

2. A GUIDE TO THE SYLLABUS

Introduction

The Advanced Supplementary Level 'Mathematics and Statistic' is designed as a two-year sixth form course occupying about half the teaching and private study time of its Advanced Level counterpart. The target candidature of the syllabus are those sixth form students who may not intend to specialize in physical sciences or engineering but wish to further their studies in mathematics beyond the Certificate of Education (CE) Level. It is intended that the course is of relevance and beneficial to studies of subjects in the social sciences. The prerequisite of the course is Mathematics at CE Level.

Main Features of the Syllabus

The syllabus aims at breadth rather than depth with a view to broadening students' perspective on Mathematics. Due emphasis on the practical aspect of mathematics has been given while the aim of making the syllabus self-contained, intellectually demanding and coherent has been markedly noted.

Mathematics and statistics each constitutes about half of the syllabus in weight. The mathematical part emphasizes on calculus because of its versatile usefulness for the study of statistical, social, biological or chemical phenomena. No further treatment of geometry and trigonometry is included as the CE Mathematics Syllabus has already covered these topics adequately for the students concerned. The algebra content of the CE Mathematics is also considered adequate except for permutations, combinations and binomial expansion which are particularly useful for studying probability and statistics. Exponential and logarithmic functions are included because of their wide applications.

The statistical part starts with basic statistical measures. Due emphasis is placed on probability because it is elementary and hence important. The normal, Bernoulli, binomial, geometric and Poisson distributions serve to widen students' knowledge of probability distributions. A study of population parameters and sample statistics depicts the relationship between populations and samples. A comparison of frequency distributions with fitted probability distributions provides a link between empirical data and theoretical models, statistics and probability, and sample and population.

As a whole, the syllabus has about 30% common with the CE Additional Mathematics Syllabus, mainly in calculus and binomial expansion. A substantial part of the syllabus is contained in the A Level Pure Mathematics and A Level Applied Mathematics Syllabuses. The overlapping with the AS Level Applied

Mathematics Syllabus is mainly in statistics and probability. However the spirit in which the topic is treated in the two syllabuses is not quite the same.

Time Allocation and Teaching Sequence

This syllabus presented here provides, through its suggested 'Time Ratio' and 'Notes on Teaching', an indication on how and to what depth a certain topic should be treated. The suggested time allocation for the course is 4 periods per week and it is assumed that there are 40 minutes in each period. School, however, may choose a slightly different time allocation to allow for their own situations.

There are three main topic areas in the syllabus and the suggested time ratio, in brief, is as follows:

<i>Topic Area</i>	<i>Time Ratio</i>
1. Algebra	27
2. Calculus	63
3. Statistics	90
<hr/> Total	180

It should be noted that the sequence of topics presented in the teaching syllabus is just an example. Teachers are free to choose their own teaching sequences. It is hoped that the presentation in the syllabus will provide teachers with maximum flexibility so that courses can be adjusted to meet the individual teaching situation,

To aid teachers in judging how far to take a given topic a 'Time Ratio' is given. It is the numerator of a fraction whose denominator, 200, is related to the total teaching time spent on the subject during the TWO years. This takes into account the time spent on classroom tests and examinations and the reduced time owing to the advent of the AS Level Examination. It is hoped that the time ratio will indicate what fraction of the total time may be spent on a particular topic. It can be seen that the total time ratio is still 20 running short. This amount of time is expected to be spent on revising the various topic areas at the end of the course.

Specific Objectives and Teaching Notes

'Specific Objectives' are given for each 'Topic Area' and the 'Detailed Content' breaks the subject matter of the topics into smaller teaching units.

The teaching methods suggested in the 'Notes on Teaching' are by no means exhaustive. While providing an example of a way in which each given topic may be taught, the notes also try to indicate the type of treatment required. However, in order to gear to the overall objectives of the syllabus, teachers are advised to

provide students with more applications of the topics in real-life problems like growth and decay, rate of change, the use of normal distribution, etc. In this way, students will be helped to develop analytic, critical and independent thinking and be able to analyze relevant information and select appropriate methods to tackle problems. Moreover, an understanding of the concepts and principles of mathematical processes and their relations to different situations will arouse and stimulate students' interest, and nurture their appreciation of the power and usefulness of mathematics. Consequently, students' confidence in applying mathematics will be elevated.

Finally, the notes on teaching should be taken as a guide to the spirit of the syllabus rather than a rigid teaching plan that must be followed closely. Teachers are, therefore, encouraged to explore and discover their own teaching methods and approaches as they think suit.