

# CAMBRIDGE UNIVERSITY REPORTER

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UNIVERSITY OF  
CAMBRIDGE

## NOTICES

## Calendar

19 December, *Saturday*. Michaelmas Term ends.

25 December, *Friday*. Christmas Day. Scarlet Day.

5 January, *Tuesday*. Lent Term begins.

13 January, *Wednesday*. First ordinary issue of the *Reporter* in the Lent Term.

19 January, *Tuesday*. Full Term begins.

26 January, *Tuesday*. Discussion via videoconference at 2 p.m. (see below).

**Discussions (Tuesdays at 2 p.m.)**

26 January

9 February

23 February

9 March

23 March

**Congregations (Saturdays unless otherwise stated)**

30 January, 2 p.m. (currently expected to be for degrees in absence only)

27 February, 2 p.m. (currently expected to be for degrees in absence only)

26 March (Friday), 11 a.m.

27 March, 11 a.m.

9 April (Friday), 11 a.m.

10 April, 11 a.m.

**Discussion on Tuesday, 26 January 2021**

The Vice-Chancellor invites those qualified under the regulations for Discussions (*Statutes and Ordinances*, November 2020, p. 105) to a Discussion via videoconference on Tuesday, 26 January 2021 at 2 p.m., for the discussion of:

1. Report of the General Board, dated 4 December 2020, on the introduction of a Master of Architecture degree in the Faculty of Architecture and History of Art (p. 244).

Those wishing to join the Discussion by videoconference should email [UniversityDraftsman@admin.cam.ac.uk](mailto:UniversityDraftsman@admin.cam.ac.uk) from their University email account and providing their CRSid (if a member of the collegiate University) by 10 a.m. on the date of the Discussion to receive joining instructions. Alternatively, contributors may email remarks to [contact@proctors.cam.ac.uk](mailto:contact@proctors.cam.ac.uk), copying [ReporterEditor@admin.cam.ac.uk](mailto:ReporterEditor@admin.cam.ac.uk), by no later than 10 a.m. on the day of the Discussion, for reading out by the Proctors,<sup>1</sup> or ask someone else who is attending to read the remarks on their behalf.

<sup>1</sup> Any comments sent by email should please begin with the name and title of the contributor as they wish it to be read out and include at the start a note of any College or Departmental affiliations they have.

**Election to the Nominating Committee for External Members of the Council**

4 December 2020

The Vice-Chancellor announces that he has received the following nomination for election to the Nominating Committee for External Members of the Council (*Statutes and Ordinances*, November 2020, p. 112), and that it has been certified to him that the candidate has consented to be nominated.

**Class (d): members of the Senate elected by the Regent House**

*Candidate*

*Nominated by*

Dr RICHARD ANTHONY, *JE*

Mr J. Grower, *JE*, and Mr N. J. Ray, *JE*

No other candidates having been nominated, the Vice-Chancellor declares that Dr Anthony is elected to the Nominating Committee with immediate effect until 30 September 2023. A further election will be announced to fill the remaining vacancy in this class.

**VACANCIES, APPOINTMENTS, ETC.****Vacancies in the University**

A full list of current vacancies can be found at <http://www.jobs.cam.ac.uk>

**University Lecturer (Honorary Clinical Consultant) in Clinical Informatics in the Department of Psychiatry;** salary: £82,096–£110,683; closing date: 3 January 2021; further details: <http://www.jobs.cam.ac.uk/job/27890/>; quote reference: RN24944

**University Lecturer, Mark Foundation Institute for Integrated Cancer Medicine (MFICM), in the Department of Oncology;** salary: £41,526–£52,559; closing date: 20 December 2020; further details: <http://www.jobs.cam.ac.uk/job/27933/>; quote reference: RD24985

**NIHR Clinical Lecturer in General Surgery in the Department of Surgery;** tenure: four years or until CCT is obtained, to start no later than 30 June 2021; salary: £34,466–£60,960 or £33,885–£58,672 or £38,694–£52,036; closing date: 10 January 2021; further details: <http://www.jobs.cam.ac.uk/job/25262/>; quote reference: RE22540

*The University values diversity and is committed to equality of opportunity.*

*The University has a responsibility to ensure that all employees are eligible to live and work in the UK.*

**NOTICES BY FACULTY BOARDS, ETC.****Asian and Middle Eastern Studies Tripos, Parts IB and II, 2020–21**

The Faculty Board of Asian and Middle Eastern Studies gives notice that, with effect from the examinations to be held in 2021, and further to its Notices of 28 October and 4 November 2020 (*Reporter*, 2020–21; 6593, p. 88 and 6594, p. 110), the form of examination for the following papers of Parts IB and II of the Asian and Middle Eastern Studies Tripos will be as specified below:

## PART IB

**East Asian Studies***C.6 Literary Chinese 2*

This paper contains three sections, all of which must be attempted. Section 1 contains one or more passages from seen texts in literary Chinese for translation into English. Candidates may be asked to comment on the texts in question. Section 2 contains unseen texts for translation into English. Section 3 is a comprehensive reading exercise. Candidates are asked to answer questions, in English, on one or more unseen texts.

*J.7 Literary Japanese*

This paper is assessed by two coursework assignments, to be handed in on the first Tuesday of Lent and Easter Terms respectively, and a *viva voce* examination to be conducted online at the end of Easter Term. Each coursework assignment will consist of translating unseen pre-modern texts, contextualising them within their cultural context, and delineating the translation strategies. The length of the contextualisation should be around 1,000 words. The first assignment also involves the analysis of selected grammar patterns. For the first assignment, the text(s) will be announced on the first day (Thursday) of the sixth week of Michaelmas Term. For the second assignment the text(s) will be announced on the first day (Thursday) of the sixth week of Lent Term. In the *viva* students will be asked to translate and discuss the classical grammar of one or multiple seen texts as well as to work on an unseen text. The unseen text will be accessible on Moodle one hour before the *viva* time. The coursework assignments will together constitute 60% of the final grade and the *viva* will constitute 40%.

## PART II

**East Asian Studies***C.13 Literary Chinese 3*

This paper will contain three sections, all of which must be attempted. Section 1 will contain one or more passages from seen texts in literary Chinese for translation into English. Candidates may be asked to comment on the texts in question. Section 2 will contain unseen texts for translation into English. Section 3 is a comprehensive reading exercise. Candidates will be asked to answer questions, in English, on one or more unseen texts.

*C.15 The Chinese tradition*

This paper will consist of twelve questions of which candidates will be required to answer three.

*C.17 Modern Chinese literature*

This paper will consist of two passages in Chinese for translation and comment, and six essay questions, of which two must be attempted.

*C.20 Contemporary Chinese society*

This paper is divided into four parts, all of which must be attempted. Part 1 and Part 2 (each carrying 15 marks) will each consist of a Chinese-language passage. Candidates will be asked to summarise the passage briefly and answer a commentary question, both in English. Part 3 and Part 4 (each carrying 35 marks) will each consist of five essay questions, of which one question must be answered.

**Classical Tripos, 2020–21**

The Faculty Board of Classics gives notice that the form and conduct of papers for examination in 2020–21 for the Classical Tripos will be as specified below.

## PART IA

*Paper 5 – Classical Questions (also serves as Paper GL5 of Part IA of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into two sections. Section A will contain no fewer than eight questions, Section B will contain no fewer than sixteen questions. Candidates will be required to answer three questions: one from Section A, one from Section B, and one from either section. Candidates for the Modern and Medieval Languages Tripos must answer three questions, at least one from Section A. All questions carry equal marks.

*Paper 6 – Translation into Greek Prose and Verse (also serves as Paper GL6 of Part IA of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into three sections. Candidates will attempt one section only. Candidates for Paper 1 may attempt Section A or C. Candidates for Paper 2 may attempt any Section. Section A will contain no fewer than four passages, of which candidates will be required to answer one. Section B will contain one passage. Section C will contain four passages, of which candidates will be required to answer two, of which at least one should be verse.

*Paper 7 – Translation into Latin Prose and Verse (also serves as Paper GL7 of Part IA of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into three sections. Candidates will attempt one section only. Candidates for Paper 3 may attempt Section A or C. Candidates for Paper 4 may attempt any Section. Section A will contain no fewer than four passages, of which candidates will be required to answer one. Section B will contain one passage. Section C will contain four passages, of which candidates will be required to answer two, of which at least one should be verse.

## PART IB

*Paper 5 – Greek Literature (also serves as Paper 9A of Part I of the English Tripos and Paper GL15 of Part IA of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into four sections. Sections A and B are intended for candidates for Paper 1, while Sections C and D are intended for candidates for Paper 2. Candidates are required to answer one question from Section A or C (as appropriate) and two questions from Section B or D (as appropriate).

*Paper 6 – Latin Literature (also serves as Paper 9B of Part I of the English Tripos and Paper GL16 of Part IA of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into four sections. Sections A and B are intended for candidates for Paper 3, while Sections C and D are intended for candidates for Paper 4. Candidates are required to answer one question from Section A or C (as appropriate) and two questions from Section B or D (as appropriate).

*Paper 7 – Ancient History (also serves as Paper GL17 of Part IA of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than ten questions. Candidates are required to answer Question 1. The remaining questions are divided into three sections of no fewer than three questions. Candidates will be required to answer two further questions, each taken from a different section.

*Paper 8 – Greek and Roman Philosophy (also serves as Paper GL18 of the Modern and Medieval Languages Tripos and as Paper 4 of Part IB of the Philosophy Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into two sections. Section A will contain in the region of seven questions on the set book, Section B will contain sufficient questions to make a total of around twenty questions for the whole paper. Candidates will be required to answer three questions, of which at least one, and not more than two, must be from Section A.

*Paper 9 – Classical Art and Archaeology (also serves as Paper A37 of Part IIA of the Archaeology Tripos and Paper GL19 of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. Candidates are required to answer three questions, including Question 1. Question 1 will contain a choice of five pairs of images for comment, one pair corresponding to each of the topics taught in the year (including ET21); candidates must answer on three images, no more than one image per pair. There will also be two essay questions corresponding to each of the topics taught in the year (including ET21). All questions carry equal weight.

*Paper 10 – Classical and Comparative Philology and Linguistics (also serves as Paper GL20 of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into four sections. Each section will contain no fewer than four questions. Candidates are required to answer three questions, each from a different section.

*Paper 11 – Translation into Greek Prose and Verse (also serves as Paper GL21 of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into three sections. Candidates will attempt one section only. Candidates for Paper 1 may attempt Section A or C. Candidates for Paper 2 may attempt any Section. Section A will contain no fewer than five passages, of which candidates will be required to answer one. Section B will contain one passage. Section C will contain five passages, of which candidates will be required to answer two, of which at least one should be verse.

*Paper 12 – Translation into Latin Prose and Verse (also serves as Paper GL22 of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into three sections. Candidates will attempt one section only. Candidates for Paper 3 may attempt Section A or C. Candidates for Paper 4 may attempt any Section. Section A will contain no fewer than five passages, of which candidates will be required to answer one. Section B will contain one passage. Section C will contain five passages, of which candidates will be required to answer two, of which at least one should be verse. There will be no back translation.

## PART II

*Paper A1 – Homer, Odyssey, and Vergil, Aeneid (also serves as Paper 31 of Part II of the English Tripos and Paper 135 of Part II of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into two sections. Section A will contain no fewer than three questions, Section B will contain no fewer than five questions. Candidates will be required to answer three questions, with at least one question answered being from each section. There will be no translation question.

*Paper A2 – Women and Greek Literature (also serves as Paper 32 of Part II of the English Tripos and Paper 136 of Part II of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into two sections. Both sections (A and B) contain essay questions, the difference being that Section A also has passages to be discussed in connection with the essay question. Candidates answer three questions, at least one from Section A and at least one from Section B. There are six questions in each section.

*Paper A3 – Horace Odes 1–4 (also serves as Paper 33 of Part II of the English Tripos and Paper 137 of Part II of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will be divided into two sections. Both sections (A and B) contain essay questions, the difference being that Section A also has passages to be discussed in connection with the essay question. Candidates answer three questions, at least one from Section A and at least one from Section B. There are six questions in each section.

*Paper B1 – Plato (also serves as Paper 138 of Part II of the Modern and Medieval Languages Tripos and Paper 14 of Part II of the Philosophy Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than twelve questions. The paper will be divided into two sections. Section A will contain questions about the set book. Section B will contain other questions. Candidates will be required to answer three questions, with at least one question answered being from each section.

*Paper B2 – Aristotle's World from Turtles to Tragedies (also serves as Paper 139 of the Modern and Medieval Languages Tripos and Paper 15 of Part II of the Philosophy Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than twelve questions and no more than fifteen questions. Candidates will be required to answer any three questions.

*Paper B3 – 'Philosophy, Politics, and the Polis' (also serves as Paper 16 of Part II of the Philosophy Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than twelve questions. Candidates will be required to answer any three questions.

*Paper C1 – Thucydides*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than twelve questions. Candidates will be required to answer any three questions.

*Paper C2 – Roman Religion: Identity and Empire*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than twelve questions. Candidates will be required to answer Question 1 and any two other questions.

*Paper C3 – Slavery in the Greek and Roman Worlds (also serves as Paper 9 of Part II of the History Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than twelve questions. Candidates will be required to answer any three questions.

*Paper C4 – The Transformation of the Roman World, AD 284–476*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of around fifteen questions. Candidates will be required to answer any three questions.

*Paper D1 – Aegean Prehistory (also serves as Paper A38 of Part IIB of the Archaeology Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than twelve questions. Candidates will be required to answer any three questions.

*Paper D2 – Beyond Classical Art (also serves as Paper A39 of Part IIB of the Archaeology Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than twelve questions. Candidates will be required to answer any three questions.

*Paper D4 – Empire’s Legacy: the transformations of Roman Italy, 350 BC to AD 300 (also serves as Paper A41 of Part IIB of the Archaeology Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than twelve questions. Candidates will be required to answer any three questions.

*Paper E1 – Elements of Comparative Linguistics (also serves as Paper 28 of the Linguistics Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. Candidates will be required to answer any three questions. There will be no fewer than eight questions.

*Paper E2 – Greek in the Bronze Age (also serves as Paper 29 of the Linguistics Tripos and Paper 142 of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. Candidates will be required to answer Question 1 and any two other questions. There will be no fewer than eight questions.

*Paper E3 – Latin as She is Spoke (also serves as Paper 30 of the Linguistics Tripos and Paper 143 of the Modern and Medieval Languages Tripos)*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. Candidates will be required to answer Question 1 and any two other questions. There will be no fewer than eight questions.

*Paper X1 – Rome – The Very Idea*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than sixteen questions. Candidates will be required to answer any three questions.

*Paper X2 – Nature and its Discontents in the Ancient World*

The paper will be examined through a 6-hour open book written paper with a 2,000-word limit per question. The paper will consist of no fewer than sixteen questions. Candidates will be required to answer any three questions.

## Engineering Tripos, Parts IIA and IIB, 2020–21: Modules

### PART IIA: MODULES

The Faculty Board of Engineering gives notice that the modules prescribed for examination in 2021, and the mode of examination for each module, will be as listed below. Candidates must offer ten modules for examination. Candidates may offer only one module from any one of the sets. Students must take at least one, but not more than two, modules from Group E ‘Management and Manufacturing’. Candidates are advised to take note of the conditions of exemption which are set by the professional engineering institutions that accredit the course: <http://teaching.eng.cam.ac.uk/content/accreditation-meng#coe>

Unit	Title	Set	Mode	Notes
<i>Group A: Energy, fluid mechanics and turbomachinery</i>				
3A1	Fluid mechanics I	IIM8&L7	Examination	Double module
3A3	Fluid mechanics II	IIM1&L1	Examination	Double module
3A5	Thermodynamics and power generation	IIM7	Examination	
3A6	Heat and mass transfer	IIAL3	Examination	
<i>Group B: Electrical engineering</i>				
3B1	Radio frequency electronics	IIM3	Examination	
3B2	Integrated digital electronics	IIAL3	Examination	
3B3	Switch-mode electronics	IIM2	Examination	
3B4	Electric drive systems	IIAL2	Examination	
3B5	Semiconductor engineering	IIM8	Examination	
3B6	Photonic technology	IIAL7	Examination	
<i>Group C: Mechanics, materials and design</i>				
3C1/3P1	Materials processing and design (engineering)	IIM5	Examination	Offered by MET as 3P1
3C5	Dynamics	IIM6	Examination	
3C6	Vibration	IIAL6	Examination	3C5 useful
3C7	Mechanics of solids	IIM4	Examination	
3C8	Machine design	IIM3	Examination	
3C9	Fracture mechanics of materials and structures	IIAL5	Examination	3C7 assumed

Unit	Title	Set	Mode	Notes
<i>Group D: Civil, structural and environmental engineering</i>				
3D1	Geotechnical engineering I	IIAM1	Examination	
3D2	Geotechnical engineering II	IIAL1	Examination	3D1 assumed
3D3	Structural materials and design	IIAM2	Examination	
3D4	Structural analysis and stability	IIAL2	Examination	
3D5	Water engineering	IIAM10	Examination	
3D7	Finite element methods	IIAL4	Examination	
3D8	Environmental geotechnics	IIAL7	Examination	
<i>Group E: Management and manufacturing</i>				
3E1	Business economics	IIAL8	Examination	
3E2	Marketing	IIAM9	Examination	
3E3	Modelling risk	IIAL8	Examination	
3E6	Organisational behaviour	IIAM9	Examination	
3E10	Operations management for engineers	IIAL8	Examination	
3E11	Environmental sustainability and business	IIAM9	Examination	
<i>Group F: Information engineering</i>				
3F1	Signals and systems	IIAM4	Examination	
3F2	Systems and control	IIAL5	Examination	
3F3	Statistical signal processing	IIAM1	Examination	3F1 assumed
3F4	Data transmission	IIAL6	Examination	3F1 assumed
3F7	Information theory and coding	IIAM5	Examination	
3F8	Inference	IIAL4	Examination	3F3 assumed
<i>Group G: Bioengineering</i>				
3G1	Molecular bioengineering I	IIAM7	Examination	
3G2	Mathematical physiology	IIAL3	Examination	
3G3	Introduction to neuroscience	IIAL2	Examination	
3G4	Medical imaging and 3D computer graphics	IIAL1	Examination	
3G5	Biomaterials	IIAM8	Examination	
<i>Group M: Multidisciplinary modules</i>				
3M1	Mathematical methods	IIAL10	Examination	
<i>Group S: Modules shared with Part IIB</i>				
4C4	Design methods	IIAM7	Examination	Shared module
4M12	Partial differential equations and variational methods	IIAL9	Examination	Shared module
4M16	Nuclear power engineering	IIAL9	Examination	Shared module

#### PART IIB: MODULES AND SETS

The Faculty Board of Engineering gives notice that the modules and sets prescribed for the examinations to be held in 2021, and the mode of examination for each module, will be as listed below. The set list is published on the Department's website at <http://teaching.eng.cam.ac.uk/content/part-iib-modules-sets-2020-21>.

Candidates must offer eight modules for examination. Candidates may normally offer only one module from any set and not more than three from the following: 4E modules; 4I1; 4M1–3; 4M23 and 4D16 (when running). No candidate who offered any module for Part IIA may again offer the same module for Part IIB.

There will be no Group R (research) modules available to Part IIB candidates in 2020–21.

Please note that as the Faculty Board does not have exclusive control over imported modules it cannot guarantee that they will not clash with any other set.

Pre-requisites are listed below for new/revised modules only. For pre-existing modules the individual syllabus pages are the definitive source of information about pre-requisites. A summary is also given on the syllabus index page.

Candidates are advised to take note of the conditions of exemption which are set by the professional engineering institutions that accredit the course: <http://teaching.eng.cam.ac.uk/content/accreditation-meng#coe>.

**Notes:**

c = coursework only

p = examination only

p+c = examination and coursework

Set	Unit	Name	Mode	Notes
<i>Group A: Energy, fluid mechanics and turbomachinery</i>				
IIBM1	4A2	Computational fluid dynamics	c	Pre-requisites: 3A1 and 3A3 assumed.
IIBM4	4A3	Turbomachinery I	p+c	Pre-requisites: 3A1 and 3A3 assumed.
IIBM6	4A4	Aircraft stability and control	c	
IIBM8	4A7	Aircraft aerodynamics and design	c	Pre-requisites: 3A1 and 3A3 assumed.
IIBM7	4A9	Molecular thermodynamics	p	Pre-requisites: 3A1 and 3A5 useful.
IIBM11	4A12	Turbulence and vortex dynamics	p	Pre-requisites: 3A1 assumed; 3A3 useful.
IIBL5	4A13	Combustion and engines	p	
IIBL11	4A15	Aeroacoustics	p	Pre-requisites: 3A1 useful.
<i>Group B: Electrical engineering</i>				
IIBM6	4B2	Power microelectronics	p	Pre-requisites: 3B3 and 3B5 useful.
IIBM11	4B5	Quantum and nano-technologies	p	Pre-requisite: 3B5 assumed.
IIBM5	4B11	Photonic systems	p	Pre-requisite: 3B6 useful.
IIBL1	4B13	Electronic sensors and instrumentation	p	Pre-requisite: 3B1 assumed.
IIBM2	4B19	Renewable electrical power	p	Pre-requisites: 3B3, 3B4, 3B6 assumed.
IIBL2	4B23	Optical fibre communication	p+c	Pre-requisites: 3B6 and 3F4 useful.
IIBL4	4B24	Radio frequency systems	p+c	Pre-requisite: 3B1 assumed.
IIBM7	4B25	Embedded systems for the internet of things	c	Pre-requisite: 3B2 useful.
<i>Group C: Mechanics, materials and design</i>				
IIBM3	4C2	Designing with composites	p+c	
IIBM8	4C3	Advanced functional materials and devices	p	Pre-requisite: 3B5 useful.
IIBM2	4C4	Design methods	p	Shared with IIA.
IIBL4	4C5	Design case studies	c	Pre-requisites: 4C4 useful.
IIBM4	4C6	Advanced linear vibrations	p+c	Pre-requisite: 3C6 assumed.
IIBM5	4C7	Random and non-linear vibrations	p+c	Pre-requisite: 3C6 useful.
IIBL8	4C8	Vehicle dynamics	p+c	Pre-requisite: 3C5 and 3C6 useful.
IIBL7	4C9	Continuum mechanics	p	Pre-requisite: 3C7 assumed, 3D7 useful.
IIBL3	4C15	MEMS: Design	p+c	
<i>Group D: Civil, structural and environmental engineering</i>				
IIBL11	4D4	Construction engineering	c	Pre-requisites: 3D1, 3D2, and 4D16 useful.
IIBM8	4D5	Foundation engineering	p	Pre-requisite: 3D2 assumed.
IIBL2	4D6	Dynamics in civil engineering	p+c	Pre-requisites: 3D2, 3D4, and 3D7 useful.
IIBM4	4D7	Concrete and prestressed concrete	p+c	Pre-requisites: 2P8 and 3D3 assumed.
IIBL5	4D9	Offshore geotechnical engineering	p	Prerequisites: 3D2 assumed.
IIBM3	4D10	Structural steelwork	p+c	Prerequisites: 3D4 assumed, 3D3 useful.
IIBM12	4D13	Architectural engineering	c	Prerequisites: 3D3, 3D4 and 3D8 useful.
IIBM7	4D14	Contaminated land and waste containment	p+c	Pre-requisite: 3D8 useful.
IIBL6	4D15	Management of resilient water systems	c	
<i>Group E: Management and manufacturing</i>				
IIBM9	4E1	Innovation and strategic management of intellectual property	c	
IIBM9	4E3	Business innovation in a digital age	c	
IIBM9	4E4	Management of technology	c	
IIBM9	4E6	Accounting and finance	c	
IIBL12	4E11	Strategic management	c	
IIBL9	4E12	Project management	c	Part IIB Engineering students only



Set	Unit	Name	Mode	Notes
<i>Group F: Information engineering</i>				
IIBM5	4F1	Control system design	p+c	Pre-requisites: 3F1 and 3F2 useful.
IIBL7	4F2	Robust and nonlinear control	c	Pre-requisites: 3F2 assumed.
IIBL11	4F3	An optimisation based approach to control	p	Pre-requisites: 3F1 and 3F2 useful.
IIBL6	4F5	Advanced information theory and coding	p	Pre-requisites: 3F7 assumed. 3F1 and 3F4 useful.
IIBM4	4F7	Statistical signal analysis	p	Pre-requisites: 3F3 assumed. 3F1 and 3F8 useful.
IIBL3	4F8	Image processing and image coding	p	Pre-requisites: 3F1 assumed. 3F3 and 3F7 useful.
IIBM6	4F10	Deep learning and structured data	p	Pre-requisites: 3F1, 3F3 and 3F8 useful.
IIBM2	4F12	Computer vision	p	
IIBM1	4F13	Probabilistic machine learning	c	Pre-requisites: 3F3 useful.
IIBL5	4F14	Computer systems	p+c	Pre-requisites: Part I Digital circuits and computing.
<i>Group G: Bioengineering</i>				
IIBL4	4G3	Computational neuroscience	c	Pre-requisites: 3G2, 3G3 useful
IIBL2	4G4	Biomimetics	c	
IIBM6	4G5	Materials and molecules: Modelling, simulation and machine learning	c	
<i>Group I: Imported modules</i>				
IIBCV	4I1	Strategic valuation (TPE25)	c	Christmas vacation module; cap: 14; borrowed from M.Phil. in Technology Policy
IIBL8	4I8	Medical physics	p	Borrowed from Physics; pre-requisite: 3G4 useful.
IIBM5	4I10	Nuclear reactor engineering	p	Borrowed from M.Phil. in Nuclear Energy; pre-requisite: 4M16 assumed.
IIBL8	4I11	Advanced fission and fusion systems	c	Borrowed from M.Phil. in Nuclear Energy; pre-requisite: 4M16 assumed.
IIBL6	4I14	Biosensors and bioelectronics	c	Borrowed from Chemical Engineering and Biotechnology; pre-requisite: 3G3 useful.
IIBL8	4I15	Mobile robot systems	c	Borrowed from Computer Laboratory
<i>Group M: Multidisciplinary modules</i>				
IIBL10	4M1	French	c	
IIBL10	4M2	German	c	
IIBM10	4M3	Spanish	c	
IIBL1	4M12	Partial differential equations and variational methods	p	Shared with Part IIa
IIBL1	4M16	Nuclear power engineering	p	Shared with Part IIa
IIBM11	4M17	Practical optimisation	c	Pre-requisite: 3M1 assumed.
IIBM12	4M20	Robotics	c	Pre-requisites: 3C5, 3C8, 3F2 and 3F3 useful
IIBL7	4M21	Software engineering and design	p	
IIBM11	4M22	Climate change mitigation	c	
IIBL6	4M23	Electricity and environment (TPE22)	c	
IIBM2	4M24	Computational statistics and machine learning	p+c	Pre-requisites: 3F3, 3F8 and 3M1 assumed.

## History and Modern Languages Tripos and Modern and Medieval Languages Tripos, 2020–21

The Faculty Board of Modern and Medieval Languages and Linguistics gives notice that with effect from the examination to be held in 2020–21 the form of the examination for Paper PG4 in Part II of the History and Modern Languages Tripos and the Modern and Medieval Languages Tripos will be as specified below. The Faculty Board is satisfied that no student's preparation for the examination will be adversely affected by these changes.

### PART II

#### SCHEDULE B

#### Portuguese

##### PG4 – *Self, Family, Nation and Empire in Lusophone Culture*

Candidates will be asked to answer three questions from different sections. Essays should refer to at least two works in any one answer. The four topics will change from Religion, Dictatorship, The Political Family, Identity, Self and Other to *Imperial Imaginaries, New National Foundations, Culture and Underdevelopment, and From Dictatorship to Democracy*.

## Advanced Chemical Engineering for the M.Phil. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Advanced Chemical Engineering for the degree of Master of Philosophy (*Statutes and Ordinances*, November 2020, p. 520) in the academic year 2020–21 and the form of examination of each module will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

#### Mandatory modules

DA	Data analysis	Coursework
NM	Numerical methods in chemical engineering	Coursework

#### Elective modules (candidates must take six)

B1	Advanced transport processes	Examination
B2	Electrochemical engineering	Examination
B3	Pharmaceutical engineering	Examination
B4	Rheology and processing	Examination
B5	Computational fluid dynamics	Coursework
B6	Fluid mechanics and the environment	Examination
C1	Optical microscopy	Examination
C2	Optimisation	Examination
C3	Healthcare biotechnology	Examination
C6	Biosensors and bioelectronics	Coursework
C7	Bionanotechnology	Examination
C8	Biophysics (techniques)	Examination
4D14	Contaminated land and waste management	Coursework and Examination
4D15	Sustainable water engineering	Coursework
4E1	Innovation and strategic management of intellectual property	Coursework
4E3	Business innovation in a digital age	Coursework
4E4	Management of technology	Coursework
4E11	Strategic management	Coursework
4G4	Biomimetics	Coursework
4G5	Materials and molecules: modelling, simulation and machine learning	Coursework
4M16	Nuclear power engineering	Examination
4M22	Climate change mitigation	Coursework
4M23	Electricity and environment	Coursework

#### Research requirements

Each candidate must submit a dissertation of up to 10,000 words on a subject approved by the Degree Committee.

## Bioscience Enterprise for the M.Phil. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Bioscience Enterprise for the degree of Master of Philosophy (*Statutes and Ordinances*, November 2020, p. 525) in the academic year 2020–21 and the form of examination of each module will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Science and Technology (ST) modules

ST1	Biopharmaceutical discovery	Coursework
ST2	Biopharmaceutical development	Coursework
ST3	Trends in biotechnology	Coursework
ST4	Diagnostics and devices	Coursework
ST5	Agricultural biotechnology	Coursework

### Business (B) modules

B1	Healthcare economics	Coursework
B2	Law and intellectual property	Coursework
TECHM	Technology and innovation management	Coursework

### Transitional (T) modules

T1	Building a bioscience enterprise	Coursework
T2	Partnerships and alliances	Coursework
T3	Finances and valuation	Coursework

### Joint assessments

Several principal individual assessments cover material from multiple modules, and include written papers on selected topics in science and technology in business (each of 4,000 words maximum) and a business plan submission. These assessments are:

STB1	Science and technology in business, paper I
STB2	Science and technology in business, paper II
T4	Bioscience enterprise in practice

Coursework includes individual and/or group activities, to address one or a selected combination of report, critical appraisal, extended paper, or audio-visual presentation and may include engagement in approved extracurricular activities.

All candidates are required to complete a dissertation of up to 10,000 words (Reference: E1) on a topic approved by the Degree Committee, and will give a presentation on the project work at a symposium (Reference: E2).

## Biotechnology for the M.Phil. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Biotechnology for the degree of Master of Philosophy (*Statutes and Ordinances*, November 2020, p. 526) in the academic year 2020–21 and the form of examination of each module will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Core modules

BPT	Principles of biotechnology (double module)	Coursework
BPC	Biotechnology practical course (double module)	Coursework

### Elective modules (candidates must take six)

C1	Optical microscopy	Examination
C3	Healthcare biotechnology	Coursework
C6	Biosensors and bioelectronics	Coursework
C7	Bionanotechnology	Coursework and examination
BX1	Chemical biology and drug discovery	Coursework
BX2	Biomaterials	Coursework and examination
MAM2	Systems biology	Coursework
4G3	Computational neuroscience	Coursework
4G4	Biomimetics	Coursework
4G5	Materials and molecules: Modelling, simulation and machine learning	Coursework
4E1	Innovation and strategic management of intellectual property	Coursework

4E4	Management of technology	Coursework
4E11	Strategic management	Coursework
4I8	Medical physics	Examination

**Research**

All candidates are required to complete an individual project report of up to 7,000 words (reference: BIRP) and to complete a team project assessed by a report of up to 7,000 words (reference: BGRP).

**Energy Technologies for the M.Phil. Degree, 2020–21**

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Energy Technologies for the degree of Master of Philosophy (*Statutes and Ordinances*, November 2020, p. 533) in the academic year 2020–21, and the form of examination of each module, will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

**Core courses (compulsory)**

ETA1	Energy topics	Coursework
ETA2	Revision of fundamentals	Coursework
ETB1	Clean fossil fuels	Coursework
ETB2	Renewables 1: wind, wave, tidal and hydro	Coursework
ETB3	Renewables 2: solar and biofuels	Coursework
ETB4	Energy systems and efficiency	Coursework

**Electives**

4A2	Computational fluid dynamics	Coursework
4A3	Turbomachinery I	Coursework and examination
4A4	Aircraft stability and control	Coursework
4A7	Aerodynamics	Coursework
4A9	Molecular thermodynamics	Examination
4A12	Turbulence and vortex dynamics	Examination
4A13	Combustion and IC engines	Examination
4A15	Aeroacoustics	Examination
4B19	Renewable electrical power	Examination
4C7	Random and non-linear vibrations	Coursework and examination
4D13	Architectural engineering	Coursework
4E1	Innovation and strategic management of intellectual property	Coursework
4E3	Business innovation in a digital age	Coursework
4E4	Management of technology	Coursework
4E6	Accounting and finance	Coursework
4E11	Strategic management	Coursework
4F2	Robust and non-linear systems and control	Examination
4F3	Optimal and predictive control	Examination
4F12	Computer vision	Examination
4I10	Nuclear reactor engineering	Examination
4I11	Advanced fission and fusion systems	Examination
4M12	Partial differential equations and variational methods	Examination
4M16	Nuclear power engineering	Examination
4M17	Practical optimisation	Coursework
4M20	Robotics	Coursework
4M22	Climate change mitigation	Coursework
4M23	Electricity and environment	Coursework
5R10	Turbulent reacting flows	Coursework
5R18	Environmental fluid mechanics and air pollution	Coursework
ESD450	Policy, legislation and government	Coursework
B2	Electrochemical engineering	Examination

**Research requirements**

Each candidate must submit a dissertation of up to 20,000 words on a subject approved by the Degree Committee.

## Engineering for Sustainable Development for the M.Phil. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Engineering for Sustainable Development for the degree of Master of Philosophy (*Statutes and Ordinances*, November 2020, p. 533) in the academic year 2020–21 and the form of examination of each module will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Core modules (mandatory)

#### *Teaching to take place in Michaelmas Term 2020*

ESD150	Driving change towards sustainability	Coursework
ESD200	Sustainability methods and metrics	Coursework
ESDSE	Stakeholder engagement	Coursework

#### *Teaching to take place in Lent Term 2021*

ESD380	Resilience and hazard mitigation in future cities	Coursework
ESD560	Innovations in sustainable design and manufacturing	Coursework
ESDCCP	Client consultancy project	Coursework

### Elective modules

#### *Teaching to take place in Michaelmas Term 2020*

ESD450	Policy, legislation and government	Coursework
ESD650	International development	Coursework
4B19	Renewable electrical power	Examination <sup>1</sup>
4D13	Architectural engineering	Coursework
4D14	Contaminated land and waste containment	Coursework and examination
4E1	Innovation and strategic management of intellectual property	Coursework
4E3	Business innovation in a digital age	Coursework
4E4*	Management of technology	Coursework
4E6*	Accounting and finance	Coursework
4M22	Climate change mitigation	Coursework
TPE20 <sup>2</sup>	Management of the innovation process	Coursework
TPE23 <sup>2</sup>	Negotiation skills	Coursework
ESD-A2	Sustainable architecture and urban design	Coursework

#### *Teaching to take place in Lent Term 2021*

ESD900	Management of resilient water systems	Coursework
ESD1000	Energy, development and rural livelihood	Coursework
4D4	Construction engineering	Coursework
4E11*	Strategic management	Coursework
4G4	Biomimetics	Coursework
4M23	Electricity and environment	Coursework
5R18	Environmental fluid mechanics	Coursework
ETB2	Renewable energy: wind, wave, tidal and hydro	Coursework
ETB3 <sup>3</sup>	Renewable energy: solar and biomass	Coursework
ETB4	Energy systems and efficiency	Coursework
TP4 <sup>2</sup>	Business, government and technology in emerging markets	Coursework

### Research requirements

All candidates are required to submit a dissertation of up to 15,000 words on a topic approved by the Degree Committee.

<sup>1</sup> All written examinations are of one and a half hours' duration unless otherwise specified.

<sup>2</sup> Limited places available for ESD students or a cap will be placed of approx. 5 ESD students per module.

<sup>3</sup> Lectures in both Michaelmas and Lent Terms (classed as a Lent module).

## Industrial Systems, Manufacture and Management for the M.Phil. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Industrial Systems, Manufacture and Management for the degree of Master of Philosophy (*Statutes and Ordinances*, November 2020, p. 539) in the academic year 2020–21, and the form of examination of each module, will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Compulsory modules

ISMM1	Manufacturing processes	Coursework
ISMM2	Operations and supply chain management	Coursework
ISMM3	Data and modelling	Coursework
ISMM4	Marketing and new business development	Coursework
ISMM5	Research methods	

### Elective modules (candidates choose one)

4E1	Innovation and strategic management of intellectual property	Coursework
4E4	Management of technology	Coursework

### Projects (all compulsory)

PR1	Industrial project 1	Coursework
PR2	Industrial project 2	Coursework
PR3	Entrepreneurship project	Coursework
PR4	Industrial project 3	Coursework
PR5	Combined essay	Coursework

### Research requirement

All candidates must submit a dissertation of not more than 15,000 words on a subject approved by the Degree Committee.

## Machine Learning and Machine Intelligence for the M.Phil. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Machine Learning and Machine Intelligence for the degree of Master of Philosophy (*Statutes and Ordinances*, November 2020, p. 541) in the academic year 2020–21 and the form of examination of each module will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Core modules

MLMI1	Introduction to machine learning ( <i>three-quarters</i> )	Coursework and examination
MLMI2	Speech recognition	Coursework
MLMI4	Advanced machine learning	Coursework
MLMI6	Information theoretic ideas in statistical inference ( <i>half</i> )	Coursework
MLMI7	Reinforcement learning and decision making	Coursework
MLMI8	Neural machine translation and dialogue systems	Coursework
MLMI10	Designing intelligent interactive systems ( <i>half</i> )	Coursework
MLMI12	Computer vision ( <i>optional</i> )	Coursework
MLMI13	Natural language processing ( <i>optional</i> )	Coursework
MLMI14	Spoken language processing and generation	Coursework
4F10	Deep learning and structured data	Examination
4F13	Probabilistic machine learning	Coursework

### Elective modules (candidates must take one)

4F1	Control system design	Coursework and examination
4F2	Robust and nonlinear systems and control	Examination
4F3	An optimisation based approach to control	Examination
4F5	Advanced communications and coding	Examination
4F7	Digital filters and spectrum estimation	Examination
4F8	Image processing and image coding	Examination
4F14	Computer systems	Coursework and examination
4G3	Computational neuroscience	Coursework

4M17	Practical optimisation	Coursework
4M20	Robotics	Coursework
4M21	Software engineering and design	Examination
L18	Automated reasoning	Coursework
L48	Machine learning and the physical world	Coursework
L95	Introduction to natural language syntax and parsing	Coursework
R222	Advanced topics in natural language processing	Coursework

Note that not all of the core modules are equally weighted. This is indicated above in the module names.

### Research

All candidates are required to submit a dissertation of up to 15,000 words on a topic approved by the Degree Committee.

## Nuclear Energy for the M.Phil. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Nuclear Energy for the degree of Master of Philosophy (*Statutes and Ordinances*, November 2020, p. 545) in the academic year 2020–21 and the form of examination of each module will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Compulsory core modules

NE1	Reactor physics	Examination
NE2	Reactor engineering and thermal-hydraulics ( <i>double</i> )	Coursework and examination
NE5	Nuclear safety principles and practice ( <i>half</i> )	Coursework and examination
NE6	Nuclear policy	Coursework
NE7	Nuclear practice ( <i>half</i> )	Coursework

### Other core modules (candidates must take at least one)

NE3	Materials for nuclear energy	Examination
NE4	Fuel cycle, waste and decommissioning	Examination
NE8	Computational reactor modelling	Coursework
NE9	Advanced fission and fusion reactor systems	Coursework

### Elective modules

4A2	Computational fluid dynamics	Coursework
4A3	Turbomachinery I	Coursework and examination
4B19	Renewable electrical power	Examination
4C4	Design methods	Examination
4C5	Design case studies	Coursework
4D7	Concrete structures	Coursework and examination
4D10	Structural steelwork	Coursework and examination
4E4	Management of technology	Coursework
4E6	Accounting and finance	Coursework
4E11	Strategic management	Coursework
4F2	Robust and nonlinear systems and control	Examination
4F12	Computer vision	Examination
4I8	Medical physics	Examination
4M15	Sustainable energy	Coursework and examination
4M17	Practical optimisation	Coursework
4M18	Present and future energy systems	Examination
4M22	Climate change mitigation	Coursework
4M23	Electricity and environment	Coursework
ESD560	Innovations in sustainable manufacturing	Coursework
B6	Fluid mechanics and the environment	Examination
TP1	Technology policy	Coursework
TP2	Economic foundations of technology policy	Coursework
TP4	Business, government and technology in emerging markets	Coursework
TP5	Policy design and evaluation	Coursework
TPE20	Management of the innovation process	Coursework
TPE21	Entrepreneurial science and innovation policy	Coursework
TPE23	Negotiation skills	Coursework
TPE24	Competitive strategy in the digital age	Coursework

ESD150	Driving change towards sustainability	Coursework
M3	Extraction and recycling	Examination
M15	Corrosion and protection	Examination
M16	Atomistic materials modelling	Examination
M21	Steels	Examination
PNP	Particle and nuclear physics/comp physics	Examination

Note that some options are half-modules, and one is a double module. This is indicated above in the module names.

### Research

All candidates are required to submit a dissertation of up to 15,000 words on a topic approved by the Degree Committee.

## Connected Electronic and Photonic Systems for the M.Res. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Connected Electronic and Photonic Systems for the degree of Master of Research (*Statutes and Ordinances*, November 2020, p. 556) in the academic year 2020–21, and the form of examination of each module, will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Electronic components and systems

4B13	Electronic sensors and instrumentation	Examination
4B24	Radio frequency systems	Coursework and examination
4B25	Embedded systems for the internet of things	Coursework
UCLRFC	RF circuits and systems	Coursework and examination

### Photonic components and systems

4B11	Photonic systems	Examination
4B23	Optical fibre communication	Coursework and examination
UCLAPD	Advanced photonic devices	Examination
UCLOTN	Optical transmission and networks	Examination
UCLPSS	Photonic sub-systems	Examination

### Business

4E4	Management of technology	Coursework
UCLTBE	Telecommunication business environment	Coursework

### Electives

4B5	Nanotechnology	Coursework and examination
GRM3	Flexible and stretchable electronics	Examination
4F5	Advanced information theory and coding	Examination
4F12	Computer vision	Examination
UCLAML	Applied machine learning	Coursework
UCLBCL	Broadband communications lab	Coursework
UCLBTC	Broadband technologies and components	Examination
UCLEC3	Electronic circuits 3	Coursework
UCLETC	Entrepreneurship theory and practice	Coursework
UCLIOT	Internet of things	Coursework
UCLPON	Physics and optics of nano-structure	Coursework and examination
UCLSNS	Software for network services and design	Coursework

The modules beginning 'UCL' are provided and examined by University College, London.

### Research

All candidates are required to complete two project reports (references: MP1 and MP2).



## Future Infrastructure and Built Environment for the M.Res. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Future Infrastructure and Built Environment for the degree of Master of Research (*Statutes and Ordinances*, November 2020, p. 556) in the academic year 2020–21, and the form of examination of each module, will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Core modules (all compulsory)

CM1	Resilient infrastructure	Coursework
CM2	Technical challenges	Coursework
CM3	Research methods	Coursework
CM4	Transferable skills	Coursework
NMIS	Nurturing and managing innovation in science	Coursework

### Elective modules (two to be chosen in consultation with the Course Director)

4C6	Advanced linear vibrations	Coursework and examination
4C7	Random and non-linear vibrations	Coursework and examination
4C9	Continuum mechanics	Examination
4D4	Construction engineering	Coursework
4D5	Foundation engineering	Coursework and examination
4D6	Dynamics in civil engineering	Coursework and examination
4D7	Concrete structures	Coursework and examination
4D9	Offshore geotechnical engineering	Examination
4D10	Structural steelwork	Coursework and examination
4D13	Architectural engineering	Coursework
4D15	Sustainable water engineering	Coursework
4E6	Accounting and finance	Coursework
4F3	An optimisation based approach to control	Examination
4F7	Digital filters and spectrum estimation	Examination
4F8	Image processing and image coding	Examination
4F10	Deep learning and structured data	Examination
4F12	Computer vision	Examination
4F13	Probabilistic machine learning	Coursework
4G4	Biomimetics	Coursework
4M12	Partial differential equations and variational methods	Examination
4M16	Nuclear power engineering	Examination
4M17	Practical optimisation	Coursework
4M20	Robotics	Coursework
4M22	Climate change mitigation	Coursework
4M23	Electricity and environment	Coursework
4M24	Computational statistics and machine learning	Coursework and Examination
5R5	Advanced experimental methods in geomechanics	Coursework
5R7	Advanced numerical methods in geomechanics	Coursework
5R14	Nonlinear solid mechanics	Coursework
5R19	Earthquake engineering	Coursework
EP10	Climate change policy and land development	Examination
ESD650	International development	Coursework

### Research

All candidates are required to complete a desktop study (DS), a mini-project (MP), a group project (GP), and an M.Res. dissertation of up to 12,000 words on a topic approved by the Degree Committee.

## Future Propulsion and Power for the M.Res. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Future Propulsion and Power for the degree of Master of Research (*Statutes and Ordinances*, November 2020, p. 556) in the academic year 2020–21, and the form of examination of each module, will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Core modules

FPP1	Advanced propulsion and power dynamics	Examination
FPP2	Turbomachinery aerodynamic design process	Coursework
FPP3	Experimental methods	Coursework
FPP4	Researcher skills	Coursework

### Elective modules

4A2	Computational fluid dynamics	Coursework
4A3	Turbomachinery I	Coursework and examination
4A4	Aircraft stability and control	Coursework
4A7	Aerodynamics and design	Coursework
4A9	Molecular thermodynamics	Examination
4A12	Turbulence and vortex dynamics	Examination
4B19	Renewable electrical power	Examination
4E4	Management of technology	Coursework
4E6	Accounting and finance	Coursework
4F1	Control system design	Coursework and examination
4F13	Probabilistic machine learning	Coursework
4M17	Practical optimisation	Coursework
4M23	Electricity and environment	Coursework
4M24	Computational statistics and machine learning	Coursework

### Research

All candidates are required to complete three mini-projects:

MP1	Combustion system aerodynamics
MP2	Compressor performance
MP3	Internal flows and combustor-turbine interaction

All candidates are furthermore required to complete three industry courses:

IC1	Holistic gas turbine design
IC2	Hands-on gas turbine training
IC3	Dyson product design

Finally, all candidates are required to complete a Ph.D. proposal dissertation of up to 12,000 words on a topic approved by the Degree Committee.

## Sensor Technologies and Applications for the M.Res. Degree, 2020–21

The Degree Committee for the Faculty of Engineering gives notice that the modules available to candidates studying the one-year course in Sensor Technologies and Applications for the degree of Master of Research (*Statutes and Ordinances*, November 2020, p. 558) in the academic year 2020–21, and the form of examination of each module, will be as shown below.

The Degree Committee for the Faculty of Engineering may issue amendments to the lists below during the Michaelmas Term 2020, provided that no candidate's preparation for the examination will be affected by the change.

### Core modules (all compulsory)

STA1	Principles of sensing	Coursework
STA2	Guided sensor design project	Coursework
ETech	Introduction to entrepreneurship	Coursework

### Elective modules (three to be chosen in consultation with the Course Director)

BIOPR	Biological physics (principles)	Examination
4B5	Nanotechnology	Coursework and examination
4B11	Photonic systems	Examination
4B13	Electronic sensors and instrumentation	Examination
4B25	Embedded systems for the internet of things	Coursework
4C3	Electrical and nano materials	Examination
4C15	MEMS: Design	Coursework and examination

4E12	Project management	Coursework
4F8	Image processing and image coding	Examination
4F12	Computer vision	Examination
4F13	Probabilistic machine learning	Coursework
4I8	Medical physics	Examination
4I15	Mobile robot systems	Coursework
4M20	Robotics	Coursework
4M22	Climate change migration	Coursework
B5	Optical imaging and microscopy	Examination
C6	Biosensors and bioelectronics	Coursework
C8	Biological physics (techniques)	Examination
GRM3	Flexible and stretchable electronics	Examination
IDP1	Atmospheric chemistry and global change	Examination
MLMI4	Advanced machine learning	Coursework
NT01	Nanotechnology characterisation techniques	Examination
NT08	Bionanotechnology	Examination
R214	Biomedical information processing	Coursework

### Research

All candidates are required to complete an individual mini-project report (reference: MP1) and a ‘Sensor Team Challenge’ project report (reference: GP1).

## REPORTS

### Report of the General Board on the introduction of a Master of Architecture degree in the Faculty of Architecture and History of Art

The General Board begs leave to report to the University as follows:

1. The General Board proposes that a new degree of Master of Architecture, titled the M.Arch., be introduced from October 2022.

2. The proposal has been submitted by the Department of Architecture and has the support of the Faculty Board of the Faculty of Architecture and History of Art, the Council of the School of Arts and Humanities, the Senior Tutors’ Committee and the General Board’s Education Committee.

3. Under the current arrangements, successful completion of the full three-year Architecture Tripos carries exemption from the Architects Registration Board (ARB)/Royal Institute of British Architects (RIBA) Part 1 – the first stage in qualifying as an architect. The Department also offers a Master of Philosophy degree in Architecture and Urban Design (MAUD), which carries exemption from ARB/RIBA Part 2, and an ARB/RIBA Part 3 course (the final qualifying stage). A person who completes all three parts of the ARB/RIBA requirements can register as an architect with the ARB.

The General Board is persuaded that, in order to highlight the particular characteristics of the Part 2 course and to distinguish it from other courses within the University, the different degree title of Master of Architecture is necessary. The new course will replace MAUD, which will be suppressed. It will be equivalent to other Master of Architecture courses across the UK, ensuring that candidates no longer perceive the Department of Architecture as missing a professional qualification course (the current use of the title of M.Phil. is confusing to candidates and funders).

4. The University and the government will consider the M.Arch. an undergraduate course, as is the case with the current MAUD. The new course title will bring it in line with the government’s own description of such courses used on its website <https://www.gov.uk/masters-loan/eligibility>. The course will be charged at an undergraduate

rate. Students admitted to the course will be eligible for student loans and grants from the Student Loans Company in the same way as undergraduate students.

5. The M.Arch. is part of the Faculty of Architecture and History of Art’s strategy to retain the brightest and best students in the Department to study architectural design and to create a similar (though not equivalent) pathway to integrated Master’s courses.

6. An automatic eligibility for the new course for students who achieve an overall mark of 65% or more in the Architecture Tripos will reduce the heavy admissions burden currently experienced on application for admission to MAUD and create a better experience for those students.

7. The Department of Architecture appointed a University Lecturer in Design Research in 2019 who will coordinate all design teaching within the Department and lead on the new M.Arch. course. The Lecturer has worked with the Head of Department on the course proposal in order to ensure the new course maintains the best elements of MAUD whilst improving the overall course design and clarifying the delivery of professional teaching.

8. RIBA and ARB welcome the new course and the clarity it brings to applicants and architectural firms regarding professional qualification to Part 2 level. In its 2019 review, RIBA requested that exploration of management practice and law needed to be demonstrated and further strengthened in MAUD. Papers in management practice and law are therefore incorporated within the design of the new course.

9. The M.Arch. will be a two-year course, recognising that teaching on MAUD has increased to two years, and fieldwork has reduced, without the fees being increased. Students may choose to undertake some fieldwork to inform their research or design during vacations. Students will keep undergraduate terms, which will make it easier for Colleges to support and accommodate students taking the course.

10. The course currently shares lectures on research skills and subject-specific topics with the M.Phil. Degree in Architecture and Urban Studies, which is a simple one-year research degree. This arrangement will continue and no extra teaching or staff are required to make the changes

proposed. The course will require four design fellows, who are part-time teaching staff, to support studio work. These are currently employed by the Department of Architecture, but the increase in fees will help to cover their costs.

11. The General Board recommends:

- I. That the degree of Master of Architecture be established with effect from 1 October 2022, with regulations as set out in Annex I of this Report, and the special regulations for the degree of Master of Philosophy in Architecture and Urban Design (*Statutes and Ordinances*, November 2020, p. 524) be rescinded from the same date.
- II. That, if Recommendation I is approved, consequential amendments be made to Ordinances with effect from 1 October 2022, as set out in Annex II.

4 December 2020	STEPHEN TOOPE, <i>Vice-Chancellor</i>	TIM HARPER	RICHARD REX
	KRISTINE BLACK-HAWKINS	NICHOLAS HOLMES	GRAHAM VIRGO
	ESME CAVENDISH	PATRICK MAXWELL	SIYANG WEI
	ANN COPESTAKE	NIGEL PEAKE	MARK WORMALD
	JOHN DENNIS	ANNA PHILPOTT	

## ANNEX I

### MASTER OF ARCHITECTURE

1. The degree of Master of Architecture (M.Arch.) shall be awarded on completion of a course of advanced study. A candidate for the degree shall pursue in the University a course of study extending over six terms.

2. A candidate for the examination for the degree of Master of Architecture must be approved by the Degree Committee for the Faculty of Architecture and History of Art.

3. The Degree Committee may approve as a candidate for the examination any candidate who has satisfied the Committee that by reason of previous study he or she is qualified to engage in postgraduate study in Architecture.

4. Applications for approval under Regulation 2 shall be sent to the Secretary of the Degree Committee so as to arrive not later than 31 March next preceding the Michaelmas Term in which the candidature is to begin, provided that the Committee shall have power to consider applications submitted after that date.

5. A candidate will be required to attend in all six terms of the year, beginning from the date announced by the Degree Committee for the start of lectures, classes or other formal instruction.

6. No person shall be a candidate for the examination or for any part thereof on more than one occasion.

7. The course of study leading to the degree of Master of Architecture shall enable the candidate to fulfil the requirements for the candidate to achieve a postgraduate professional qualification in Architecture.

8. Not later than 1 June preceding the course of study the Degree Committee will circulate to candidates a list of supervisors and approved subject areas for the dissertation required for examination to be held in the following year.

9. The course shall consist of lectures, seminars, design studio supervisions and presentations relating to the two written papers and supporting the development of the candidate's design portfolio and dissertation.

10. Candidates shall submit to the Degree Committee the proposed subjects of their portfolio and dissertation to the Secretary of the Faculty Board not later than the end of the third quarter of Michaelmas Term of their first year.

11. Each candidate shall obtain the approval of the Degree Committee of the proposed subject portfolio and dissertation not later than the last day of Michaelmas Term.

12. For the purpose of the general regulations for the degree, the Degree Committee concerned with the examination shall be the Degree Committee for the Faculty of Architecture and History of Art.

**13.** The scheme of examination shall consist of:

- (a) a research proposal of no more than 3,000 words;
- (b) a dissertation, on a topic agreed by the assigned supervisor and approved by the Degree Committee for the Faculty of Architecture and History of Art. The dissertation shall be of not more than 20,000 words in length, including footnotes/endnotes but excluding bibliography, acknowledgements, table of contents, list of illustrations and appendices;
- (c) a portfolio of design work on a project related to the topic of the dissertation;
- (d) a written examination consisting of one or more papers on management practice and law relating to architectural practice.

**14.** The examination may include, at the discretion of the Examiners, an oral examination on the dissertation, or on the general field of knowledge within which this falls, or both.

**15.** Each candidate shall present for the inspection of the examiners a portfolio of design work carried out over the duration of the course and attested by satisfactory evidence.

**16.** The mode of examination for each paper, and details regarding the arrangements for the submission of design portfolios, research proposals and dissertations, shall be published by the Degree Committee not later than the division of Michaelmas Term.

**17.** The Degree Committee shall appoint such number of Examiners and Assessors as they may deem sufficient, including a resident member of the Senate as Chair of Examiners.

**18.** The names of the candidates who satisfy the Examiners shall be arranged in alphabetical order in a single class; a mark of distinction shall be affixed to the names of those students whose work is of special merit. The Chair of Examiners shall communicate the marks of all candidates to the Registry.

**19.** While following the course of study leading to the examination for the degree of Master of Architecture, a student shall pay the appropriate University Composition Fee.

**20.** On completing the requisite number of terms and having satisfied the Examiners in the examination, the candidate shall be entitled to proceed to the degree of Master of Architecture.

**21.** A student who has taken the examination shall not be entitled to count any part of the period during which he or she has been a candidate for that examination towards a course of research for the degree of Ph.D., M.Sc., or M.Litt.

## ANNEX II

- (i) By adding 'Master of Architecture' to the list of primary degrees in Section 1 of Special Ordinance B (i) (*Statutes and Ordinances*, November 2020, p. 71).
- (ii) By adding a reference to the degree of Master of Architecture in the following regulations:
  - (a) Ordinance for Residence and Precincts of the University (*Statutes and Ordinances*, November 2020, p. 172), Regulation 8(a).
  - (b) General Regulations for Examiners and Assessors (*Statutes and Ordinances*, November 2020, p. 255), Regulation 9 and paragraph (c) of the Schedule.
  - (c) Ordinance on Payments to Examiners and Assessors (*Statutes and Ordinances*, November 2020, p. 256), Regulation 3(a).
- (iii) By amending the Ordinances for Academical Dress (*Statutes and Ordinances*, November 2020, p. 181) as follows:
  - (a) In the regulations for Black Gowns, by adding before the entry for the M.Math. Degree 'M.Arch.: the M.A. gown but with a circle of cord on the sleeve with a button in the centre'.
  - (b) In the regulations for Hoods, by adding before the entry for the M.Math. Degree 'M.Arch.: the M.Eng. hood but with a part lining of white silk four inches (10 cm) deep;'.
- (iv) By amending the Ordinance for Admission to Degrees (*Statutes and Ordinances*, November 2020, p. 174) as follows:
  - (a) By inserting reference to the Master of Architecture in the Forms of Presentation for Degrees, before the reference to Business Administration.
  - (b) By inserting the following in the Schedule to the Forms of Admission to Degrees, before the reference to the M.Math. Degree:
 

For the M.Arch. Degree	Magistri in Architectura
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- (v) By inserting a reference to the Masters of Architecture in the Order of Seniority of Graduates (*Statutes and Ordinances*, November 2020, p. 180), after the Masters of Philosophy.

## OBITUARIES

### Obituary Notices

RICHARD LUCKETT, M.A., Ph.D., Emeritus Fellow and formerly Pepys Librarian of Magdalene College, sometime Fellow of St Catharine's College, former University Lecturer in the Faculty of English, died on 19 November 2020, aged 75 years.

Professor JUDITH JARVIS THOMSON, of Newnham College, M.A., (Hon.) Litt.D., F.B.A., Professor of Philosophy Emerita and formerly Laurence S. Rockefeller Professor of Philosophy, Massachusetts Institute of Technology, died on 20 November 2020, aged 91 years.

## GRACES

### Graces submitted to the Regent House on 9 December 2020

The Council submits the following Graces to the Regent House. These Graces, unless they are withdrawn or a ballot is requested in accordance with the regulations for Graces of the Regent House (*Statutes and Ordinances*, November 2020, p. 105) will be deemed to have been approved at **4 p.m. on Friday, 18 December 2020**. Further information on requests for a ballot or the amendment of Graces is available to members of the Regent House on the Regent House Petitions site.<sup>§</sup>

1. That Professor SABINE BAHN, *LC*, be appointed one of the Septemviri for two years from 1 January 2021.
2. That Dr MINNA SUNIKKA-BLANK, *CHU*, be appointed one of the Septemviri for two years from 1 January 2021.
3. That Professor BRENDAN BURCHELL, *M*, be appointed one of the Septemviri for two years from 1 January 2021.
4. That Mr JOHN TANNATT DIX, *DAR*, be reappointed one of the Septemviri for two years from 1 January 2021.
5. That Regulation 1(*j*) of the Ordinance for the Medical Education Committee and the last sentence of Regulation 2 be rescinded (*Statutes and Ordinances*, November 2020, p. 134).<sup>1</sup>
6. That Regulations 4 and 5 of the regulations for the Denis Dooley Prize in Clinical Anatomy (*Statutes and Ordinances*, November 2020, p. 834) be amended to read as follows:<sup>2</sup>
  4. The Adjudicators of the Prize shall be the Regius Professor of Physic, the Professor of Anatomy and the University Clinical Anatomist (or their duly appointed deputies). In the Michaelmas Term the Adjudicators shall give notice of the date by which and the manner in which candidates shall submit their entries for the Prize, and of any requirements relating to the subject, form, and length of an essay to be submitted for the Prize.
  5. The Prize shall be awarded by the Adjudicators who may at their discretion examine a candidate *viva voce*.
7. That the regulations for the ExxonMobil Chemical Engineering Prize (*Statutes and Ordinances*, November 2020, p. 842) be rescinded in their entirety.<sup>3</sup>

<sup>1</sup> The Council, on the recommendation of the General Board and the Faculty Board of Clinical Medicine, is proposing to make a change to the membership of the Committee to remove a category that is no longer relevant.

<sup>2</sup> The Council, on the recommendation of the General Board, the Faculty Board of Clinical Medicine and the officers who currently award the Prize, is proposing these changes to add the University Clinical Anatomist to those responsible for awarding the Prize.

<sup>3</sup> The Council, on the recommendation of the General Board and the Chemical Engineering and Biotechnology Syndicate and with the concurrence of the donor, has agreed to the withdrawal of the Prize.

<sup>§</sup> See <https://www.governance.cam.ac.uk/governance/key-bodies/RH-Senate/Pages/RH-Petitions.aspx> for details.

## ACTA

### Approval of Graces submitted to the Regent House on 25 November 2020

The Graces submitted to the Regent House on 25 November 2020 (*Reporter*, 6597, 2020–21, p. 172) were approved at 4 p.m. on Friday, 27 November 2020.

E. M. C. RAMPTON, *Registrar*

END OF THE OFFICIAL PART OF THE 'REPORTER'

**COLLEGE NOTICES****Elections***Corpus Christi College*

Elected to a Fellowship in Class F from 25 January 2021:

Gemma Louise Donaldson, M.A., *M* (Domus Bursar)

*Darwin College*

Elected to a Professorial Fellowship under Title C from 1 December 2020:

Professor Angelos Michaelides, Ph.D., *Belfast*

*Hughes Hall*

Elected to a Fellowship in Class D from 2 December 2020:

Dr Jimmy Chan, B.A., Ph.D., *DOW*

*King's College*

Elected to an Ordinary Fellowship from 1 October 2020:

Dr Julienne Obadia, Ph.D., *New School for Social Research, New York*

Dr Philip Michael Francis Knox, M.A., M.St., D.Phil., *Oxford*

Dr Jamie Oliver Vicary, C.A., C.A.S.M., *TH*, Ph.D., *Imperial*

Dr Marwa Mahmoud, M.Sc., *American University Cairo*, Ph.D., *K*

Dr Aline Guillermet, M.A., *Université Jean Moulin Lyon 3*, Ph.D., *Essex*

Dr Alice Blackhurst, M.Phil., Ph.D., *EM*

Dr Benjamin James Ravenhill, M.A., Ph.D., M.B., B.Chir., *K*

Dr Fraz Arif Mir, B.Sc., M.B., B.S., *London*, M.A., *Cantab*, FRCP

Dr Alice Hutchings, Ph.D., *Griffith University, Australia*

Dr Cicely Marshall, M.A., *Brown University*, D.Phil., *Oxford*

Elected to a Professorial Fellowship from 1 October 2020:

Professor Richard Causton, M.A., *York*, ARCM

Professor Timothy Griffin, M.S., Ph.D., *Cornell University, New York*

Elected to a Life Fellowship from 1 October 2020:

Professor Robert Andrew Foley, M.A., Ph.D., *PET*

Professor Christopher Aidan Gilligan, CBE, M.A., *Cantab*, M.A., D.Phil., *Oxford*, Sc.D., *K*

Dr David Arthur Good, Ph.D., *DAR*

Elected to an Ordinary Fellowship on 24 November 2020 for four years:

Dr Myfanwy Hill, B.Sc., *Royal Veterinary College*, B.V.Sc., *Bristol*, Ph.D., *PEM*, MRCVS, (Loke Medical Sciences Fellow)

**Vacancies**

*Gonville and Caius College and Emmanuel College*: Joint College Lectureship in Spanish (and Fellowship at Gonville and Caius); tenure: for three years from 1 October 2021 or as soon as possible thereafter (with the possibility of renewal for a further two years then reappointment to the retiring age); salary: £36,914–£46,718; closing date: 4 January 2021; further details: <https://www.cai.cam.ac.uk/vacancies>