Imperial College London

Programmes Committee (PC)
Tuesday 18 February 2020
10:00-13:00
Room 504 (Meeting Room 1), 5th Floor Sherfield Building

Present
Dr Edgar Meyer (Chair), Ms Jolande Bot-Vos, Mr Ashley Brooks, Dr Lorraine Craig, Dr Jo Horsburgh, Mr Scott Tucker, Dr Vijay Tymms, Dr Mike Tennant (Deputy Chair), Ms Judith Webster, Ms Men-Yeut Wong (Secretary) and Ms Betty Yue.

Apologies
Dr Janet De Wilde, Mr Mohit Devgan, Dr Kate Ippolito, Professor Jonathan Mestel. Mr Abhijay Sood, Professor Roberto Trotta,

In Attendance
Dr Sam Au, Dr Carlo Ciliberto, Mr Joël McConnell, Dr Krystian Mikolajczyk Ms Louise O'Sullivan, Dr Paolo Taticchi and Dr Michael Weatherburn.

1	**Welcome and Apologies**

The Deputy Chair welcomed attendees to the meeting and apologies, as above, were noted.

The Deputy Chair informed members the Professor Sue Smith would be standing down from the Programmes Committee in the New Year, the Committee thanked Sue for her time served on the Committee as the Faculty of Medicine representative, in particular, for acting as reference panel Chair during the Undergraduate Curriculum Review process. The Committee noted that Dr Jeffrey Vernon would be the Faculty of Medicine representative in the New Year.

2	**PC.2019.23 Minutes of the previous meeting**

The minutes of the previous meeting held on 18 February 2020 were approved as an accurate record subject to the correction of minor typographical errors.

3	**Matters Arising**

There were no matters arising discussed.

Items for consideration

New Programme Proposal

4	**PC.2019.24 MRes Cancer Technology**

4.1.1 The Programmes Committee considered a proposal from the Department of Bioengineering to introduce the above programme with effect from October 2020.

4.1.2 The Committee welcomed the programme lead Dr Sam Au and the Head of Student Programmes (Department of Bioengineering) Ms Louise O'Sullivan who were invited to present the new programme proposal.

4.1.3 The Department of Bioengineering proposed to introduce the MRes in Cancer Technology programme which endeavours to train a new generation of engineers to tackle cancer and stimulate multidisciplinary collaborative cancer technology research throughout College and with the Institute of Cancer Research.

4.1.4 The programme will be structured into a teaching element and a research element that consists of a single large Cancer Technology Research Project. Teaching modules will be run in the Department of Bioengineering primarily in the Autumn term. The independent

research project will be ordinarily co-supervised by two Principal Investigators in any Department of the Faculty of Engineering, Faculty of Medicine, Faculty of Natural Sciences, and the Institute of Cancer Research with complementary expertise, with at least one supervisor appointed at Imperial College.

4.1.5 The Department also sought approval for the collaborative module with the Institute of Cancer Research for the Cancer Technology Research module which is an essential module of programme.

4.1.6 Members agreed that the proposal presented had been original, novel and well-designed creating a strong programme for an initial small cohort of students who should experience a high standard of learning and teaching.

4.1.7 The Programmes Committee agreed upon the following recommendations:

The programme team should:

- Review the Programme Learning Outcomes to ensure that they are of a Level 7 FHEQ standard, the Committee acknowledged that the programme team had sought advice from the Educational Development Unit but could further refine the outcomes to remove redundancy, in particular, the repetition of "Plan and execute";

- The Committee noted that the new programme proposal form presented the Cancer Technology Research Project module with detail that is not replicated in the programme/module specification, the programme team could include:
    o How the module is delivered, its content, example research topics in further detail and what students should expect during the 9-month research project period;
    o The Committee received clarification of how students would be expected to contact supervisors prior to applying on to the programme and the selection process of students, this information could be included in the programme specification;
    o Clarity around when project skills are taught and how, including poster presentation skills and skills in research and statistical analyses;

- Review the allocation of study hours to the project module, members were of the opinion that 41 hours seemed a little low for a 70 ECTS module and recommended that the programme team refer to the Graduate School's What Master's students and their project supervisors might mutually expect from each other (MSc, MEd, MPH, MRes and PG Dip) document for best practice around supervision hours. The programme team should be mindful that with a large project, adequate supervision is in place for all students with mechanisms to ensure that each student receives the same level of support;

- Ensure that the teaching of radiation oncology (e.g. external radiotherapy, brachytherapy, radiosurgery) is made more evident within the relevant module specifications, this recommendation had been raised by an external industry reviewer and the programme team reported that programme does teach radiation oncology agreeing that it could be made more explicit;

- Provide further clarification within the Frontiers in Cancer Technology Research, in particular, what are the range of modules/seminars from which students can choose to attend and the expectations of the student;

- Liaise with the Deputy Director (Academic Quality and Standards) to ensure that it is clear in the collaborative module agreement with the Institute of Cancer Research who the owner is of the intellectual property and commercialisation of students' work;

- If at all possible, consider (as part of their response to the recommendations or as part of the forthcoming PG Curriculum Review process) the alignment of the four taught modules to a credit size of 7.5ECTS and reducing the project to 60ECTS allowing for an exit award of PG Cert.

4.1.8   The Programmes Committee noted the programme team's request (by way of the new programme proposal procedure) for a Programme Specific Regulation to allow for a project module weighted at 70 ECTS (as the College Regulations allows for a maximum MRes project module weighted at 60 ECTS).

4.1.9   The Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee for approval with effect from October 2020 subject to the recommendations noted above.

4.2   MSc Applied Machine Learning

4.2.1   The Programmes Committee considered a proposal from the Department of Electrical and Electronic Engineering

5.1   MSc Machine Learning and Data Science (Online)

5.1.1   The Programmes Committee considered a proposal from the Department of Mathematics to introduce the above programme with effect from October 2020.

5.1.2   The Committee welcomed the programme leads Professors Emma McCoy and Niall Adams who had been invited to present the new programme proposal to the Committee.

5.1.3   The Department of Mathematics proposed to introduce the MSc in Machine Learning and Data Science as a fully online degree which would be part-time delivered across two-years (24 months). The programme aims to train students in the computational, mathematical and statistical foundations of machine learning, preparing them for the most advanced engineering roles in areas such as Artificial Intelligence, data science and machine learning.

Students will have the opportunity to work with industry-standard machine learning and statistic tools and moreover, to develop a deep understanding of the appropriate use of such tools. The curriculum also covers the ethics and limitations of machine learning to equip students with the skills to ethically apply these techniques to their future work

The international nature of the online programme endeavours to foster global collaboration and research between students in a way that a campus-based programme may not, furthering the College's mission to encourage and engage in international and interdisciplinary research. The flexible approach to learning afforded by an online degree allows us to meet the demands of our growing student base, allowing students for whom study in London or full-time study is not feasible; allowing a broader base of the best students to access and participate in an Imperial College education. Scary

5.1.4   The Programmes Committee agreed upon the following recommendations:

The Programmes Committee requested further assurances from the programme leads:

- That the timescale of building all the online content would be feasible for the October 2020 start date;

- That in terms of the welfare provision, students will be provided with the same support as students on-campus;

- That the quality of the programme delivered is equal to the quality of programmes taught on-campus;

- That the content for the suite of electives will be developed before students start in October, and to clarify where the elective modules will sit within the programme structure

which is an entirely core programme (i.e. will a core module be removed or made elective to accommodate for the suite of electives?).

That the programme team:

- Review the entry requirements of the programme to include students with an engineering background rather than "in a subject appropriate to that of the programme to be followed", the Committee also asked that the programme team clarify whether the entry requirements request for a Upper Second Class Honours degree or a Lower Second Class honours degree. The admissions guidance would advise "The minimum requirement is normally a 2:1 UK Bachelor's Degree with Honours in Chemistry or Biochemistry (or a comparable qualification recognised by the College)."

- Confirm the programme fees, would they be set at £28,000 per year, or £28,000 for two academic years;

- Consider the benefits of accrediting the programme with professional bodies, and whether this would make the programme more attractive to students;

- Clarify how the research project will be supervised;

- Liaise with the Business school who have refined their online provision to discuss the management of an online programme, such as office hours/time zones, cohort building, staff student committees across time-zones, how to conduct oral exams online;

- The Graduate School reported that they had worked closely with the Global Masters in Public Health programme team (first intake October 2019) in developing their online induction session and suggested that the Business School could work with the Graduate School in developing an online version of their induction session;

- Consider the diverse background of students who will join the October 2020 cohort (students who may have work experience, culture, time-zones, age, etc.);

5.1.5   The Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee for approval with effect from October 2020 subject to the recommendations noted above.

5.2   MSc Applied Machine Learning

5.2.1   The Programmes Committee considered a proposal from the Department of Electrical and Electronic Engineering to introduce the above programme with effect from October 2020.

5.2.2   The Committee welcomed the programme leads Drs Krystian Mikolajczyk and Carlo Ciliberto who had been invited to present the new programme proposal to the Committee.

5.2.3   The proposed programme addresses the problem of how automated systems operating in a real- world environment can learn and extract information from the observed signal/data. There has been significant interest amongst current undergraduate and postgraduate students in modules focussing on Machine Learning applied in industrial applications. This specifically designed degree will attract graduates as well as professional candidates interested in an intensive course on Machine Learning applied to engineering domains.

The main objectives of the programme are:
- to provide the theoretical basis for Machine Learning systems with associated design methods and algorithms for modelling real systems with various types of observed signals;
- to produce graduates equipped to pursue careers that involve design, modelling, analysis and control of intelligent signal and data processing;

- to offer students from a broad electrical and electronic engineering background the opportunity to acquire advanced knowledge on machine and deep learning in engineering domains;
- to provide students with a good background in Machine Learning and skills that will enable graduates to continue their studies into a PhD in AI systems.

5.2.4 The Programmes Committee agreed that the programme team should seek further guidance from the Quality Assurance and Enhancement team (in particular, the Assistant Registrar (Programme Development)) to further enhance the programme proposal paperwork. Further guidance should be sought from the Educational Development Unit to ensure that the learning outcomes have been presented at the correct FHEQ level.

5.2.5 It was agreed that the revised paperwork should be submitted to the 18th February 2020 meeting of the Programmes Committee (paper deadline of 4th February 2020).

5.3   MSc Engineering for Biomedicine

5.3.1 The Programmes Committee considered a proposal from the Department of Bioengineering to introduce the above programme with effect from October 2020.

5.3.2 The Committee welcomed the programme lead Dr Chiu Fan Lee and the Head of Student Programmes (Department of Bioengineering) Ms Louise O'Sullivan who were invited to present the new programme proposal to the Committee.

5.3.3 The proposed programme seeks to support the departments vision for the future by facilitating crucial cross-disciplinary collaborations between medics, physical scientists, engineers, life scientists and clinical scientists; and responds to student requests for an opportunity to engage wit bioengineering after an undergraduate degree in the life sciences or in medicine (including veterinary medicine and dentistry). With the current MSc Bioengineering programmes, candidates must have a primary degree in engineering or the physical sciences, this means that clinicians and life scientists are ineligible to study an MSc in the department. The department regularly receive enquiries from high achieving candidates who cannot currently be accommodated at MSc level, and therefore this programme has been designed in response to this demand.

5.3.4 In recent years, the Department of Bioengineering has become more diverse in terms of training and background; and many members of academic staff within the department have a life science of clinical background (e.g. cardiology, neuroscience). However, a substantial number of the departments Msc Programmes still require undergraduate math skills and therefore the MSc in Biomedical Engineering is not suitable for even the most excellent clinical or life science graduates. This programme has been designed to enable these students to integrate their knowledge with Bioengineering, taking modules which build upon their undergraduate training in the biological sciences while maintaining the same, or higher, level of excellence in their MSc programmes. Students on the MSc in Engineering for Biomedicine programme will take existing Level 6/7 modules which have been predetermined to be suitable for students without undergraduate mathematics/physics training, combined with a 'Fundamentals in Bioengineering' 10 ECTS credit module this is currently offered to intercalated iBSc medical students.

5.3.5 Members of the Committee agreed that the proposal presented was interesting and well-designed which should garner a high interest from students with a background in life sciences, medicine, veterinary medicine and dentistry.

5.3.6 The Committee agreed upon the following recommendations:

That the programme team:
- Review the Programme Learning Outcomes to ensure that there are of a Level 7 FHEQ standards. The Committee acknowledged that the programme team had sought advice

from the Educational Development Unit but should now liaise with the Quality Assurance and Enhancement team in particular the Assistant Registrar (Programme Development) to ensure that the outcomes are demonstrated at the correct level;

- Review the entry requirements of the programme to consider whether mathematics should be added as a requirement, members of the Committee discussed how students with a clinical background could struggle with the level of mathematics skills required; or consider adding a primer module in mathematics to the programme structure;

- Consider the entry requirements of students with a Bachelor of Medicine and Bachelor of Science (MBBS), as their awards are unclassified, how will the programme team assess the entry requirements of these students?;

- Standardise the use of "component" and "element" within the programme and module specification, should this refer to "modules";

- Consider adding an ethics component to the programme and to make it more evident within the programme specification;

- Should explore the option of adding intermediate awards (PG Certificate/PG Diploma) to the programme as these options are often attractive to clinical students;

- Consider the comments submitted by the external reviewers when updating their programme proposal in response to the recommendations above.

5.3.7 The programme team were advised that the recommendations above be considered and that the response to the recommendations be submitted to the Quality Assurance and Enhancement team. Chair's Action would then be taken to approve the resubmitted documentation and the programme specifications could then be published on-line.

5.3.8 The Programmes Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee for approval with effect from October 2020 subject to the recommendations noted above.

6 Major Modifications to Existing Programmes

Faculty of Engineering

6.1 MEng Mechanical Engineering

The Programmes Committee considered a retrospective proposal from the Department of Mechanical Engineering to add two elective modules (ELEC97046 Human Centred Robotics, and PO3.2 Plasma Physics) to the fourth year of the above programme with effect from October 2019.

The Programmes Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee for approval with immediate effect with the following recommendation:

- The programme team should note the College's annual modifications deadlines which falls on the 31st March- major modifications and 31st July- minor modifications.

6.2 MA MSc Innovation Design Engineering

The Programmes Committee considered a retrospective proposal from the Dyson School of Engineering to make the changes noted below with effect from September 2019:
- Change in assessment strategy of IDE1, from a formative assessment to summative assessment;

- Changes to the wording of the programme level intended learning outcomes, to align with terminology used commonly throughout the IDE programme and industry;
- Combine units Solo Project part 1 & 2 and Solo Project part 3 & 4 into a single Unit of study. This enables formative assessment and negates the need to summatively assess the Solo Project at the end of Phase 2;
- Increase ECTS units for IDE1 Superform, from 0 to 5 ECTS;
- Reduce ECTS units for IDE1 Critical Historical Studies (CHS), from 20 to 15 ECTS.

The Programmes Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee for approval with immediate effect with the following recommendation:

- The programme team should note the College's annual modifications deadlines which falls on the 31st March- major modifications and 31st July- minor modifications.

6.3   MSc Chemical Engineering

The Programmes Committee considered a retrospective proposal from the Department of Chemical Engineering to replace the examination element of the Advanced Process Design module with 100% coursework.

The Programmes Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee for approval with immediate effect with the following recommendation:

- The programme team should note the College's annual modifications deadlines which falls on the 31st March- major modifications and 31st July- minor modifications.

6.4   MRes Molecular Science and Engineering

The Programmes Committee considered a retrospective proposal from the Department of Chemical Engineering – Institute of Molecular Science and Engineering to make the following changes to the modules below with effect from October 2019:

- Fundamentals of Molecular Engineering:
  - Addition of:
    Process Modelling problem class;
    Introduction to Optimisation lecture;
    Optimisation problem class;
  - Removal of:
    Prototype Design lecture (moved to Manufacturing Module);
    Introduction to Multicriteria Decision Making class (content moved to Design Module);
  - Change to the content of coursework to include Optimisation instead of Multicriteria Decision Making;
  - As a result of above, contact hours should be changed from 14.5 to 16 hours.

- Underpinning Molecular Science:
  - Addition of Introduction to Programming combined lecture/workshop;
  - 4 instead of 3 homework reports to be set (addition of separate question on Molecular Structure & Characterisation);
  - Contact hours should be increased from 11 to 14 hours.

- Design of Molecular Systems:
  - Addition of Design of Molecular Systems workshop and problem class.
  - Addition of Multicriterial Decision Making content (moved from Fundamentals of Molecular Engineering Module).
  - Contact hours should be increased from 10 to 15 hours

- Manufacturing Processes:
  - o Addition of three short lab sessions.
  - o Contact hours should be increased from 17 to 23 hours.
  - o Assessment weightings to be changed to: 70% for the project report and 30% for a combined report on the three short lab sessions.

- Multiscale Modelling – Understanding, Visualising and Predicting:
  - o Increase in length of time of Statistical Thermodynamics problem class.

The Programmes Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee for approval with immediate effect with the following recommendation:

- The programme team should note the College's annual modifications deadlines which falls on the 31st March- major modifications and 31st July- minor modifications.

Faculty of Natural Sciences

6.5   Undergraduate Physics
MSci Physics
MSci Physics with Theoretical Physics

The Programmes Committee considered a retrospective proposal from the Department of Physics to make changes to the progression rules noted below with effect from October 2019:

- To allow students enrolled on to the MSci Physics and the MSci Physics with Theoretical Physics (pre-Curriculum Review) to choose a non-physics Level 7 elective module within their elective choices made over the duration of their degree;

- To allow students to transfer down from MSci Physics with Theoretical Physics to BSc Physics with Theoretical Physics at the end of Year 2 if students have not met the progression requirements.

The Programmes Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee with immediate effect with the following recommendation:

- The programme team should note the College's annual modifications deadlines which falls on the 31st March- major modifications and 31st July- minor modifications.

7   Suspensions and Withdrawals of Existing Programmes

7.1   BSc Mathematics, Optimisation and Statistics

The Programmes Committee considered a proposal from the Department of Mathematics to withdraw the above programme with effect from October 2021

The Programmes Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee with effect from October 2021.

7.2   Undergraduate Life Sciences
BSc Biochemistry with Management and a Year in Industry/Research (4yr)
BSc Biochemistry with Management and a Year in Industry/Research (5yr)
BSc Biotechnology with Management with a Year in Industry/Research (5yr)
BSc Biological Sciences with Management and a Year in Industry/Research (4yr)
BSc Biological Sciences with Management and a Year in Industry/Research (5yr)

The Programmes Committee considered a proposal from the Department of Life Science to withdraw the above programme with effect from October 2020

The Programmes Committee agreed to recommend the proposal to the Quality Assurance and Enhancement Committee with effect from October 2020.

8   Dates of Future Meetings
Tuesday 18 February 2020, 10:00 - 13:00, Room 504, 5th Floor Sherfield Building.
Tuesday 31 March 2020, 10:00 - 13:00, Room 504, 5th Floor Sherfield Building.
Tuesday 12 May 2020, 10:00 - 13:00, Room 504, 5th Floor Sherfield Building.
Tuesday 14 July 2020, 10:00 - 13:00, Room 504, 5th Floor Sherfield Building.