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Modes of Interaction

Prof James Busfield
Dr Jim Shaikh

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Routes of Engagement – Student Projects

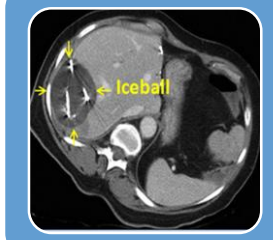
Benefits to the company

- Cost-effective way of getting a project done or an idea tested
- Ability to trial potential employees
- A creative, highly skilled and fresh approach
- Involvement and access to high quality cutting edge researchers

Costs – Students should have consumables provided and expenses paid for company visits

IP - Standard agreements regarding any IP developed while involved in an industry project

NDA – Standard NDAs can be arranged. All projects need to be examinable (and be seen by the examiners)



In Module Case Studies

3rd Year Individual Projects

4th Year Group Projects

MSc Projects

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Undergraduate Placements

Placements of 7 - 14 months

- Supported by Industrial Experience Managers
- More than 100 students at any time are on a work placement
- Our partners include:
  - Service Now (27 placements since 2011)
  - Rolls Royce (24)
  - Airbus
  - Rail Delivery Group
  - Arconic
  - GlaxoSmithKline
  - Siemens
  - IBM
  - Fidelity
  - UBS

Karan Mehta (3) Crawford Blagden Osman Goreish (4)

SEMS IE Manager

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PhD Student Funding and Work Placements

- Industrial collaborators frequently fund research studentships
- The current entry price for IAB partners for a funded PhD is a 3 year studentship at £85K + consumables
- There are opportunities to cofund other scholarships as well and to support CASE awards
- Research sponsors often take PhD research students on placement (and often hire them as well after graduation)

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London City Institute of Technology

- The IOT will focus on delivery of:
  - T levels
  - Higher and Degree Apprenticeships
  - Industry-linked PhDs and research
- It will be located in an innovation hub, as part of a regeneration scheme in London's only enterprise zone
- Over 1,800 places at full capacity in 2027:
  - 20% at Level 3
  - 50% at Levels 4 and 5
  - 30% at Level 6 & 6+
- Degree Apprenticeships are to be industry led but already planned for 2022 start are courses in:
  - BEng Data Scientist (3 years)
  - BEng Aerospace Engineering (4 years)
  - MSc Systems Engineering (3 years)
  - …….?

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School of Engineering and Materials Science
11th Industrial Advisory Board 26th February 2020

Professor James Busfield
Director of Industrial Engagement in SEMS

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Division Structure in SEMS

Aerospace Engineering and Fluid Mechanics	Bioengineering	Chemical Engineering and Renewable Energy	Materials Engineering	Mechanical Engineering, Robotics and Design





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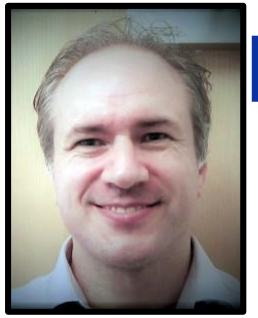


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Agenda for the IAB today

A. Curriculum Review and Update
   - Review of the latest skills matrix
B. MSc Programme Review

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Item 1 – Curriculum Review

The need to review the academic programmes

Improve the delivery of knowledge	• Ensure continuity of knowledge between modules • Avoid repetition
Align academic content between modules	• Be transparent about what the students need to know from a module and where will they use it in the future
Include skills	• Ensure that skills are developed as well as technical knowledge • Provide clarity on skills acquired and their value in employment
Improve impact of teaching	• Reduce assessment & ensure all assessments have clear goals, aligned between modules
Student feedback	• Experience repetition of knowledge • Difficulty understanding certain areas • Excess assessment with unclear goals

Proposed Framework

SEMESTER A

- Good experimental design & practise 1
- Applied maths 1 (statics)
- Engineering Materials
- Design

SEMESTER B

- Good experimental design & practise 2
- A: Applied Maths 2 (dynamics) (mech, aero)
- OR
- B: Chemical Materials (chem, bio, mat, sust)
- Thermofluids
- Exploring (Stream) Engineering

Blue = coursework assessed module.: can include in class tests, reports, labs – highly flexible

Red = examination assessed module

Skills Content Review

- “Curriculum review group” focus on technical and transferable skills (graduate attributes ; employability attributes) required throughout a programme of study, and develop a map for developing each of these throughout the programme
- Skills need to determine the shape of the programmes. An essential graduate skill is to develop an appreciation of the importance of life-long learning, self-development and self-sustainability for personal and professional reasons

Areas	skill number	By the end of their degree (BEng) our graduates will be able to, or will have:
Resilience	1	developed a growth mind-set approach, appreciating life-long learning, self-development and self-sustainability for personal and professional reasons
	2	confidence built through active engagement in activities that take the student out of their comfort zone.
	3	an appreciation of the criticality of their personal wellbeing, work and lifestyle habits
Creativity	4	a range of critical thinking and problem solving techniques to develop, assess, and prioritise multiple creative solutions to problems
	5	an understanding of the development of product requirements
	6	think and analyse strategically in order to manage large amounts of information /data sets
Working collaboratively	7	worked with different communities in order to develop a global pespective
	8	worked in a team and developed an appreciation of team roles and characteristics
	9	provided and received constructive feedback

Areas	skill number	By the end of their degree (BEng) our graduates will be able to, or will have:
Effective communication	10	communicate and disseminate using a variety of digital resources for different audiences
	11	convey technical and other information in a written form appropriate for the audience and media use
	12	undertake critical assessment of information
	13	understand and implement careful communication
Project management	14	an awareness and use of common project management tools, methodologies and processes used in industry and research
	15	evaluate required resource, time, risks and strategy for a project.
	16	apply integrated or systems approaches to the solution of complex problems
Professional practice	17	an awareness of the importance of health and safety, from both a personal and corporate responsibility standpoint.
	18	commercial awareness
	19	understanding of code of ethic
	20	appreciation of Quality Assurance processes, GLP, regulatory frameworks

Areas	skill number	By the end of their degree (BEng) our graduates will be able to, or will have:
Technical	21	sketching and drawing - hand and computer generated
	22	practical awareness and use of prototyping and manufacture techniques
	23	practical and laboratory skills
	24	appreciation of and ability to work with technical uncertainty and apply appropriate statistical methods
	25	design testing protocols including the techniques associated with the design of experiments
	26	perform quantitative, semi-quantitative and qualitative analysis; critically evaluate inputs and outputs
	27	numerical and computational modelling skills, FEA & CFD
	28	awareness of coding
	29	proficiently use commercial software

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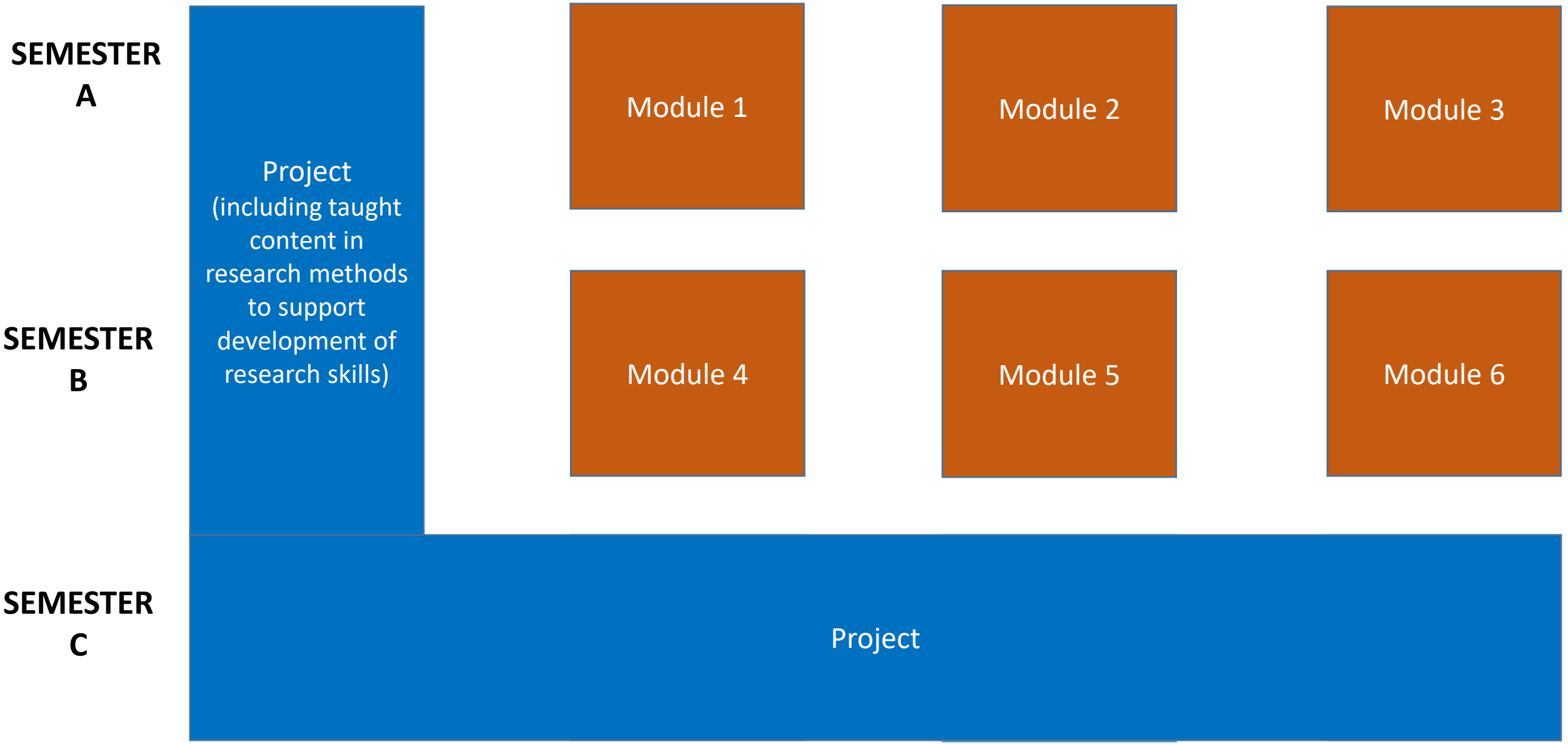
Item 2 – MSc Programme Review

Overall Proposals

We are considering new MSc programmes in which:

- All teaching is carried out in blocks
  - Focused periods of study - could this enable CPD courses also?
  - Is there interest in tapping into MSc level teaching?
- There is a defined set of modules for each programme (remove optionality)
  - The rationale is to create more tightly supportive teaching cohorts
  - Groups move together through the MSc with a tutor and we can more easily support consistent skills development
- Different MSc programmes are defined by 6 modules which provide the taught content in different areas of strength across the school
  - Identify priority MSc areas for graduates
  - Identify core strength areas for SEMS

MSc Structure



The extended MSc Project

Project – 90 credits, including 2 “modules” during teaching semesters which incorporate taught content covering:

- Critical literature review
- Generating & motivation a research question
- Experimental design
- Laboratory practise, workbook & collating data
- Data analysis & statistics
- Presenting results
- Contextualising your findings (discussion)
- Communicating research (oral)
- Communication research (written)

Potential MSc Areas

“Advanced” versions of current UG degrees:

Advanced Mechanical Engineering

Advanced Chemical Engineering

Advanced Sustainable Energy Engineering

Advanced Aerospace Engineering

Advanced Robotics

Advanced Biomedical Engineering

Advanced Materials Science & Engineering

New ideas – cross divisions or new areas:

Sustainability & Renewables:
- Renewable energy engineering?
- Sustainable energy engineering?
- Sustainable energy & materials?

Materials Science
- Advanced Materials for Future Transport

Systems Engineering

Bioengineering / Biomaterials
- Advanced Biomaterials
- Biomedical Engineering & Materials
- Predictive in vitro Models for Medical Innovation & Research

Design
- Engineering Design & Optimisation

“with management” versions of all MSc?

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