



Science Industry Partnership (SIP)

Employers Driving Skills for Growth

Modular Masters in Formulation Science and Technology Webinar 14th July 2015

Programme

1. Introduction to the SIP and its programmes (Cogent)
2. The Modular Masters in Formulation Science and Technology
 - Why the MM and what are the skills needs of industry?
 - What is the MM?
 - Modules and Pathways
 - How does the MM programme work?
 - Fees and funding
 - Summary of the benefits of the MM
3. Employer comment and academic comment
4. Reminder of contacts, links and materials available
5. Q&A by chat message or audio – and wrap-up

 **This webinar is being recorded and will be made available** 

Science Industry Partnership: Approved by Government

- Co-investment of up to £32.6M in the employer-led SIP proposal - Huge vote of confidence in the sector
- Government in strategic partnership with employers to deliver the Industrial Strategy
- Led by an employer SIP Board, chaired by GSK
- The SIP will:
 - develop skills strategy for science sector
 - co-invest in skills and education projects with employers (England only)
- SIP publically launched on 8th July 2014



Scope

- “The Science Industry Partnership embraces:
Life Sciences - pharmaceuticals, biotechnology, medical technology and consumer healthcare
Industrial Sciences - chemicals, petrochemicals, industrial bio-technology, polymers, advanced materials and formulations”
- **SIP Board:** Synergy Health, Steel Bars, UCB, Ecolab, Becton Dickinson BioSciences, Green Biologics, MedImmune, Pfizer, Thermo Fisher, NHS England, Unilever, Takeda Cambridge, Eisai, Fujifilm Diosynth, Sera Laboratories, Novartis, GSK, SABIC, Lotte Chemical, Abzena, 3M, J&J, Victrex
- **SIP Higher Education/Modular Masters Groups:** GSK, Fujifilm, Critical Pharma, Ineos, UCB, Altana, Merlin, Leica Biosystems, Afton, Lotte, MP Scientific, Pfizer, Victrex, ABPI, RSC, Lonza, HEFCE, Essar, Synergy Health, Thermo Fisher, Green Biologics, Croda, Innospec, Reckitt Benckiser, AstraZeneca

SIP Programmes:

- **STEM Careers** – Employer-School links
- **Traineeships** – Short placements for young people
- **SMART Apprenticeships** – training plans tailor-made for the employer
- **Workforce Development**
 - Upskilling the technician workforce - Gold Standard
 - Small Business Framework for Growth – Funding and Skills Profiles
- **Higher Education:**
 - Industry Graduates (Industry Degree Scheme)
 - **Formulation Technology Modular Masters**
 - Advanced Training Partnership - Industrial Biotech. Scoping stage.

For more information about the SIP:

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Visit: www.scienceindustrypartnership.com



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Employers Driving Skills for Growth

Modular Masters in Formulation Science and Technology

What is the Formulation Modular Masters?

The most

- comprehensive
- flexible
- quality assured
- industrially relevant
- cross sector

suite of advanced training available for those engaged in
Formulation Science and Technology

Who Is It For?

- Designed for learners **in industry** who wish to **study part time**
 - Leading to a formal qualification or
 - Single modules as CPD / training courses
- Suitable for a **wide range of participants** including graduates, experienced senior technicians or PhD scientists
- Working in formulation R&D, process development, manufacturing, quality, technical marketing, applications development
- Relevant to wide range of industries:
 - Pharmaceuticals, personal care, cleaners and detergents, agrochemicals, paints, inks, adhesives, speciality chemicals, construction chemicals, lubricants, food processing etc.

What Does Industry Say it Wants? (Consultation 2013)

- Flexible modular framework
 - Can build a Masters programme suitable for the industry, the company or the individual
- Opportunity for multiple providers (“best of the best”)
- Individual modules can be done as standalone CPD training
- Option to lead to assessed academic qualifications: Postgraduate Certificate, Diploma and Masters
- Variety of delivery and assessment methods
- Focus on advanced skills in the workplace
- Research project with relevance to industry
- Industrial Governance to ensure relevance to employers

Who Is Delivering The Programme?

- Consortium of leading UK Universities
 - Specialising in Formulation
 - Track record of industry engagement and relevance
 - Selected by Industry Panel
- University of Birmingham:
 - Centre For Formulation Engineering (Lead)
 - Pharmaceutical Sciences
- University of Leeds: Chemical Engineering
- Imperial College London: Chemical Engineering
- Kings College London: Pharmacy

UNIVERSITY OF
BIRMINGHAM



UNIVERSITY OF LEEDS

Imperial College
London

KING'S
College
LONDON

Capabilities and Experience in Formulation

- **University of Birmingham:**

- Pioneering Centre for Doctoral Training in Formulation Engineering
- Over 50 EngDs (with e.g. Unilever, Syngenta, Pfizer, GSK, Mondelez, P&G, Boots, Pepsico, Imerys, Merck, Johnson Matthey etc)
- Full time MSc programmes: Advanced Chem Eng, Pharm Sci

- **University of Leeds:**

- Centre for Doctoral Training in Particle Science and Engineering
- CPD Courses in formulation-related topics

- **Imperial College London:**

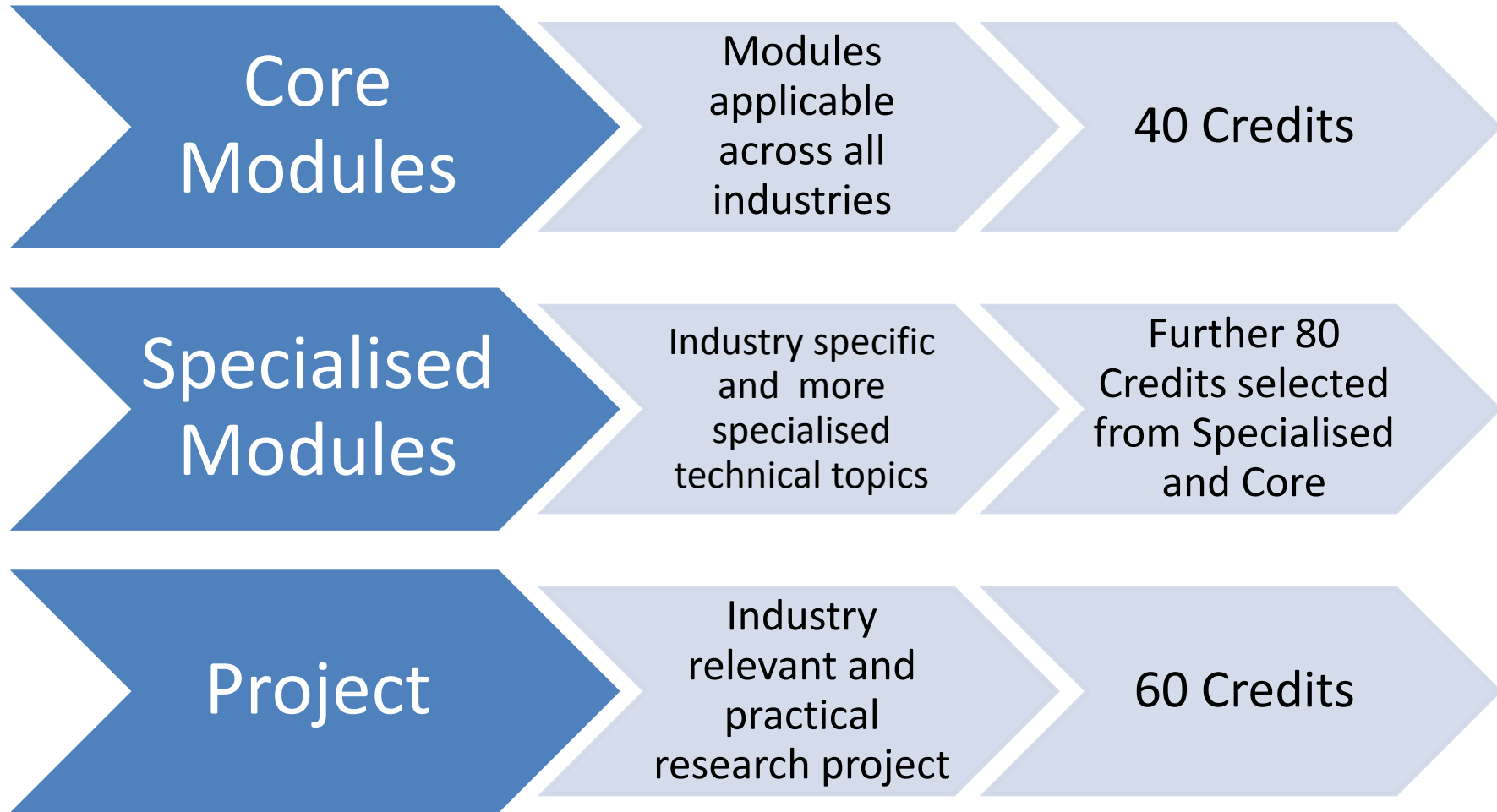
- Full-time MSc in Structured Product Engineering

- **Kings College London:**

- Full-time MSc in Pharmaceutical Technology, includes formulation

...as well as numerous industrial research collaborations

Modular Masters: Programme Structure



Core Modules: Descriptions Available

Title	Delivered By	Credits	Learning Modes	Assessment	Date(s)
Process Engineering Fundamentals for Formulators	University of Birmingham (Formulation Engineering)	10	In-person (one week) E-Learning	80% exam, 20% course work	12 th Oct 2015
Bioscience for Formulators	University of Birmingham (Formulation Engineering)	10	In-person (one week) E-Learning	80% exam, 20% course work	5 th Oct 2015
Industrial Chemistry	Imperial College London	10	In-person (3h/wk, 1 term) E-learning	Examination	Autumn 2015
Formulation Chemistry and Engineering	Imperial College London	10	In-person (10x 0.5 day) E-learning	Examination and assignment	October 2015 (tbc)
Characterisation for Formulation	University of Birmingham (Formulation Engineering)	10	In-person (three days)	Assignment	14 th Mar 2016
Product Characterisation	Imperial College London	10	In-person (10x 0.5 day) E-learning	Examination and assignment	Spring 2016
Particle Characterisation	University of Leeds	10	In-person (one week)	Examination and assignment	May 2016 (tbc)
Introduction to Colloid Science	Imperial College London	10	In-person (10x 0.5 day) E-learning	Examination and course work	Spring 2016
Colloid Chemistry and Rheology	University of Birmingham (Formulation Engineering)	20	In-person (one week) Distance/e-learning	Examination and assignment	9 th Nov 2015
Mathematical Modelling of Time-Dependent Processes	University of Birmingham (Formulation Engineering)	10	In-person (one week) Distance/e-learning	Course work	Summer 2016
Design of Experiments and Multivariate Data Analysis	University of Leeds	10	In-person (one week) Distance/e-learning	Examination and assignment	October 2015
Product Design	University of Birmingham (Formulation Engineering)	10	In-person (one week)	Course work	Summer 2016
Molecular Delivery for Formulation	University of Birmingham (Formulation Engineering)	10	In-person (one week) Distance/e-learning	Examination	2 nd Nov 2015

Specialised Modules: Descriptions Available

Title	Delivered By	Credits	Learning Modes	Assessment	Date(s)
Principles of Drug Delivery and Disposition	King's College London	10	In person	Examination and assignment	Spring 2016 (tbc)
Pharmaceutical Pre-formulation and Formulation	University of Birmingham (Pharmaceutical Sci)	10	In-person (four days) E-learning	Assignment	Autumn 2015
Formulation of Pharmaceutical Drug Products	University of Birmingham (Pharmaceutical Sci)	10	In-person (one week)	Examination and assignment	Spring 2016
Food Formulation and The Consumer	University of Birmingham (Formulation Engineering)	10	In-person (one week) Distance/e-learning	Assignment	15 th Feb 2016
Developing Food Structure Through Thermal Processing	University of Birmingham (Formulation Engineering)	10	In-person (one week) Distance/e-learning	Examination and assignment	1 st Feb 2016
Particle Engineering	Imperial College London	10	In-person (10x 0.5 day) E-learning	Examination and assignment	Spring 2016
Advanced Pharmaceutical Formulation	University of Birmingham (Pharmaceutical Sci)	10	In-person (one week)	Examination and assignment	Spring 2016
Spray Drying of Formulated Products	University of Leeds	10	In-person	Assignment	Spring 2016
Emulsion Technology and Microencapsulation	University of Leeds	10	In-person	Examination and assignment	September 2015
Rheology of Suspensions and Dispersions	University of Leeds	10	In-person (two days)	Examination and assignment	12-13 June 2015
Non-Aqueous Colloids	University of Leeds	10	In-person (two days)	Examination and assignment	June 2016
Drug Delivery: Liquid Dosage Forms and Microbiology	King's College London	10	In person	Examination and assignment	Spring 2016 (tbc)
Drug Delivery: Solid Dosage Forms	King's College London	10	In person	Examination and assignment	Spring 2016 (tbc)
Pharmaceutical Process Development	Imperial College London	10	In-person (10x 0.5 day) E-learning	Examination and assignment	Autumn 2016
Membrane Science and Membrane Separation Processes	Imperial College London	10	In-person (10x 0.5 day) E-learning	Examination and assignment	Autumn 2016

Pathways

- **Flexible:**

- Choose from one or more of the Universities.
- Option to take individual modules as CPD with or without assessment or accreditation.

- **Full Masters: 180 Credits** – select from any institution

- 120 Taught Credits - 40 or more from list of Core modules and the remainder selected from Core or Specialised list
- 60 Credits from Research Project
 - Usually carried out at employer with University supervision
 - Safeguards for company confidentiality and IP
- Typically 2-4 years part-time study for the taught credits (i.e. 3 to 6 modules per year), plus 6 months to one year part-time for the project

- **Intermediate Qualifications** (can choose to pursue full Masters later)

- Postgraduate Certificate – 60 Taught credits (at least 40 Core)
- Postgraduate Diploma – 120 Taught credits (as for Masters)

Pathways

- **Modules**

- Not all are suitable for everyone, although many are of wide interest
- Pathways on next slides are **suggestions, not prescriptive**

- **Suitability indicated in matrix (also in brochure)**

- Look at module summaries (online) to help choose
- Student / employer discuss choice with Cogent (later Senior Tutor)

- **Key:**

Likely to be suitable for that industry	Blue	Red	Green	Brown	Purple	Grey
May be suitable depending on student/employer interest	Light Blue	Light Red	Light Green	Light Brown	Light Purple	Light Grey
Unlikely to be suitable	White	White	White	White	White	White

- Additional specialised modules will be added **according to industry need**
- Taught modules will typically be spread over 2-4 years
 - Repeating timetable, approximately annually

Title	Delivery	Credits	Pharma	Home / Personal Care	AgChem	Food/Drink	Paints/Inks	Lubricants
Core Modules – Fundamental scientific and technological topics broadly relevant to all industries. Choose 40 credits or more from Core.								
Process Engineering Fundamentals for Formulators	UoB	10						
Bioscience for Formulators	UoB	10						
Industrial Chemistry	ICL	10						
Formulation Chemistry and Engineering	ICL	10						
Characterisation for Formulation	UoB	10						
Product Characterisation	ICL	10						
Particle Characterisation	UoL	10						
Introduction to Colloid Science	ICL	10						
Colloid Chemistry and Rheology	UoB	20						
Mathematical Modelling of Time-Dependent Processes	UoB	10						
Design of Experiments and Multivariate Data Analysis	UoL	10						
Product Design	UoB	10						
Molecular Delivery for Formulation	UoB	10						
Specialised Modules – Topics mainly of relevance to single industries, or specialised technological themes. Further modules may be added								
Principles of Drug Delivery and Disposition		10						
Pharmaceutical Pre-formulation and Formulation	UoB	10						
Formulation of Pharmaceutical Drug Products	UoB	10						
Food Formulation and The Consumer	UoB	10						
Developing Food Structure Through Thermal Processing	UoB	10						
Particle Engineering	ICL	10						
Advanced Pharmaceutical Formulation	UoB	10						
Spray Drying of Formulated Products	UoL	10						
Emulsion Technology and Microencapsulation	UoL	10						
Rheology of Suspensions and Dispersions	UoL	10						
Non-Aqueous Colloids	UoL	10						
Drug Delivery: Liquid Dosage Forms and Microbiology		10						
Drug Delivery: Solid Dosage Forms		10						
Pharmaceutical Process Development	ICL	10						
Membrane Science & Membrane Separation Processes	ICL	10						
Project								
Industrial Research Project	Any	60						

Example Pathways (1)

Example: Home and Personal Care

Year 1

Autumn

Formulation Chemistry and Engineering (ICL) 10 Credits

Colloids (UoB) 20 Credits

Spring/ Summer

Product Design (UoB) 10 Credits

Characterisation (UoB) 10 Credits

Spray Drying of Formulated Products (UoL) 10 Credits

Year 2

Autumn

Design of Experiments (UoL) 10 Credits

Emulsification and Encapsulation (UoL) 10 Credits

Rheology (UoL) 10 Credits

Spring/ Summer

Mathematical Modelling (UoB) 10 Credits

Molecular Delivery (UoB) 10 Credits

Particle Engineering (ICL) 10 Credits

Year 3

Project (60 Credits)

Example: Bioscience/Biotechnology

Year 1

Autumn

Formulation Chemistry and Engineering (ICL) 10 Credits

Pharmaceutical Pre-Formulation (UoB) 10 Credits

Molecular Delivery (UoB) 10 Credits

Spring/ Summer

Product Design (UoB) 10 Credits

Characterisation (UoB) 10 Credits

Pharma Process Development (ICL) 10 Credits

Year 2

Autumn

Design of Experiments (UoL) 10 Credits

Principles of Drug Delivery (KCL) 10 Credits

Rheology (UoL) 10 Credits

Spring/ Summer

Mathematical Modelling (UoB) 10 Credits

Advanced Pharma (UoB) 10 Credits

Particle Engineering (ICL) 10 Credits

Year 3

Project (60 Credits)

Example Pathways (2)

Example - Pharmaceuticals

Year 1

Autumn

Bioscience (UoB) 10 Credits

Colloids (UoB) 20 Credits

Spring/ Summer

Product Design (UoB) 10 Credits

Characterisation (UoB) 10 Credits

Principles of Drug Delivery (KCL) 10 Credits

Year 2

Autumn

Design of Experiments (UoL) 10 Credits

Pharma Formulation / Pre Formulation (UoB) 10 Credits

Pharma Process Development (ICL) 10 Credits

Spring/ Summer

Advanced Pharma Formulation (UoB) 10 Credits

Drug Delivery: Liquids (KCL) 10 Credits

Drug Delivery: Solids (KCL) 10 Credits

Year 3

Project (60 Credits)

Example – Food

Year 1

Autumn

Bioscience (UoB) 10 Credits

Colloids (UoB) 20 Credits

Spring/ Summer

Product Design (UoB) 10 Credits

Characterisation (UoB) 10 Credits

Food Formulation and The Consumer (UoB) 10 Credits

Year 2

Autumn

Design of Experiments (UoL) 10 Credits

Membrane Science (ICL) 10 Credits

Emulsification and Encapsulation (UoL) 10 Credits

Spring/ Summer

Developing Food Structure (UoB) 10 Credits

Spray Drying (UoL) 10 Credits

Particle Engineering (ICL) 10 Credits

Year 3

Project (60 Credits)

Study Commitments

- Guideline: A module comprising 10 credits will require:
 - learner “contact time” (lectures and tutorials or the online equivalent) of about 25 hours and
 - “non-contact time” (reading, self-study and assignments) of approximately a further 75 hours.
- It is for the employer to decide how much contact and non-contact time will be within the learner’s working hours and how much will be in the learner’s own time.
- All modules are available as in-person courses. Many of the modules are also available in distance learning or e-learning format.
- Depending on demand it is expected that an optional annual summer school will be held to bring learners and teachers together.

Fees

- Flat rate for 10 Credit Module: £1,000+VAT irrespective of University
- Workforce development funding of up to 50% per learner per module may be available for companies based in England (time limited)
- Above fees for UK/EU students. Non EU students can be accommodated – fees by agreement
- Booking through Cogent – fees include administration by Cogent

How Does It Work?

- **Booking:** Via Cogent
- **Registration:**
 - Cogent assists students to register with **one or more** of the individual Universities for respective modules
 - Students pursuing Masters/PG Dip/PG Cert will register with University of Birmingham at a later date.
 - Modules already completed and assessed (at any of the Universities, including Modular Masters pilot) may count.
- **Eligibility:**
 - Typically a good degree in a relevant science/engineering discipline
 - Universities tend to be flexible, especially for CPD
- **Timetable:**
 - Repeating timetable (approximately annual)
 - Timetable will be updated regularly
 - Many modules concurrently being offered to full-time MSc students

How Does It Work?

- **Distance and e-learning** offered for many of the modules:
 - Typically lecture materials offered as video or downloadable slides
 - Supplemented by reading list, assignments and online tutor sessions
- **Assessment** (for those wishing to attain a qualification):
 - Depends on the module – coursework, assignments, exams
 - Research project assessed by dissertation
- **Senior Tutor based at Birmingham:**
 - Responsible for admin, coordination, communication between Univs
 - Guidance for learner and employer on module choice
- **Industry Governance:**
 - SIP Employers, Academics
 - Consider requests for new content, delivery at new locations etc
 - Ongoing review of suitability of programme

Materials Available

- A5 Course brochure:

http://www.scienceindustrypartnership.com/media/473667/modular_masters_v6.pdf

- Product Sheet for each Module

• <http://www.cogentskills.com/workforce-development/modular-masters/modular-masters-in-formulation-science-and-technology-core-modules/>

• <http://www.cogentskills.com/workforce-development/modular-masters/modular-masters-in-formulation-science-and-technology-specialised-modules/>



Student Feedback

“I recently undertook the Colloid Chemistry and Rheology module at Birmingham University. I have been an industrial fluids formulator for over 7 years and my company specialises in emulsions and neat oil formulations. The module was split into numerous topics including emulsion science and rheology, both of which were particularly pertinent to my career, and the delivery of the module was paced well. One particular section I found useful was regarding polymer stabilisation of emulsion systems which I have been able to apply to my work. **I am already scheduled to take the next module on Characterisation for Formulation and will hopefully be completing the full Masters qualification.**”

Aaron S: Part-time student in industry

Employer Feedback

“Formulation science is essential in the pharmaceutical industry, with formulators involved at every stage from the discovery phase of new medicines to commercialisation.

What the Modular Masters is going to offer is **unique in a number of ways**: the diversity of topics covered within the programme, the quality of the teaching providers, the flexibility of the modular course structure and the learning styles, such as distance learning.

With the increasing competition in the sector around the world, it’s important for the UK to develop and grow its expertise in the key area of formulation.

The Modular Masters fills the gap for modular courses covering these skills which will **meet a growing need** for both Pfizer and the pharmaceutical sector in general.”

Richard Green - Senior Director, Drug Product Design, Pfizer R&D

Summary of Programme Benefits (1)

- **Choice of depth of study :**
 - Study one or more modules as CPD only or
 - Accumulate credits to form a full Masters or intermediate qualification.
- Delivery from a consortium of the UK's **leading Universities**
- **Flexible study** via in-person, distance or e-learning
- Unique flexible **tailor-made programme**
 - Choose from one or more providers
 - Senior Tutor works with employer and employee to design a study pathway to meet student needs
- **Research project** carried out in the workplace to apply the knowledge learned to real-life challenges
- Simplified **“one stop” administration** via Cogent Skills

Summary of Programme Benefits (2)

- Suitable for a **wide range of participants** including graduates, experienced senior technicians or PhD scientists
- Suitable for **all industries** engaged in formulation
- Helps improve **capability, motivation and retention** of employees.
- Helps apply science and technology **to solve real-world problems**
- Allows learning **across different industries**

Contact Details

For Information or Registration:

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www.cogentskills.com/workforce-development/modular-masters

For Information:

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07450 436515

Modular Masters: Questions?