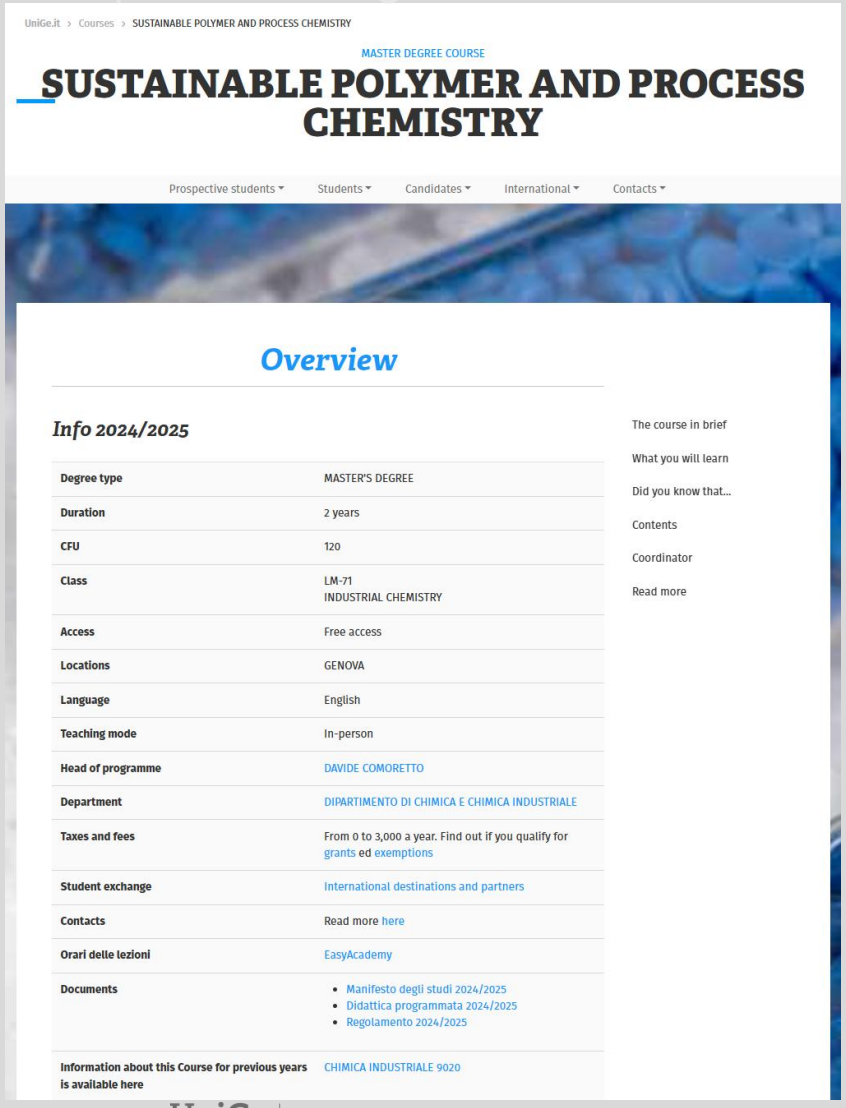
https://corsi.unige.it/corsi/11950

https://chimica.unige.it/node/1816

SMART @ UNIGE

SMART organization

https://corsi.unige.it/en/corsi/11950



UniGe.it › Courses › SUSTAINABLE POLYMER AND PROCESS CHEMISTRY

MASTER DEGREE COURSE

SUSTAINABLE POLYMER AND PROCESS CHEMISTRY

Prospective students | Students | Candidates | International | Contacts

Overview

Info 2024/2025

Degree type	MASTER'S DEGREE
Duration	2 years
CFU	120
Class	LM-71 INDUSTRIAL CHEMISTRY
Access	Free access
Locations	GENOVA
Language	English
Teaching mode	In-person
Head of programme	DAVIDE COMORETTO
Department	DIPARTIMENTO DI CHIMICA E CHIMICA INDUSTRIALE
Taxes and fees	From 0 to 3,000 a year. Find out if you qualify for grants ed exemptions
Student exchange	International destinations and partners
Contacts	Read more here
Orari delle lezioni	EasyAcademy
Documents	• Manifesto degli studi 2024/2025 • Didattica programmata 2024/2025 • Regolamento 2024/2025
Information about this Course for previous years is available here	CHIMICA INDUSTRIALE 9020

The course in brief
What you will learn
Did you know that...
Contents
Coordinator
Read more

Documents

- Manifesto degli studi 2024/2025
- Didattica programmata 2024/2025
- Regolamento 2024/2025

Final Exam Regulatios on the Department Web site
https://chimica.unige.it/node/1816

Università di Genova | DCCI Dipartimento di Chimica e Chimica Industriale

Dipartimento | Didattica | Dottorato | Ricerca | Divulgazione | Per Aziende | Sicurezza | Contatti | News, Eventi, Bandi

Year)

Allegati

SMART Leafleft (287.27 KB)
SMART Optional classes (216.45 KB)
REGULATIONS_FINAL-EXAMINATION_SMART_ENG-ITA_24-25 (187.87 KB)
REGULATIONS_FINAL-EXAMINATION_SMART_ENG-ITA_25-26 (182.83 KB) ←
Presentazione_LM_SMART - 2026 (8.86 MB)

SMART @ UNIGE

SMART organization

https://corsi.unige.it/en/corsi/11950

Documents

- Manifesto degli studi 2024/2025
- Didattica programmata 2024/2025
- Regolamento 2024/2025

- **Manifesto degli Studi 2024/2025**
- Upon clicking on the name of the class (for instance, https://corsi.unige.it/en/off.f/2024/ins/77887?codcla=11767
- Several important info…

UniGe.it › Courses › Subjects 2024/2025 › PRINCIPLES OF POLYMER SCIENCE

PRINCIPLES OF POLYMER SCIENCE

CODE	114422
ACADEMIC YEAR	2024/2025
CREDITS	4 cfu anno 1 SCIENZA E TECNOLOGIA DEI MATERIALI 11430 (LM SC.MAT.) - GENOVA 4 cfu anno 2 SCIENZA E TECNOLOGIA DEI MATERIALI 11430 (LM SC.MAT.) - GENOVA 8 cfu anno 1 SUSTAINABLE POLYMER AND PROCESS CHEMISTRY 11767 (LM-71) - GENOVA 5 cfu anno 2 CHIMICA INDUSTRIALE 9020 (LM-71) - GENOVA
SCIENTIFIC DISCIPLINARY SECTOR	CHIM/04
LANGUAGE	English
TEACHING LOCATION	GENOVA
SEMESTER	1° Semester
TEACHING MATERIALS	AULAWEB

OVERVIEW

Principles of Polymer Science (114422) is a 8 CFU class held in the first semester of the 1st year in the Sustainable Polymers and Process Chemistry MSc Course.

This class provides fundamental theoretical and practical knowledge on polymeric materials in solution, melt and solid state.

MANIFESTO DEGLI STUDI A.A. 2024/2025
CORSO DI LAUREA MAGISTRALE in 11767 SUSTAINABLE POLYMER AND PROCESS CHEMISTRY (classe LM-71)

SCHEDA INFORMATIVA

Sede amministrativa: GE
Classe delle lauree in: Classe delle lauree magistrali in SCIENZE E TECNOLOGIE DELLA CHIMICA INDUSTRIALE (classe LM-71)
Durata: 2 anni
Indirizzo web: https://chimica.unige.it/node/1816
Dipartimento di riferimento: DIPARTIMENTO DI CHIMICA E CHIMICA INDUSTRIALE

REQUISITI PER L'ACCESSO E MODALITÀ DI AMMISSIONE +
FINALITÀ E OBIETTIVI FORMATIVI +
CARATTERISTICHE E MODALITÀ DI SVOLGIMENTO DELLA PROVA FINALE +
PROFILO PROFESSIONALE E SBOCCHI OCCUPAZIONALI E PROFESSIONALI PREVISTI PER I LAUREATI +
PROFESSIONI A CUI PREPARA IL CORSO (codifiche ISTAT) +

PIANO DI STUDI

1° anno (coorte 2024/2025)

Codice	Disciplina	Settore	CFU	Tipologia/Ambito	Docenti	Ore
114422	PRINCIPLES OF POLYMER SCIENCE (1° Semestre)	CHIM/04	8	8 CFU CARATTERIZZANTI Discipline Chimiche Ambientali, Biotecnologiche, Industriali, Tecniche ed Economiche	CAVALLO DARIO COMORETTO DAVIDE	LEZ: 32 LAB: 52
66402	CHEMISTRY AND TECHNOLOGY OF CATALYSIS + LABORATORY (2° Semestre)	CHIM/04	6	6 CFU CARATTERIZZANTI Discipline Chimiche Ambientali, Biotecnologiche, Industriali, Tecniche ed Economiche	COMITE ANTONIO	LEZ: 32 ESE: 13 LAB: 13
114449	UNIT OPERATIONS, REACTOR ENGINEERING AND CHEMICAL TECHNOLOGIES		10			
	114450 - UNIT OPERATIONS, REACTOR ENGINEERING AND CHEMICAL TECHNOLOGIES MOD.1 (Annuale)	ING-IND/25	5	5 CFU CARATTERIZZANTI Discipline Chimiche Ambientali, Biotecnologiche, Industriali, Tecniche ed Economiche	SERVIDA ALBERTO	LEZ: 40
	114451 - UNIT OPERATIONS, REACTOR ENGINEERING AND CHEMICAL TECHNOLOGIES MOD.2 (Annuale)	CHIM/04	5	5 CFU CARATTERIZZANTI Discipline Chimiche Ambientali, Biotecnologiche, Industriali, Tecniche ed Economiche	MONTICELLI ORIETTA COMITE ANTONIO	LEZ: 40
61837	THEORY OF INDUSTRIAL CHEMICAL PROCESS DEVELOPMENT (2° Semestre)	ING-IND/26	6	6 CFU CARATTERIZZANTI Discipline Chimiche Ambientali, Biotecnologiche, Industriali, Tecniche ed Economiche	REVERBERI ANDREA	LEZ: 48
114427	INDUSTRIAL CHEMISTRY (2° Semestre)	CHIM/04	8	8 CFU CARATTERIZZANTI Discipline Chimiche Ambientali, Biotecnologiche, Industriali, Tecniche ed Economiche	CASTELLANO MAILA COMORETTO DAVIDE	LEZ: 64
80198	ECONOMY AND MANAGEMENT OF PRODUCTIVE PROCESSES (2° Semestre)	ING-IND/26	6	6 CFU AFFINI O INTEGRATIVE Attività Formative Affini o Integrative	VOCCIANTE MARCO	LEZ: 40 LAB: 12
114426	OTHER TRAINING ACTIVITIES 1 (1° Semestre)		2	1 CFU ALTRE ATTIVITA' Abilità Informatiche e Telematiche 1 CFU ALTRE ATTIVITA' Altre Conoscenze Utili per l'Inserimento Nel Mondo del Lavoro	COMORETTO DAVIDE SERVIDA ALBERTO COMITE ANTONIO REVERBERI ANDREA VOCCIANTE MARCO PEDDIS DAVIDE	LEZ: 18

6 CFU tra i seguenti insegnamenti:

111302	CARBON DIOXIDE CAPTURE, UTILIZATION, AND STORAGE (1° Semestre)	CHIM/04	6	6 CFU AFFINI O INTEGRATIVE Attività Formative Affini o Integrative	COMITE ANTONIO PAGLIERO MARCELLO	LEZ: 40 LAB: 13
111303	MEMBRANE SEPARATION TECHNOLOGY (2° Semestre)	CHIM/04	6	6 CFU AFFINI O INTEGRATIVE Attività Formative Affini o Integrative	PAGLIERO MARCELLO	LEZ: 40 LAB: 13
114428	POLYMER MANUFACTURING: FROM CLASSICAL PROCESSING TO 3D PRINTING (2° Semestre)	CHIM/04	6	6 CFU AFFINI O INTEGRATIVE Attività Formative Affini o Integrative	CAVALLO DARIO LOVA PAOLA	LEZ: 32 ESE: 6 LAB: 20
94802	POLYMERS FOR ELECTRONICS AND ENERGY HARVESTING (1° Semestre)	CHIM/04	6	6 CFU AFFINI O INTEGRATIVE Attività Formative Affini o Integrative	COMORETTO DAVIDE	LEZ: 40 LAB: 13
114432	SPECTROSCOPY FOR PROCESS ANALYTICAL TECHNIQUES (PAT) (2° Semestre)	CHIM/04	6	6 CFU AFFINI O INTEGRATIVE Attività Formative Affini o Integrative	SERVIDA ALBERTO COMORETTO DAVIDE	LEZ: 40 LAB: 13

SMART organization

https://corsi.unige.it/en/corsi/11950

Documents

- Manifesto degli studi 2024/2025
- Didattica programmata 2024/2025
- Regolamento 2024/2025

- Upon clicking on the name of the class (for instance, https://corsi.unige.it/en/off.f/2024/ins/77887?codcla=11767
- Several important info…

AIMS AND CONTENT

LEARNING OUTCOMES

Aim of this class is to provide the advanced knowledge (both theoretical and experimental) necessary for the study of macromolecules in the liquid and solid state, both in the amorphous and crystalline phase. The physico-chemical properties of polymeric materials and the structure-property relationships of macromolecules are discussed through the characterization of the molecular dimensions, the microstructure of the chains, the properties of the material. Theoretical concepts will be deepened by lab activities on characterization methods of polymers in solution, in the melt and solid state.

AIMS AND LEARNING OUTCOMES

Aim of this class is to provide fundamentals for advanced studies of macromolecules in solution, melt and solid state, both amorphous and semi-crystalline. Physical chemical properties of polymer materials as well as structure-property relations are discussed, focusing on characterization of molecular size, phase and kinetic transitions and melt/solid state material properties.

At the end of the class, students are expected to know:

- The concept of macromolecule, of molecular weight distribution and the meaning of the different molar mass averages;

- Thermodynamics principles governing the macromolecular state in solution, with particular emphasis on the Flory-Huggins and Flory-Krigbaum models, the Theta temperature as well as the phase equilibria;

- The characteristics of the main techniques used for advanced characterization molar masses;

- To describe and discuss the correlation between size and structure of the polymer chains and their solution properties;

- Macromolecular properties in the (semi)crystalline state, melting (Tm), morphology, kinetics of crystallization, and connections with thermodynamic parameters;

- Properties of macromolecules in the amorphous state, in particular the glass transition temperature and its dependence on the molecular mass and on the polymer structure

- The working principles and application of the main techniques used for polymer characterization, including static light scattering, gel permeation chromatography, differential scanning calorimetry, wide-angle x-ray scattering, infra-red spectroscopy, polarized light microscopy, rotational rheometry and mechanical testing in uniaxial tension.

PREREQUISITES

Basic knowledge of polymer chemistry is required to efficiently follow the lectures of this teaching. For the students possessing a bachelor degree in Chemistry and Chemical Technology or Material Science from the University of Genova the prerequisites are given by the attendance of the teachings "Macromolecular Chemistry" or "Science and Technology of Polymeric Materials". Students from abroad or from different bachelor courses must acquire this knowledge by independently deepen the topics on suggested studying material (for instance Introduction to Synthetic Polymers by, Ian M. CAMPBELL, Oxford University Press, 2000).

EXAMS

EXAM DESCRIPTION

The oral exam consists in a discussion covering the topics presented during lessons, including lab activities. The exam will start with the discussion of one laboratory experience selected by the student among those carried out (up to 10/30). Then, one or more theoretical questions will follow. The student must show to have understood main physical/chemical/technological fundamentals related to the topics and to use the suitable technical vocabulary including ability to answer questions (up to 20/30).

Lab attendance is compulsory. The exam is possible only after attending all lab experiences.

For students with disabilities or with SLD, the assessment method will comply with the UNIGE rules summarized in https://unige.it/disabilita-dsa.

Students have to book in advance an appointment for the exam with teachers.

In case of emergency and only according to specific indications by the University of Genoa, the assessment method for the exam might be changed, including the possibility of an online procedure.

ASSESSMENT METHODS

The aim of the exam is to verify the achievement of the intended learning objectives both for the theoretical and labs topics. If these objectives are not met, the student will be encouraged to further study the topics, with the support of the teacher's explanations, and attempt the exam again. During the laboratory classes, teachers will assess the extent of students' participation and their capability in conducting experimental work. The exam will ascertain whether the student has attained an adequate level of knowledge on the class topics, with particular reference to polymer physico-chemical properties in various states and their means of characterization.

The Grading System

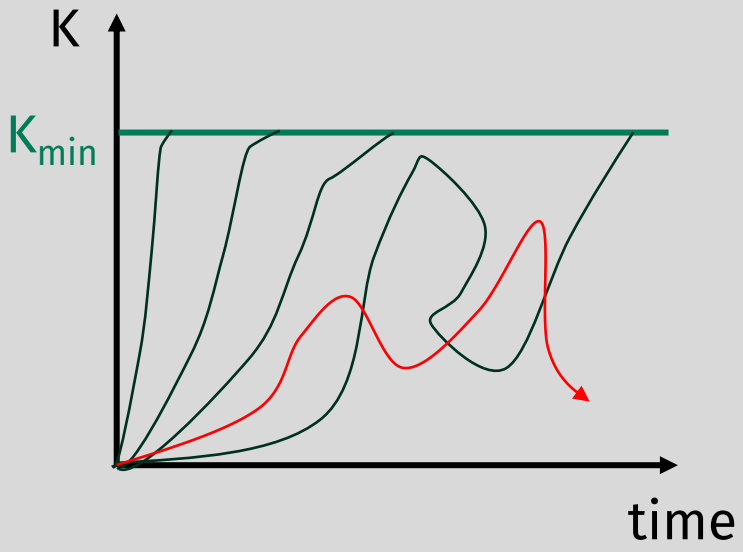
- **Exams are MAINLY ORAL and VERY THOUGH!**
- **NO ON-LINE EXAMS ARE ALLOWED!**
- **Exams are graded according to a scale ranging from 0 to 30.**
- **18 is the passing mark (very poor).**
- A **cum laude** may be added to the highest grade (30 e lode), as a special distinction.
- The minimum passing mark for the final degree is 66/110 (very poor), whereas the maximum is 110/110.
- For outstanding students, the degree may be awarded "**cum laude distinction**".

Minimum passing grade	18
Adequate	19-23
Satisfactory	24-26
Good	27-28
Very good	29-30
Outstanding	30 *cum laude*

SMART ADMISSION → SMART GRADUATION

?

EVEN IF ADMITTED TO SMART, GRADUATION IS NOT GUARANTEED IF YOU DON'T ACHIEVE A MINIMUM LEVEL OF KNOWLEDGE (K_{min})



TO PREVENT PROBLEMS AND DELAYS IN EXAMS:

- **ATTEND ALL LESSONS!**
- Ask question during the lessons: there are not stupid questions but stupid answers, only.
- Review the main topics after each lesson.
- Do the assigned homework.
- Participate actively in class.
- Ask your professors for additional explanations after the lessons if needed.

Università di Genova | DCCI DIPARTIMENTO DI CHIMICA E CHIMICA INDUSTRIALE

MANIFESTO SMART: COMPULSORY

1° Year (52 credits)

Code	Title	SSD	Type/Area	Teacher
114426	**OTHER TRAINING ACTIVITIES 1** (1°)		2 CFU	PhysMatCompSci RECAP
114427	**INDUSTRIAL CHEMISTRY** (2°)	CHIM/04	8 CFU CAR	Comoretto Davide Castellano Maila
114449	**UNIT OPERATIONS, REACTOR ENGINEERING AND CHEMICAL TECHNOLOGIES (**1° & 2°)	ING-IND/25 CHIM/04	10 CFU CAR	Servida Alberto Comite Antonio Monticelli Orietta
80198	**ECONOMY AND MANAGEMENT OF PRODUCTIVE PROCESSES** (2°)	ING-IND/26	6 CFU AFF/INT (5t+1p)	Vocciante Marco
114422	**PRINCIPLES OF POLYMER SCIENCE** (1°)	CHIM/04	8 CFU CAR (4t+4p)	Comoretto Davide Dario Cavallo
61837	**THEORY OF INDUSTRIAL CHEMICAL PROCESS DEVELOPMENT** (2°)	ING-IND/26	6 CFU CAR	Reverberi Andrea
66402	**CHEMISTRY AND TECHNOLOGY OF CATALYSIS + LABORATORY** (1°)	CHIM/04	6 CFU CAR (4t+2p)	Comite Antonio
NA	**OPTIONAL CLASS** (1° /2)	CHIM/04	6 CFU AFF/INT (5t+1p)	

2° Year (68 credits)

Code	Title	SSD	Type/Area	Teacher
114439	**SYNTHESIS AND INDUSTRIAL PRODUCTION OF POLYMERS** (1°)	CHIM/04	9 CFU CAR (6t+3p)	Monticelli Orietta Vicini Silvia
114441	**ECO-DESIGN OF MATERIALS AND SUSTAINABLE TECHNOLOGIES** (2°)	CHIM/03 CHIM/06	5 CFU AFF/INT (4t+1p)	Colombara Diego Pellis Alessandro
114440	**SUSTAINABLE DESIGN & RECYCLING OF INORGANIC MATERIALS** (1°)	CHIM/02	5 CFU CAR (4t+1p)	Peddis Davide
114444	**CIRCULAR ECONOMY PROCESSES FOR PLASTICS AND THE ENVIRONMENT**	CHIM/04	6 CFU CAR (5t+1p)	Lova Paola (1° & 2°)
NA	**OPTIONAL CLASS** (1° /2°)		6 CFU OPT (5p+1t)	
114448	**FOCUS GROUP** (1° /2°)		2 CFU OPTIONAL	Student seminars on topics of their choice in line with the training project (soft skills, flipped classroom, focus group)
114445	**OTHER TRAINING ACTIVITIES 2 (intellectual properties and patenting)** (1° /2°)		1 CFU	SEMINARS
114446 100274	**OTHER TRAINING ACTIVITIES 3-4**		3 CFU	Advanced English (2°)/ Italian for Foreigners (1°&2°)
114447	**MASTER THESIS**		31 CFU	

MANIFESTO SMART: OPTIONAL CLASSES

Optional courses

Code	Title	SSD	Type/Area	Teacher
111302	**CARBON DIOXIDE CAPTURE, UTILIZATION, AND STORAGE** (2°)	CHIM/04	5t+1p CFU AFF/INT	Pagliero Marcello Antonio Comite
111303	**MEMBRANE SEPARATION TECHNOLOGY** (1°)	CHIM/04	5t+1p CFU	Pagliero Marcello Antonio Comite
114428	**POLYMER MANUFACTURING: FROM CLASSICAL PROCESSING TO 3D PRINTING** (2°)	CHIM/04	5t+1p CFU AFF/INT	Cavallo Dario Lova Paola
114435	**PROPERTIES OF POLYMER-BASED MATERIALS, BIOMATERIALS AND COMPOSITES** (1° & 2°)	CHIM/04	5t+1p CFU AFF/INT	Castellano Maila Alloisio Marina
94802	**POLYMERS FOR ELECTRONICS AND ENERGY HARVESTING** (1°)	CHIM/04	5t+1p CFU AFF/INT	Comoretto Davide
114432	**SPECTROSCOPY FOR PROCESS ANALYTICAL TECHNIQUES (PAT)** (2°)	CHIM/04 ING-IND/25	5t+1p CFU AFF/INT	Comoretto Davide Servida Alberto
108102	**MODELING AND NUMERICAL SIMULATION OF MATERIALS BEHAVIOR IN THE PROCESS INDUSTRY** (2°)	ING-IND/26	5t+1p CFU AFF/INT	Marco Vocciante
121409	**ARTIFICIAL INTELLIGENCE FOR MATERIAL DESIGN AND CHEMICAL PROCESS OPTIMIZATION** (2°)	ING-IND/26	5t+1p CFU AFF/INT	Marco Vocciante

1 cfu = 25 h of work

1 cfu theo = 8 h lesson, 17 h individual study

1 cfu pratice = 13 h lab, 12 h individual study

For OTA1 only, 1 cfu = 12,5 h lesson, 12.5 h individual study

SMART: INDUSTRIAL COLLABORATIONS

- Omya International GmbH (https://www.omya.com/en)
- Infineum Italia S.r.l. (https://www.infineum.com/)

- **Seminars** (**TECHNICAL, Financial fundamentals**, **INTELLECTUAL PROPERTY**, Laws/Regulations…).

UniGe | DCCI

SMART: MASTER THESIS

Università di Genova — DCCI Dipartimento di Chimica e Chimica Industriale

- **31 CFU, ≥ 6 months**

Erasmus+

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

university of groningen

EVONIK Leading Beyond Chemistry

lyondellbasell

Maastricht University

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

IPLOM

SOLVAY

Infineum

eni

biochemtex

lamberti

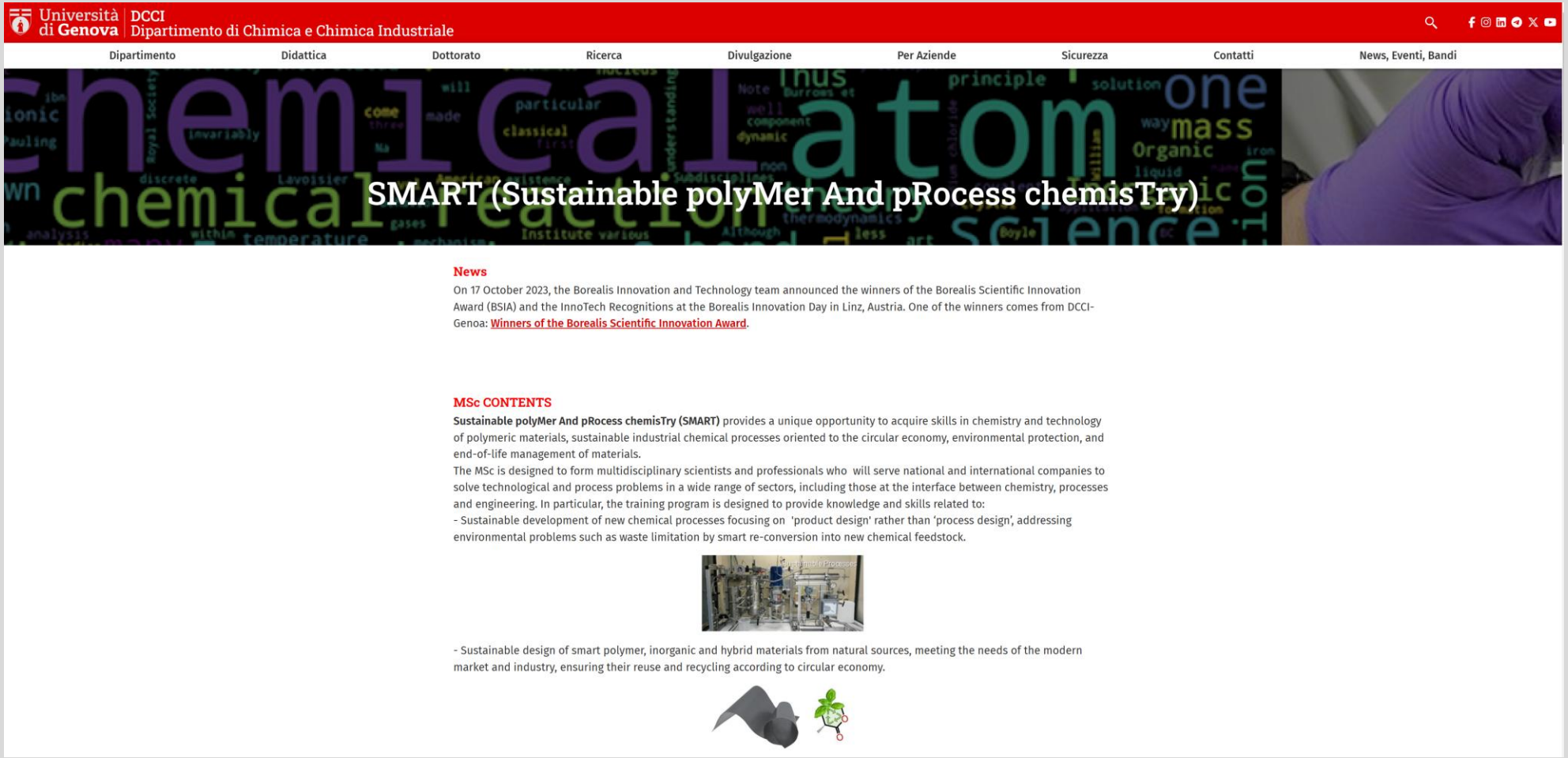
proplast PLASTICS INNOVATION POLE

BOERO

ECOSPRAY TECHNOLOGIES

Sustainable polyMer And pRocess chemisTry Master of Science Organization

https://chimica.unige.it/node/1816



- Go there for SMART description and additional documents

Sustainable polyMer And pRocess chemisTry Master of Science organization

https://chimica.unige.it/node/1816

FURTHER READINGS

In order to possess a minimum background to tackle the SMART MSc programme, applicants might read:

BOOKS (fundamental issues)

- Introduction to Synthetic Polymers by, Ian M. CAMPBELL, Oxford University Press, 2000
- Elements of Chemical Reaction Engineering by H. Scott FOGLER, Pearson, 2020
- Mass Transfer Operations, Robert TREYBAL, McGraw Hill, 1980

PAPERS

- Nature Communications volume 8, 15611 (2017)
- Nature Communications volume 9, 2157 (2018)
- Scientific Reports volume 8, 4666 (2018)
- Chem. Eng. News, 2018, 96(12); 5
- Xin Lu et al., Nature 606, 511–515 (2022)
- https://closetheglassloop.eu/
- Environ. Sci. Technol. 2018, 52, 8, 4835–4841
- European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Grohol, M., Veeh, C., Study on the critical raw materials for the EU 2023 – Final report, Publications Office of the European Union, 2023, https://data.europa.eu/doi/10.2873/725585
- https://eurometaux.eu/media/20ad5yza/2022-policymaker-summary-report-final.pdf
- https://op.europa.eu/en/publication-detail/-/publication/57318397-fdd4-11ed-a05c-01aa75ed71a1
- Current Opinion in Green and Sustainable Chemistry 2018, 13:1–7

Additional suggestions are available on request.

Allegati

SMART Leafleft (287.27 KB)
SMART Overview (2.6 MB)

In order to possess a minimum background to tackle the SMART MSc programme, applicants might read:

BOOKS (fundamental issues)

- Introduction to Synthetic Polymers by, Ian M. CAMPBELL, Oxford University Press, 2000
- Elements of Chemical Reaction Engineering by H. Scott FOGLER, Pearson, 2020
- Mass Transfer Operations, Robert TREYBAL, McGraw Hill, 1980

- **If you are aware that you have gaps in some topics**, as highlighted during the interview, **improve your preparation by studying the books suggested here.**
- **Be pro-active.**

SMART Students: ECONOMICAL SUPPORT

- ALISEO: https://www.aliseo.liguria.it/foreign-students/

Aliseo
Agenzia ligure per gli studenti e l'orientamento

- Before flying to Genova, ask sass@unige.it, subject: INFO ACCOMODATION - Sustainable polymer and process chemistry.

- Concerning VISA, We are aware of problems occurring, in particular for selected countries.
- However, we don't have tools to solve them.

FOREIGN STUDENTS

ALiSEO is the Regional Agency for students and guidance of Liguria.

Body of the Regional sector of the Liguria Region, ALiSEO was established with regional law n. 25 of 5th December 2018 and started its activity on 1st January 2019 with the aim of helping students to reach the highest levels of education and support them in their choices through guidance activities and youth policies.

The offered services are **economic benefits** provided for by regional and national laws for students of all levels.

ALiSEO also promotes and carries out guidance activities in the choice of training courses and interventions in the field of social and youth policies

ALISEO SERVICES

- Scholarship
- University study hall
- Student restaurants
- Accommodation
- Cultural and sport activities.

University Scholarship
Economic Benefits Service
Accommodations
Accommodations with fee
Rental contribution
Accommodation for undergraduate students
Summer accomodation
Canteen Service
Forms

Notizie
Archivio notizie
Avvisi
Gare

SMART Students: Housing in Genova

- Portals suitable to look for an accommodation (beware that agencies may ask for an additional rent rate):

https://www.cercoalloggio.com/genova
https://www.roomgo.it/ (private-to-private)
https://www.idealista.it/ (agency)
https://www.immobiliare.it/?msockid=0c374cecb168681b017f586ab0b569fe (agency)
Check also Facebook groups.

- The location of the university is here:

https://www.google.it/maps/place/Via+Dodecaneso,+31,+16146+Genova+GE/@44.402359,8.9683563,16z/data=!3m1!4b1!4m6!3m5!1s0x12d3430afa365441:0xbb84430ae8235370!8m2!3d44.402359!4d8.9709312!16s%2Fg%2F11c28ydkth?entry=ttu&g_ep=EgoyMDI1MDIyNi4wIKXMDSoASAFQAw%3D%3D

- Hence the zones of Genoa where I suggest to focus your research are "San Fruttuoso", "San Martino", "Albaro", and "Foce". Then "Brignole" and "Carignano". "Sturla" is reachable as well.
- There may be other zones that look close on the map, but it is suggested to avoid them as they may not be the best.
- Once you get in touch with a landlord, We STRONGLY suggest you, to request a video call visit of any house you may be interested in, to avoid scams.

SMART STUDENTS: TUITION FEES

- Check: https://unige.it/en/tasse-e-benefici/calcolo-contributo-Universitario (Italian and EU students)
- Simulator: https://servizionline.unige.it/web-esterni2/en/#/simulatoretasse
- Notice the warning there reported as well as the possible economical benefits you could get from Aliseo (https://www.aliseo.liguria.it/), mainly canteen access as well as housing.
- Another very important tool is the ISEE (https://unige.it/en/tasse-e-benefici/isee), i.e. Indicatore della Situazione Economica Equivalente (Equivalent Economical Situation Indicator).
- If the income of your family is within suitable ranges, you might get some discount on the tuition fees.
- Notice, there are discounts only for students from “developing countries", which are defined every year by the Ministry of the University.
- As an average, the rough annual tuition fee for them is about 400€/y.
- **For “developing countries”, fees can be even much lower.**

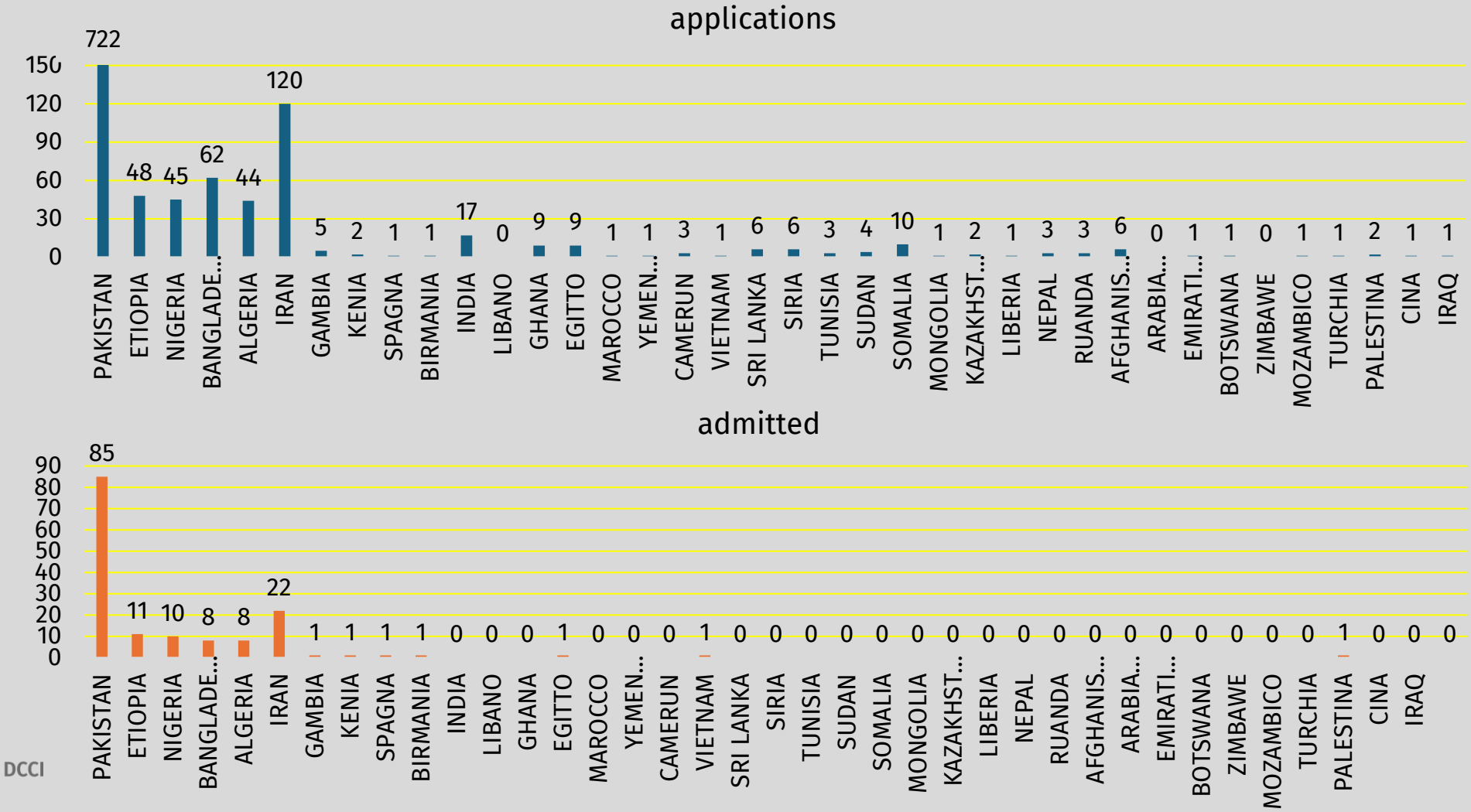
SMART: CONCLUSIONS

SUSTAINABLE POLYMER AND PROCESS CHEMISTRY (SMART)

- To tackles **SUSTAINABILITY** and **EFFICIENCY** challenges **MODERN SOCIETY** imposes on the chemical industry in a **RIGOROUS** and **RESPONSIBLE** way.

SMART: EXTRA-UE APPLICATIONS 2025-2026

- **Applications: 1141**
- **Students Selected: 150**
- **Foreign Students Expected in Genova: ~15 (Why?)**



UniGe

DCCI