Maths
'A' level

General Introduction

Welcome to your 'A' level Pure Maths and Mechanics course. This General Introduction should provide you with all the information you need to make a successful start to your studies.

The Specification (or Syllabus)

This course has been designed to give you a full and thorough preparation for the AS level or A level Mathematics B specification, set by the Assessment and Qualifications Alliance (AQA).

The **Subject Code** for entry to the AS only award is **5321.**
The **Subject Code** for entry to the Advanced level award is **6321.**

Private Candidates

The AQA specification is open to private candidates. Private candidates should contact AQA for a copy of *'Information for Private Candidates*'.

Oxford Open Learning

Arrangement of Modules

This course is divided into four separate modules. The first module corresponds to modules P1 and P2 of your specification. The third corresponds to modules P4 and P5 of your specification. Each of the other modules corresponds to the module of the same name in your specification.

Module P1/P2 (Pure Maths) (exam entry codes: MBP1 & MBP2)

Module M1 (Mechanics) (code: MBM1)

Module P4/P5 (Pure Maths) (codes: MBP4 & MBP5)

Module M2 (Mechanics) (code: MBM2)

This introduction serves as a point of reference for the whole course.

Textbooks

It is essential that you acquire the following textbooks to support your studies:

L. Bostock and S. Chandler, *The Core Course for 'A' Level* (Stanley Thornes, ISBN 0-8595-0306-2)

L. Bostock and S. Chandler, *Mathematics, Mechanics and Probability* (Stanley Thornes, ISBN 0-85950-141-8)

One easy way of acquiring accompanying textbooks is through the Oxford Open Learning website (www.ool.co.uk).

General Information

In the past few years there have been many changes in Mathematics, at 'O' level, now GCSE, and at 'A' level. In the 1960s "Modern Mathematics" was introduced and the new syllabuses involving this threw out much of the old traditional work. This was fine for the very able students, but those who found Mathematics less easy had many problems, since these modern syllabuses contained topics which were difficult to relate to practical ideas.

After experimenting with these new syllabuses, the examination boards introduced courses containing the best of the modern topics, together with the traditional ones which are still relevant. Nowadays, instead of a wide range of possible syllabuses, each examination board tends to offer a core syllabus of basic mathematics, together with a set of more diverse options which the student can choose from.

By experience, we have found that students wanting to study 'A' level Mathematics by correspondence courses or open learning wish to take either the single subject 'Pure Mathematics', or the combined topics of 'Pure Mathematics and Mechanics', sometimes just called 'Mathematics'. This course covers all the topics essential for the AQA Pure Mathematics and Mechanics 'A' Level examination. Modules P1/P2 and M1 can also be taken as a Mathematics 'AS' level.

Pre-Requisite Experience

In order to study this course, you are expected to have a knowledge of mathematics up to a good 'O' level or GCSE standard. Just a mere pass is not usually a sufficient basis on which to progress to 'A' level. In particular you are expected to have a good grasp of algebra — equations, factors, fractions, and, especially, the manipulation of formulae. These are topics which are frequently encountered in all aspects of this course, and it will be assumed that you have a sound knowledge of them. You should know, in geometry, the triangle and circle properties, together with the tests for similar and congruent triangles. The trigonometrical definitions of sine, cosine and tangent, together with the solution of a right-angled triangle, should be known.

If your Maths skills were acquired a number of years ago, it might be an idea to purchase a GCSE Maths revision book to help refresh your memory.

Electronic Calculators

All examining boards now recommend, or actually require, that a calculator is used in the examination. The syllabus will specify the type of calculator allowed. It should at the very least be a "scientific" type, with functions which include sin, cos, tan and their inverses, in both degrees and radians, $\sqrt{}$, x^y, e^x, $\log_e x$ and a memory, as well as the standard keys. It is strongly recommended that you use a graphical calculator if you have one.

In this course you should use a calculator for all questions requiring a numerical answer, unless you are specifically told to leave answers in surd (root) form. Final answers should always be given to three significant figures, but during your working, keep intermediate values to as great a degree of accuracy as your calculator will allow. You should show in your working any necessary explicit formula you use to calculate your answer. Marks may be deducted for lack of essential working. All steps in working should be shown, giving the answers at each stage.

Using the Course Materials

No textbook can take the place completely of an actual lesson, so, when studying this course, the lesson notes will add to, or expand, the text of the book, and you should study both together. The lesson notes will indicate at which points you should work from the book, and the exercises you should attempt.

At the start of each book there is a section on the use of the book which includes a list of notation, and instructions for answering multiple–choice exercises. You should study the list of notations carefully, and also refer to the notations which are listed in the syllabus of the examination board. Occasionally there will be slight variations in notation, so it is important to realise this, and, if two alternative notations are given, be able to recognise and use either.

As you follow the lesson notes, you will be told when to refer to the book, which sections to study, and which exercises to attempt. The textbooks contain very many worked examples. In order to save space, and so include all these, often lines of working have been omitted from the solutions. You should perform these lines yourself, as you follow through the examples. In general, always keep a pen and paper, and your calculator, beside you, as you work through the course.

Activities and Practice Exercises

The books also contain many exercises to be worked. The numerical solutions to these are given at the end of the books. Graphical solutions are not included, but they will be given to a selection of examples at the end of any appropriate lesson. When you have worked through the questions in an exercise, check your answers with those given. If you have made any mistakes, look through the question again, trying to see where you went wrong. If you still cannot see how to get the correct answer, ask your tutor for help, and he or she will show you your mistake.

There is no need to work every question of every exercise, but try to pick out a variety of different types. If, however, you find a topic more difficult, then try more of the questions set on it, to give you practice in overcoming the problems.

At the end of each chapter there are usually multiple–choice and miscellaneous exercises covering the whole chapter. You will be told when to attempt these, in the lesson notes. The AQA syllabus does not include a multiple–choice paper, but it is still a good idea to attempt the multiple-choice exercises in the books.

The miscellaneous exercises provide an excellent selection of questions covering the work of that chapter. They usually contain a large number of questions, and there is no need to attempt every

one. However, the questions in them are often taken from past 'A' level examinations. The source of these are indicated at the end of the question. It is always helpful to acquire copies of the most recent examination papers. Exams change from year to year, and this will give you a better idea of what to expect.

Where necessary, the lessons also include Activities to provide additional practice or help with difficult points. These Activities include space underneath for you to attempt your answer. Having done so, the correct answer will be found at the end of that particular lesson.

Tutor-Marked Assignments

After a group of lessons you will find a tutor-marked assignment, and you will be told at which stage to work this. It should be attempted only when you are satisfied that you have completely studied and mastered the lessons to which it relates. It is best to attempt assignments under examination conditions, however it is not obligatory. Your answers to these assignments should be sent to your tutor for marking, and, when they are returned to you, suggested answers will be sent with them.

At this level of mathematics, there is rarely just one "right" method for solving a problem, however. The suggested answers will give one way, usually, but not always, the shortest. The method you have used may well be completely different. Your tutor will indicate whether it is as good on your test-paper when it is returned.

Experience shows that students who do submit assignments are much more successful than those who don't. It is your primary means of gaining individualised help, of sorting out problems and maintaining motivation.

To conclude, this is no easy, armchair, subject. Much depends on your ability to work hard, and puzzle out any problems. When you encounter difficulties, try the problem again, working the problem out in various ways, until you suddenly see the correct method. Always work the assignments without assistance, and send in an attempt at every question, however badly you think you might have done. Only then can your tutor see what your difficulties are, and help you to overcome them.

The 'AS' level and 'A' level System

Students should be aware that the 'A' level system in the UK was changed in 2000. As a result, all the awarding bodies, including AQA (which brought together the old AEB and NEAB exam groups) introduced new Advanced Subsidiary (AS) as well as revised Advanced ('A') level specifications and examinations across the full subject range.

The Advanced Subsidiary (AS) Level

Advanced Subsidiary (AS) courses may be used in one of two ways:

As a final qualification, allowing candidates to broaden their studies and to defer questions about specialism;

As the first half (50%) of an Advanced Level qualification, which must be completed before an Advanced Level award can be made.

Advanced Subsidiary is designed to provide an appropriate assessment of knowledge, understanding and skills expected of candidates who have completed the first half of a full Advanced Level Qualification.

The Advanced Level (AS + A2)

The Advanced Level examination is in two parts:

Advanced Subsidiary (AS) - 50% of the total award;
A second examination, called A2 - 50% of the total award

Most Advanced Subsidiary and Advanced level courses are modular. The AS level normally comprises three teaching and learning modules and the A2 comprises a further three teaching and learning modules. These modules generally match the Units of Assessment (or Exam Papers).

Examination Flexibility

The new style 'A' levels allow for more flexibility in the taking of exams. The two most popular options are:

AS is completed at the end of one year and A2 at the end of the second year;
AS and A2 are completed at the end of the same year.

Both of these options are open to students following this course as it is divided into two halves and follows the same modular sequence as the specification.

Grading and Shelf-Life

The **grading system** has not changed much from the old 'A' level system. For both AS level and the full 'A' level qualification, there is a 5-grade scale: A, B, C, D and E. Candidates who fail to reach the minimum standard for Grade E will be recorded as U (unclassified).

The **shelf-life** of the results, prior to the award of the qualification, is limited only by the shelf-life of the specification. As long as the specification stays in its present form, grades can therefore be carried forward indefinitely.

Studying the Syllabus

You should be sure to acquire your own copy of the syllabus, either via the AQA Publications Dept or from the website www.aqa.org.uk.

The syllabus can be purchased from

Publications,
AQA, Aldon House,
39, Heald Grove,
Rusholme,
Manchester
M14 4NA (tel: 0161-953-1170)

or downloaded from www.aqa.org.uk/qual/pdf/AQA6321WSP.pdf.

We advise that you obtain a copy of the syllabus so that you can assess which topics you have covered in the most detail and which ones you will feel happiest about in the exam. AQA can also provide advice booklets on your course, including 'Supplementary Guidance for Private Candidates'. As you approach the examination, it will also be helpful to purchase and tackle past papers from AQA.

Using the Internet

All students would benefit from access to the Internet. You will find a wealth of information on all the topics in your course. As well as the AQA website (www.aqa.org.uk), you should get into the habit of checking the Oxford Open Learning site (www.ool.co.uk) where you may find news, additional resources and interactive features as time goes by. If you have not already done so, you may register for your free copy of *How to Study at Home*, our 200-page guide to home learning, or enrol on further courses. Put it on your Favourites list now!

Good luck with your studies!