FHS Mathematics and Statistics Part B 2019

First Notice to Candidates
Trinity Term 2019

This notice contains information about:
1. Classification conventions and marking schemes
2. The format of papers in Part B
3. The use of calculators and statistical tables.

Please read in particular the Class Descriptors, and note that each class requires specific skills in each of three forms: **reasoning, deductive logic**, and **problem-solving**.

The timetable for the examination will be set by the Examination Schools and will be made available to you through Student Self Service. If you are unable to take a paper at the stipulated time for a religious or other compelling reason, you should ask your college to make the appropriate application on your behalf.

The full regulations for the Part B examination are contained in the Examination Decrees and Regulations at http://www.admin.ox.ac.uk/examregs/2018-19/hsomathandstat/studentview/

Full particulars about the syllabus and other information can be found in the Mathematics and Statistics Undergraduate Handbook and Supplements (available at http://www.stats.ox.ac.uk/student-resources/bammath/course-materials/.

The examining conventions for Mathematics and Statistics (which are summarised in this notice) are given in full in the Examination Conventions (available at http://www.stats.ox.ac.uk/student-resources/bammath/examinations/.

A Second Notice will be sent out later with information about practical arrangements in the Examination Schools, including use of candidate numbers, handing in of scripts and so on.

Dr Neil Laws
Chairman of Examiners
Department of Statistics
February 2019

Classification Conventions and Marking Schemes

Marking of Mathematics and Statistics Papers

The majority of mathematics and statistics examinations are marked by a single assessor or examiner according to a pre-agreed mark scheme which is strictly adhered to. Marking schemes for written papers will aim to ensure that the following qualitative criteria hold.

- **20–25 marks**: A completely, or almost completely, correct answer, showing excellent understanding of the concepts and skill in carrying through the arguments and/or calculations; minor slips or omissions only.
- **13–19 marks**: A good though not complete answer, showing understanding of the concepts and competence in handling the arguments and/or calculations. Such an answer might consist of an excellent answer to a substantial part of the question, or a good answer to the whole question which nevertheless shows some flaws in calculation or in understanding or in both.
- **7–12 marks**: Standard material has been substantially and correctly answered with some possible minor progress on to other parts of the question.
- **0–6 marks:** Some progress has been made with elementary, accessible material.

University Standardised Marks

Marks for each individual examination paper will be reported as University Standardised Marks (USMs). The object of the USMs is to allow direct comparison between the results of examinations in different subjects. Raw marks are turned into USMs by scaling, sometimes necessary to ensure that all papers are fairly and equally rewarded. The correspondence between the USM ranges and classes is as follows:

- a First Class performance (on that paper) is indicated by a mark of 70 or over
- an Upper Second Class performance (on that paper) is indicated by a mark of 60 to 69
- a Lower Second Class performance (on that paper) is indicated by a mark of 50 to 59
- a Third Class performance (on that paper) is indicated by a mark of 40 to 49
- a Pass performance (on that paper) is indicated by a mark of 30 to 39
- a Fail performance (on that paper) is indicated by a mark below 30.

In order to arrive at such standardized marks for each paper, the Examiners will mark and assess papers in the way described below.

The examiners in Part B will assign university standardised marks (USMs) for each paper taken in Part B and they may recalibrate the raw marks to arrive at the USMs reported to candidates. The scaling algorithm used by the mathematics examiners is explained in detail in the 2018 examiners' report which can be found on WebLearn https://weblearn.ox.ac.uk/x/ZA4DnE.

When considering whether to scale the raw marks on a paper the examiners will consider the following:

- the relative difficulty of the paper compared to the other Part B papers
- information on candidates' performances at Part A
- the report submitted by the assessor who set and marked the paper.

Examiners will use their academic judgement to ensure that appropriate USMs are awarded and may use further statistics to check that the marks assigned fairly reflect the students' performances on a paper.

Classification Conventions

All candidates will receive a classification at the end of the third year based on aggregated USMs from Parts A and B as follows.

Every candidate must offer:

- 10 units at Part A (counting A2 as a double-unit and, for candidates offering 4 long options, two of the long option papers as half-units)
- 8 units (or equivalent) at Part B.

The relative weightings of the Parts is as follows:
- The weighting of Part A is 40%.
- The weighting of Part B is 60%.

A Strong Paper rule is used for classification.

Strong Paper rule
To satisfy the nth class strong paper rule:
- you need at least 6 units (or the equivalent) to have a mark of the nth class standard or above,
- and you also need at least 2 of these units (or the equivalent) to be in Part B.

For example, to satisfy the First class strong paper rule you need at least 6 units (or the equivalent) with marks of 70 or above, with at least 2 of these units (or the equivalent) being in Part B.

Let *AvUSM = Average weighted USM in Parts A and B together* (symmetrically rounded [62.49 will be rounded down and 62.50 will be rounded up]). Classifications are determined as follows:

- First Class: *AvUSM* >= 70 and the First Class strong paper rule is satisfied.
- Upper Second Class: EITHER *AvUSM* >= 70 and the First Class strong paper rule is not satisfied
  OR 60 <= *AvUSM* < 70 and the Upper Second Class strong paper rule is satisfied.
- Lower Second Class: EITHER 60 <= AvUSM < 70 and the Upper Second Class strong paper rule is not satisfied
  OR 50 <= *AvUSM* < 60 and the Lower Second Class strong paper rule is satisfied.
- Third Class: EITHER 40 <= *AvUSM* < 50
  OR 50 <= *AvUSM* < 60 and the Lower Second Class strong paper rule is not satisfied.
- Pass: 30 <= *AvUSM* < 40.
- Fail: *AvUSM* < 30.

The Examiners will take particular care in assigning classes to those candidates whose marks fall near each class boundary.

Class Descriptors
The average USM ranges used in the classifications reflect the following qualitative class descriptors:
- **First Class**: the candidate shows excellent skills in reasoning, deductive logic and problem-solving. He/she demonstrates an excellent knowledge of the material, and is able to use that in unfamiliar contexts.

- **Upper Second Class**: the candidate shows good or very good skills in reasoning, deductive logic and problem-solving. He/she demonstrates a good or very good knowledge of much of the material.

- **Lower Second Class**: the candidate shows adequate basic skills in reasoning, deductive logic and problem-solving. He/she demonstrates a sound knowledge of much of the material.

- **Third Class**: the candidate shows reasonable understanding of at least part of the basic material and some skills in reasoning, deductive logic and problem-solving.

- **Pass**: the candidate shows some limited grasp of at least part of the basic material.

- **Fail**: little evidence of competence in the topics examined; the work is likely to show major misunderstanding and confusion, coupled with inaccurate calculations; the answers to questions attempted are likely to be fragmentary only.

[Note that the aggregation rules in some circumstances allow a stronger performance on some papers to compensate for a weaker performance on others.]

BA in Mathematics and Statistics
Any candidate who satisfies the Examiners for Parts A and B (and who does not subsequently enter for and achieve Honours for Part C) may supplicate for the Honours degree of BA in Mathematics and Statistics with the classification as described above, provided they have fulfilled all the conditions for admission to a degree of the university.

MMath in Mathematics and Statistics
In order to proceed to Part C, a candidate must achieve an Upper Second Class standard or better in Parts A and B together.

Candidates successfully completing Part C will receive a separate classification based on their USMs in Part C papers.

Note that successful candidates may only supplicate for one degree – either a BA or an MMath. The MMath has two classifications associated with it, but a candidate will not be awarded both a BA degree and an MMath degree.

Mitigating Circumstances Notices to Examiners (MCE)
The board of examiners will use the following procedure for the consideration of medical and other special circumstances transmitted to them via the Examinations and Assessments Section:
   (a) A subset of the board will meet to discuss the individual applications and band the seriousness of each application on a scale of 1-3 with 1 indicating minor impact, 2 indicating moderate impact, and 3 indicating very serious impact. When reaching this decision, examiners will take into consideration the severity and relevance of the circumstances, and the strength of the evidence. Examiners will also note whether all or a subset of papers were affected being aware that it is possible for circumstances to have different levels of impact on different papers.
   (b) The banding information will be used at the final board of examiners meeting to adjudicate on the merits of candidates.
   (c) A brief, formal record will be kept confirming (i) the fact that information about special circumstances has been considered by the examiners, (ii) how that information has been

considered, and (iii) the outcome of the consideration with the reasons for the decisions reached.

Further information on how to make an application for consideration of mitigating circumstances in an examination is available at
http://www.ox.ac.uk/students/academic/exams/guidance.

Format of examination papers

Statistics papers

SB1 Applied and Computational Statistics (double unit)
This is a 2 ½ hour paper, consisting of 2 questions on SB1.1 Applied Statistics and 2 questions on SB1.2 Computational Statistics. Candidates may attempt as many answers as they wish but only the best 3 answers will count for a candidate's total mark. Each question is marked out of 22 and the separate compulsory assessed practical component is marked out of 34.

Statistics papers SB2.1, SB2.2, SB3.1, SB3.2, SB4.1 (units)
These are unit papers containing 3 questions. Each question is marked out of 25. A unit paper lasts for 1 and 45 minutes. Candidates may hand in as many answers as they wish: the best 2 answers will count for a candidate's total mark.

Mathematics Options

Mathematics papers B1.1-B8.5
These are unit papers, containing 3 questions. Each question is marked out of 25. Each paper lasts for 1 hours and 45 minutes. Candidates may hand in as many answers as they wish: the best 2 answers will count for a candidate's total mark.

Late submission or Failure to submit coursework
For the courses below where coursework is a part of the assessment, candidates are asked to refer to the separate Notice regarding the details governing late submission or failure to submit coursework.
https://www1.maths.ox.ac.uk/members/students/undergraduate-courses/ba-master-mathematics/examinations-assessments/examination-19

BEE Extended Essay in Mathematics (double unit)
USMs will be assigned to Extended Essays with the same meaning as regards class boundaries as in the Mathematics and Statistics papers and are assessed independently by two assessors appointed by the Examiners. In arriving at these marks, the relative weights attached to content, mathematics and presentation will be 25%, 50% and 25%, respectively.

BSP Structured Projects (double unit)
Candidates will be assessed on their written project, oral presentation and peer review. The weightings for these three components are 75%, 15% and 10% respectively. For the written projects the weighting will be further divided between general explanation and discussion of the problem (50% of available marks) and mathematical calculations and commentary (50% of available marks).

BN1.1   Mathematics Education

Candidates are assessed on two written assignments and a short presentation. The weightings of these components are 35%, 35% and 30% respectively.

BN1.2 The Undergraduate Ambassadors' Scheme (unit)
Candidates are assessed on their journal of activities, oral presentation, course report and project, teacher report. The weightings for these four components are 20%, 30%, 35% and 15% respectively.

OCS2 Computational Complexity (unit)
This is a unit paper which lasts 2 hours and has three questions. Candidates may answer up to two questions. Each question is marked out of 25.

Calculators and Statistical tables

Calculators will not be permitted on the Mathematics papers. Calculators will be permitted for SB1, SB2.1, SB2.2, SB3.1, SB3.2, SB4.1.

Candidate's attention is drawn to the type of calculators examiners now permit. Only calculators on the list below may be permitted.

For papers **SB1, SB2.1, SB2.2, SB3.1, SB3.2, SB4.1 only,** basic scientific calculators which have features such as exp and log, but which are **non-programmable**, will be allowed. For these papers **any** of the following will be permitted:

Casio fx-83 series,
Casio fx-85 series,
Sharp EL-531 series.

Candidates should note that no calculators will be made available in the examination room.

New Cambridge Elementary Statistical Tables will be provided for use with papers SB1, SB2.1, SB2.2, SB3.1, SB3.2, SB4.1. These tables will be available for inspection in room LG.04 at the Department of Statistics between 9.30 am and 12 noon on any weekday in Week 4 of Trinity Term.