

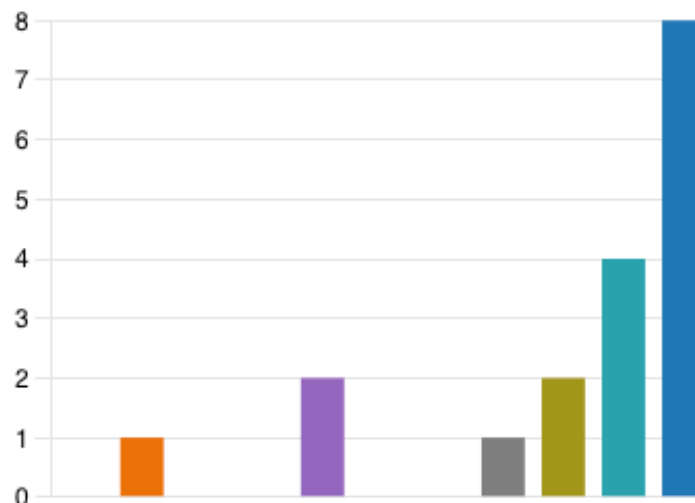
# Chemical Industry survey of chemistry graduate skills

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Dr M. Paz Muñoz

# Which of the following best describes your industry?

● Agrochemical	0
● Coatings (e.g., paint, etc.)	1
● Cosmetics	0
● Extraction/management/produc...	0
● Energy (production, storage, etc.)	2
● Environmental	0
● Food	0
● Materials	1
● Pharmaceutical	2
● Other (please specify)	4
● Other	8



Other (please specify);Fine chemicals;  
Other (please specify);Chemistry CRO;  
Other (please specify);Scientific equipment manufacturer;  
Other (please specify);Analytical Instruments for all above;

## What are the chemistry degrees or main specialisations (e.g. BSc, MChem, MChem with X) that are most appealing to your company?



BSc, MChem

MChem

BSc, MChem

MChem

MChem with year in Industry

PhD

Bsc, MChem, PhD. Focussing on either synthetic organic chemistry and/or medicinal chemistry. A year in industry would also be attractive.

MChem, BSc

MSc, PhD

MChem, PhD in Chemistry or related science degree.

general chemistry or chemistry with nuclear. Modules including analytical techniques (both radiometric & standard techniques theory & practice), nuclear in medicine, inert atmosphere working (eg inert atmosphere boxes, schlenk etc)

Bsc MChem, PhD

We tend to look for MChem or Chem eng

We don't have a specific degree that is most appealing, it's a balance between qualifications and employability skills that we look for

BSc, MChem with inorganic and physical chemistry, corrosion science, material science

A degree with good analytical chemistry for background.

71% mention MChem

36% mention PhD

14% mention year in industry experience

In the next five years, what types of positions suitable for a Chemistry Graduate do you expect to hire?



Scientist 1 (organic chemist)

Associate Chemistry consultants

Synthetic chemists, analytical chemists

R&D Graduate Chemist

R&D Chemist

Medicinal chemist

Materials Scientists and Material Specialists

Formulation Scientists, Analytical specialists

Technical Sales Specialist, Engineer, Glassblowers, Product managers.

Range of lab and desk based roles in active and non-active facilities. Analytical, modelling, experimental, radiological protection advisor, safety & assurance roles.

Graduate scientists

Various technical sales positions.

Materials experts, materials engineers and laboratory positions with a range of responsibilities

Material Engineer

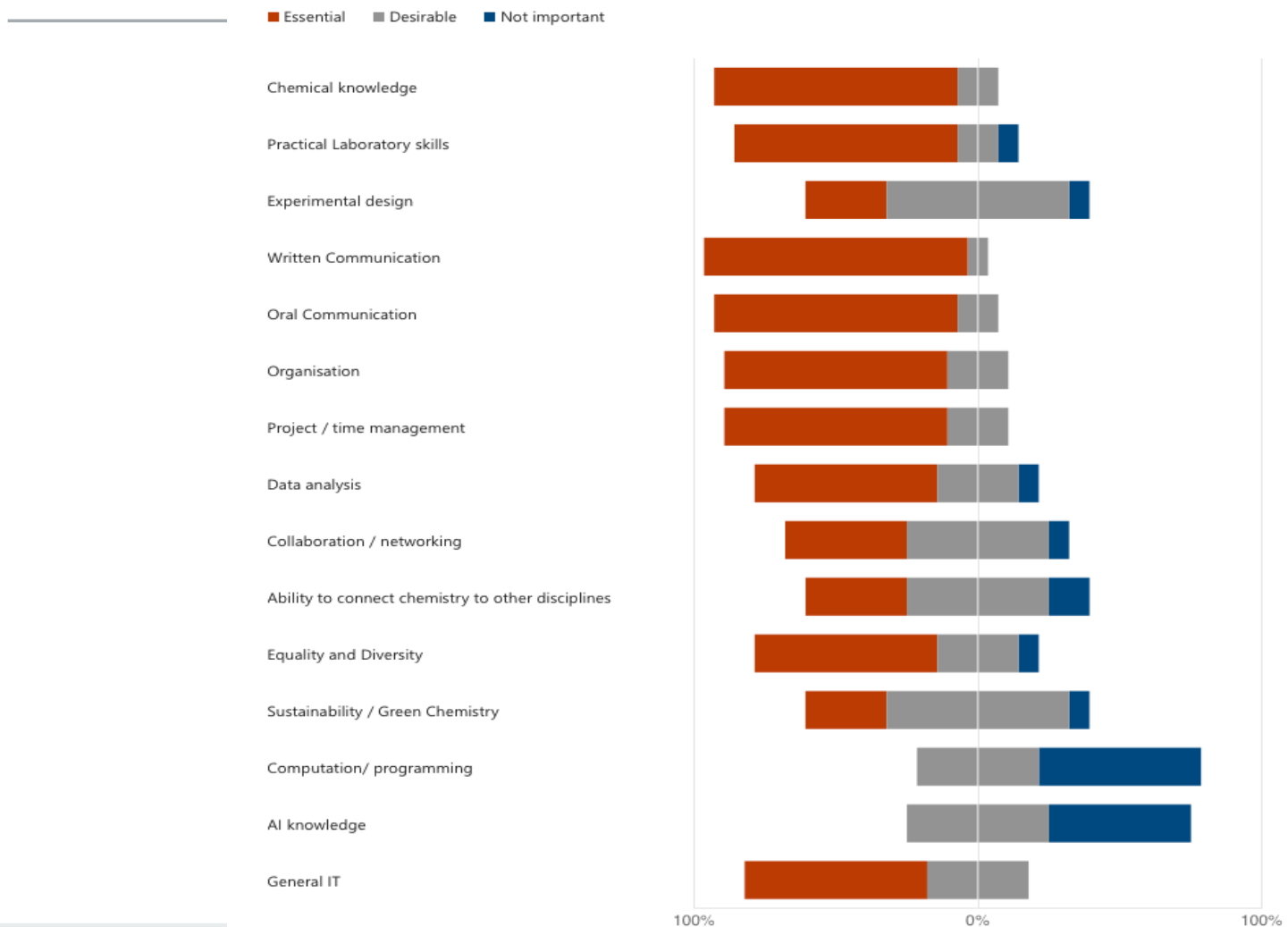
Technical Specialists for Chromatography and Spectroscopy, Engineers and also Sales Specialists (who need the background as well).

For the following skills, please indicate whether you consider them "essential", "desirable" or "not important" when hiring Chemistry Graduates



Chemical knowledge	Practical Laboratory skills	Experimental design	Written commun.	Oral commun.	Organisation	Project / time management	Data analysis	Collaboration / networking	Ability to connect chemistry to other disciplines	Equality and Diversity	Sustainability / Green Chemistry	Computation programming AI	General IT knowledge	
Essential	Essential	Desirable	Desirable	Desirable	Desirable	Desirable	Not important	Desirable	Desirable	Desirable	Desirable	Not important	Not important	Desirable
Essential	Not important	Desirable	Essential	Essential	Essential	Essential	Essential	Essential	Essential	Essential	Essential	Not important	Not important	Essential
Essential	Essential	Desirable	Essential	Essential	Essential	Essential	Essential	Essential	Desirable	Essential	Desirable	Desirable	Desirable	Essential
Essential	Essential	Essential	Essential	Essential	Essential	Essential	Desirable	Desirable	Desirable	Essential	Desirable	Desirable	Desirable	Essential
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Essential	Desirable	Not important	Essential	Essential	Essential	Essential	Desirable	Desirable	Desirable	Essential	Desirable	Not important	Not important	Essential
Desirable	Essential	Desirable	Essential	Essential	Desirable	Desirable	Essential	Desirable	Essential	Desirable	Desirable	Not important	Not important	Essential
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Essential	Essential	Essential	Essential	Essential	Essential	Essential	Essential	Desirable	Essential	Essential	Desirable	Desirable	Desirable	Essential
Desirable	Essential	Desirable	Essential	Essential	Essential	Essential	Desirable	Essential	Essential	Essential	Essential	Not important	Not important	Desirable

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Ranking of importance		% selecting Essential	% selecting Desirable	% selecting Not important
2	<b>Chemical Knowledge</b>	86%	14%	0%
3	Practical laboratory skills	79%	14%	7%
7	Experimental design	29%	64%	7%
1	<b>Written communication</b>	<b>93%</b>	7%	0%
2	<b>Oral communication</b>	86%	14%	0%
3	Organisation	79%	21%	0%
3	Project / time management	79%	21%	0%
4	Data analysis	64%	29%	7%
5	Collaboration / networking	43%	50%	14%
6	Ability to connect chemistry to other disciplines	36%	50%	14%
4	Equality and Diversity	64%	29%	7%
8	Sustainability / green chemistry	26%	64%	7%
9	Computation / programming	0%	43%	57%
9	AI knowledge	0%	50%	50%
4	General IT	64%	35%	0%

## Are there other skills not listed above that you consider essential for a Chemistry Graduate?

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To **adapt** to different situations and to understand what is required and what is not for a given project, and to be able to **articulate/defend why they have taken a particular approach**

Relevant **industrial experience**.

**Safeworking** in a laboratory

General confidence and the **ability to 'be curious'**.

**Resilience** is desirable in all of our roles but especially the sales roles, as you are required to expect a fair share of rejection.

**Presentation** (to internal & external parties) preparation of **lab safety paperwork**

**Independent thinking and initiative**.

**Team work** in an interdisciplinary environment

Problem solving/troubleshooting. **Failure analysis**.

To have the confidence to **apply their knowledge to other fields** easily.



## What skills do you find are often lacking in the graduates that you hire?

Applying theoretical knowledge to **practical** experiment.

**Communication skills** are often weak, new graduates don't know how to talk to clients or communicate effectively

**Practical** chemistry

**Organisation and project management.** Lab skills can vary massively dependant on the graduate. This is why we tend to look to see whether the graduate has previously had experience in industry as their lab skills and organisation are at a higher level.

**Advanced route planning** - e.g. which protection group strategy etc.. This can be taught on the job however.

**Self-confidence**, rounded experience, interpersonal skills

**Specialised work experience.** Too many generalists.

Lack of **industrial knowledge** i.e. what companies specialise in certain areas, current trends, who makes what and where to get it from.

Hands on **lab experience & troubleshooting** (uni experiments tend to work whereas research experiments don't always go to plan)

**Industrial awareness**

**Real world experience** (e.g. working in an environment where you need to get your hands dirty) and being able to work with others who have different backgrounds

Ability to apply theory to **real world examples**.

In general, **lack of analytical skills** learned from university.

## When hiring Chemistry Graduates, what would give an applicant a competitive edge at your company?



Working on wide range of organic reactions/synthesis **small to large scale** also can work on **cross functional operations teams**.

Some **understanding of chemical regulations** in the EU and UK and good examples of **written work to show/present at interview**

Some lab experience, eg. from an **industrial placement**

Relevant **industrial experience**.

Basic understanding of different types of **polymer chemistry**.

**Experience working independently in a lab**

A good degree plus **self-confidence, rounded experience and interpersonal skills**

**Industry experience/placement**

Geographically, for some jobs that require to work from the office in ---.

**Willingness to travel** and a clean driving license.

**General honesty and interest** at interview stage.

Context of theory to current **real world issues**

**Industrial experience**.

**Work placements** and work shadowing helps differentiate candidates. Someone who has spent time in a real pharmaceutical lab or shadowed a technical sales person in the field gets valuable insight to the world outside academia. Applicants who have worked in a commercial lab alongside studying.

Someone who can **get on with a wide range of backgrounds and personalities**

**Communication skills, flexibility, genuinely curious learner**.

**Hands-on experience with analytical instruments** of a wide range.

Is there anything else you would like to share with us that might help us re-develop our chemistry curriculum?



Better understanding of **fundamentals of organic chemistry and reaction mechanisms.**

As I don't fully know the content of the curriculum this is difficult to answer, but from our business perspective an **overview of the regulatory frameworks applicable to the chemical industry** would be useful

When we **take on industrial placement students**, we often see differences in the understanding of the chemistry fundamentals. We appreciate that we may work in a niche area that we can't expect universities to cover, but **students that understand the fundamentals of reactive chemistry and then are able to apply this to a different context, always do much better than those that don't have this.**

Aim to **place students in industry for 8-12 weeks as a minimum.**

Where possible **invite industry to set challenges for students as part of end of year projects.**

I think it would be beneficial to keep **industry partner's involved in the teaching aspect of the course** and allow industry to help steer this, as ultimately, the students will be working in these environments once they graduate. It would also give industry more incentive to collaborate on projects and offer equipment when required.

Helping students develop **employability skills** as well as academic skills

subsea corrosion, **material science**

**Revamp the analytical modules** to have more hands-on experience as well as theory.

# What does sustainability mean for your company?



We are ISO 14001 and 9001 accredited company, as a commitment to the environment we drive our chemical processes make less environmental impact on the environment using continuous improvement.

Future proofing, a way to ensure that business can continue in the years to come. We work in a sustainable way with regards to the testing we conduct

We are seeing a rise in our clients requesting sustainability information and accreditation

Reduced CO2 emissions.

End-of-life circularity of product.

Increased product durability, and hence, lifespan.

Business continuation for the future.

Working as efficiently as possible, reducing waste where possible.

Altering approaches and methods and working with suppliers to make changes.

any product developed should have longevity

We have a sustainability champion and team that have monthly meetings to help reduce energy, waste and water use.

We have joined schemes to reduce our footprint, such as planting trees and only joining banks that invest in Carbon neutral projects.

It is very important to the senior management team as ultimately they want to help improve the planet's wellbeing.

key ambition to be more sustainable but still trying to find a way to implement particularly when labs are leased on nuclear licensed facilities

Minimising consumption of energy and waste generation.

Reducing the impact of our business operations on the environment, but also working with our customers to help them do the same.

Many of our products are designed to reduce water or energy usage.

Being able to minimise waste, maximising recycling opportunities and working with supply chains and customers to achieve those outcomes

Sustainability is the future of all businesses and everyone is responsible to enable a sustainable world

Low energy usage, low consumables and plastics usage, low carbon emissions.

## Are you already using or do you expect to use AI in your company and how?

No, and not as we know of yet

Indirectly, some of our clients are using AI

We currently utilise Design of Experiment.

Commercially sensitive information.

not currently using it specifically and no serious plans for adoption soon.

yes

We already use basic AI to monitor trends and predict forecasts, but I believe we will use it more to reduce the employee's time on wasteful tasks and streamline the company's workload.

unsure

Yes. Knowledge management.

Not currently in any meaningful way as an organisation, but individuals are using various platforms to help understand complex applications or rewrite comms.

Early stages of exploration

Limited use at present

Not yet.



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