Cambridge Assessment
International Education

Syllabus

Cambridge O Level
Statistics 4040

Use this syllabus for exams in 2022, 2023 and 2024.
Exams are available in the November series.

Cambridge
Pathway

Contents

1. Introduction

1.1 Why choose Cambridge International?

Cambridge International prepares school students for life, helping them develop an informed curiosity and a lasting passion for learning. We are part of the University of Cambridge.

Our Cambridge Pathway gives students a clear path for educational success from age 5 to 19. Schools can shape the curriculum around how they want students to learn – with a wide range of subjects and flexible ways to offer them. It helps students discover new abilities and a wider world, and gives them the skills they need for life, so they can achieve at school, university and work.

Our programmes and qualifications set the global standard for international education. They are created by subject experts, rooted in academic rigour and reflect the latest educational research. They provide a strong platform for students to progress from one stage to the next, and are well supported by teaching and learning resources.

Every year, nearly a million Cambridge learners from 10 000 schools in 160 countries prepare for their future with the Cambridge Pathway.

Cambridge learners

Our mission is to provide educational benefit through provision of international programmes and qualifications for school education and to be the world leader in this field. Together with schools, we develop Cambridge learners who are:

- **confident** in working with information and ideas – their own and those of others
- **responsible** for themselves, responsive to and respectful of others
- **reflective** as learners, developing their ability to learn
- **innovative** and equipped for new and future challenges
- **engaged** intellectually and socially, ready to make a difference.

Recognition

Our expertise in curriculum, teaching and learning, and assessment is the basis for the recognition of our programmes and qualifications around the world.

Cambridge O Level is internationally recognised by schools, universities and employers as equivalent in demand to Cambridge IGCSE™ (International General Certificate of Secondary Education). There are over 700 000 entries a year in nearly 70 countries. Learn more at **www.cambridgeinternational.org/recognition**

Cambridge Assessment International Education is an education organisation and politically neutral. The content of this syllabus, examination papers and associated materials do not endorse any political view. We endeavour to treat all aspects of the exam process neutrally.

Support for teachers

A wide range of materials and resources is available to support teachers and learners in Cambridge schools. Resources suit a variety of teaching methods in different international contexts. Through subject discussion forums and training, teachers can access the expert advice they need for teaching our qualifications. More details can be found in Section 2 of this syllabus and at **www.cambridgeinternational.org/teachers**

Support for exams officers

Exams officers can trust in reliable, efficient administration of exams entries and excellent personal support from our customer services. Learn more at **www.cambridgeinternational.org/eoguide**

Quality management

Cambridge International is committed to providing exceptional quality. In line with this commitment, our quality management system for the provision of international qualifications and education programmes for students aged 5 to 19 is independently certified as meeting the internationally recognised standard, ISO 9001:2015. Learn more at **www.cambridgeinternational.org/ISO9001**

1.2   Why choose Cambridge O Level?

Cambridge O Level is typically for 14 to 16 year olds and is an internationally recognised qualification. It has been designed especially for an international market and is sensitive to the needs of different countries. Cambridge O Level is designed for learners whose first language may not be English, and this is acknowledged throughout the examination process.

Our aim is to balance knowledge, understanding and skills in our programmes and qualifications to enable students to become effective learners and to provide a solid foundation for their continuing educational journey.

Through our professional development courses and our support materials for Cambridge O Levels, we provide the tools to enable teachers to prepare students to the best of their ability and work with us in the pursuit of excellence in education.

Cambridge O Levels are considered to be an excellent preparation for Cambridge International AS & A Levels, the Cambridge AICE (Advanced International Certificate of Education) Diploma, Cambridge Pre-U, and other education programmes, such as the US Advanced Placement program and the International Baccalaureate Diploma programme. Learn more about Cambridge O Levels at **www.cambridgeinternational.org/olevel**

Guided learning hours

Cambridge O Level syllabuses are designed on the assumption that learners have about 130 guided learning hours per subject over the duration of the course, but this is for guidance only. The number of hours required to gain the qualification may vary according to local curricular practice and the students' prior experience of the subject.

1.3   Why choose Cambridge O Level Statistics?

Cambridge O Levels are established qualifications that keep pace with educational developments and trends. The Cambridge O Level curriculum places emphasis on broad and balanced study across a wide range of subject areas. The curriculum is structured so that candidates attain both practical skills and theoretical knowledge.

Cambridge O Level Statistics is recognised by universities and employers throughout the world as proof of statistical knowledge and understanding. Successful Cambridge O Level Statistics candidates acquire knowledge of basic statistical ideas, methods and terminology. Study of the content of the syllabus enables candidates to:

- represent and use statistical data in graphical, diagrammatic and tabular forms
- interpret statistical statements, calculations and diagrams
- perform statistical calculations with appropriate accuracy
- acquire knowledge of elementary ideas in probability.

Cambridge O Level Statistics provides a suitable foundation for further study in the subject, as well as developing concepts which are relevant in a wide range of other subjects.

Prior learning

Candidates beginning this course are not expected to have studied Statistics previously.

Progression

Cambridge O Levels are general qualifications that enable candidates to progress either directly to employment, or to proceed to further qualifications.

Candidates who are awarded grades C to A* in Cambridge O Level Statistics are well prepared to follow courses leading to AS & A Level Statistics, or the equivalent.

1.4   How can I find out more?

If you are already a Cambridge school

You can make entries for this qualification through your usual channels. If you have any questions, please contact us at **info@cambridgeinternational.org**

If you are not yet a Cambridge school

Learn about the benefits of becoming a Cambridge school at **www.cambridgeinternational.org/startcambridge**

Email us at **info@cambridgeinternational.org** to find out how your organisation can register to become a Cambridge school.

2.   Teacher support

2.1   Support materials

You can go to our public website at **www.cambridgeinternational.org/olevel** to download current and future syllabuses together with specimen papers or past question papers, examiner reports and grade threshold tables from one series.

For teachers at registered Cambridge schools a range of additional support materials for specific syllabuses is available online from the School Support Hub. Go to **www.cambridgeinternational.org/support** (username and password required). If you do not have access, speak to the School Support coordinator at your school.

2.2   Endorsed resources

We work with publishers who provide a range of resources for our syllabuses including print and digital materials. Resources endorsed by Cambridge International go through a detailed quality assurance process to make sure they provide a high level of support for teachers and learners.

We have resource lists which can be filtered to show all resources, or just those which are endorsed by Cambridge International. The resource lists include further suggestions for resources to support teaching. See **www.cambridgeinternational.org/i-want-to/resource-centre** for further information.

2.3   Training

We offer a range of support activities for teachers to ensure they have the relevant knowledge and skills to deliver our qualifications. See **www.cambridgeinternational.org/events** for further information.

3. Syllabus content at a glance

Candidates for Cambridge O Level Statistics study the following topic areas:

1. Data and its collection
2. Summary representation of data
3. Formation of data into ungrouped or grouped frequency distributions
4. Formation of frequency distributions into cumulative frequency distributions
5. Statistical measures, their interpretation and appropriate use
6. Transformations involving mean and standard deviation
7. Crude and standardised rates, and their appropriate use
8. Index numbers
9. Bivariate distributions and their representation by scatter diagrams
10. Time series
11. Elementary ideas of probability
12. Probability distributions.

4. Assessment at a glance

Cambridge O Level Statistics candidates take two compulsory components.

All candidates take:		Weighting
Paper 1	**2 hours 15 minutes**	50%
Candidates answer **all** questions.		
There will be a number of short questions, each worth up to 8 marks, and four longer questions, each worth 14–16 marks.		
Electronic calculators should be used.		
Candidates should show all working in the spaces provided on the question paper. Essential working must be shown for full marks to be awarded.		
100 marks		
and		
Paper 2	**2 hours 15 minutes**	50%
Candidates answer **all** questions.		
There will be a number of short questions, each worth up to 8 marks, and four longer questions, each worth 14–16 marks.		
Electronic calculators should be used.		
Candidates should show all working in the spaces provided on the question paper. Essential working must be shown for full marks to be awarded.		
100 marks		

Availability

This syllabus is examined in the November examination series.

This syllabus is available to private candidates.

Detailed timetables are available from **www.cambridgeinternational.org/timetables**

Cambridge O Levels are available to centres in administrative zones 3, 4 and 5.

Combining this with other syllabuses

Candidates can combine this syllabus in an examination series with any other Cambridge International syllabus, except:

- syllabuses with the same title at the same level.

Please note that Cambridge O Level, Cambridge IGCSE and Cambridge IGCSE (9–1) syllabuses are at the same level.

Mathematical Instruments

As well as the usual mathematical instruments, candidates may use flexicurves in this examination.

Mathematical Notation

Please see the list of mathematical notation at the end of this booklet.

5. Syllabus aims and assessment objectives

5.1 Syllabus aims

The aims of the syllabus are to enable candidates to:

- appreciate that much of the information encountered in a wide variety of contexts in everyday life has a statistical base
- recognise the suitability of this information for statistical analysis
- appreciate the extent of the accuracy of this information
- acquire an understanding of the elementary concepts of statistics and probability which are useful and relevant for carrying out such analysis
- apply appropriate methods based on these concepts to numerical information
- draw appropriate conclusions from the results of the application of statistical methods
- interpret both primary statistical information and the conclusions of statistical analysis
- be aware of the limitations and levels of accuracy of interpretations and conclusions, and their relevance in an everyday societal context.

5.2 Assessment objectives

AO1 Knowledge and techniques

Demonstrate knowledge and understanding of elementary concepts and procedures in the collection, organisation, presentation and analysis of data. Recall specific methods of analysis, select those which are appropriate in a given situation, and perform relevant statistical and probability calculations accurately. Apply combinations of statistical skills in the solution of problems.

AO2 Interpretation and communication

Interpret the results of statistical analysis in a variety of contexts to make deductions and draw conclusions relevant to those contexts. Justify the use of specific methods of analysis in a given situation. Communicate conclusions in a clear and logical manner.

5.3 Relationship between assessment objectives and components

The approximate weightings allocated to each of the assessment objectives are summarised below.

The table shows the assessment objectives (AOs) as a percentage of each component and across the qualification as a whole.

Component	AO1 %	AO2 %
Paper 1	85–90	10–15
Paper 2	85–90	10–15
Weighting of AO in qualification	85–90	10–15

6.   Syllabus content

Topic area	Further guidance
1. Data and its collection.	
1.1 General ideas of sampling.	Including knowledge of the terms: population, census, sample, representative sample.
1.2 Types of sampling.	Including knowledge of random, systematic, stratified and quota sampling methods. Use of random numbers.
1.3 Bias: how it arises and is avoided.	
1.4 General ideas of surveys.	Including the use of closed and open questions in questionnaires.
1.5 Types of data and variable.	Including knowledge of the terms: qualitative, quantitative, discrete, continuous.
2. Summary representation of data.	
2.1 Classification and representation in tabular form.	Including two-way tables.
2.2 Representation in pictorial or diagrammatic form.	Including pictograms, pie charts, comparative pie charts, Venn diagrams, bar charts, sectional and percentage bar charts, dual bar charts, box-and-whisker diagrams, stem-and-leaf diagrams.
2.3 The purpose and use of various forms of representation, their advantages and disadvantages.	
2.4 Interpretation of data presented in tabular, pictorial or diagrammatic form.	
3. Formation of data into ungrouped or grouped frequency distributions.	
3.1 Class measures for grouped frequency distributions.	Class limits, boundaries and mid-points, class intervals.
3.2 Representation in frequency polygons and histograms.	
4. Formation of frequency distributions into cumulative frequency distributions.	
4.1 Representation in tabular form.	
4.2 Representation in graphical form.	Cumulative frequency curves and polygons for continuous data.

Topic area	Further guidance
5. Statistical measures, their interpretation and appropriate use.	
5.1 Measures of central tendency: mean, median, mode and modal class.	Including calculation or estimation from a set of numbers, an ungrouped or grouped frequency distribution.
5.2 Measures of dispersion: range, interquartile range, variance and standard deviation.	Including calculation or estimation from a set of numbers, an ungrouped or grouped frequency distribution.
5.3 Quartiles and percentiles.	Including estimation of median, quartiles and percentiles from a cumulative frequency curve or polygon, and by linear interpolation from a cumulative frequency table.
5.4 Measures for combined sets of data.	Including calculation of mean and standard deviation.
6. Transformations involving mean and standard deviation.	
6.1 Effect on mean and standard deviation of adding a constant to each observation and of multiplying each observation by a constant.	
6.2 Linear transformation of data to a given mean and standard deviation.	
7. Crude and standardised rates, and their appropriate use.	Including application to death rates, fertility rates, accident rates.
8. Index numbers.	Including price relatives and weighted aggregate index numbers. Use and limitations of weighted aggregate index numbers.
9. Bivariate distributions and their representation by scatter diagrams.	
9.1 Elementary ideas of correlation.	Including understanding of the terms: positive, negative, strong, weak correlation.
9.2 Lines of best fit.	Including the method of semi-averages, and the derivation of the equation of the fitted straight line in the form $y = mx + c$. Use and limitations of a line of best fit in prediction.

Topic area	Further guidance

10. Time series.
    10.1   Understanding of trend.
 	
    10.2   Understanding of seasonal variation.
	Including determination by calculation of moving averages, with centring, where appropriate.
	Including calculation of mean seasonal variation.
	Use of a trend line and seasonal component in prediction.

11. Elementary ideas of probability.	Including the treatment of mutually exclusive and independent events. Selections made with or without replacement.

12. Probability distributions.
    12.1   Formation of the probability distribution of a discrete variable.
    12.2   Expectation.
	
	Including expected profit and loss in simple games. Idea of a fair game.

7. Mathematical notation

The list which follows summarises the notation used in Cambridge's mathematics examinations. Although primarily directed towards Advanced Level, the list also applies, where relevant, to examinations at Cambridge O Level.

1. Set Notation

$\in$	is an element of
$\notin$	is not an element of
$\{x_1, x_2, \ldots\}$	the set with elements x_1, x_2, …
$\{x: \ldots\}$	the set of all x such that …
$\mathrm{n}(A)$	the number of elements in set A
$\emptyset$	the empty set
$\mathscr{E}$	the universal set
A'	the complement of the set A
$\mathbb{N}$	the set of natural numbers, $\{1, 2, 3, \ldots\}$
$\mathbb{Z}$	the set of integers $\{0, \pm 1, \pm 2, \pm 3, \ldots\}$
$\mathbb{Z}^+$	the set of positive integers $\{1, 2, 3, \ldots\}$
$\mathbb{Z}_n$	the set of integers modulo n, $\{0, 1, 2, \ldots, n-1\}$
$\mathbb{Q}$	the set of rational numbers
$\mathbb{Q}^+$	the set of positive rational numbers, $\{x \in \mathbb{Q}: x > 0\}$
$\mathbb{Q}_0^+$	the set of positive rational numbers and zero, $\{x \in \mathbb{Q}: x \geqslant 0\}$
$\mathbb{R}$	the set of real numbers
$\mathbb{R}^+$	the set of positive real numbers $\{x \in \mathbb{R}: x > 0\}$
$\mathbb{R}_0^+$	the set of positive real numbers and zero $\{x \in \mathbb{R}: x \geqslant 0\}$
$\mathbb{R}^n$	the real n-tuples
$\mathbb{C}$	the set of complex numbers
$\subseteq$	is a subset of
$\subset$	is a proper subset of
$\nsubseteq$	is not a subset of
$\not\subset$	is not a proper subset of
$\cup$	union
$\cap$	intersection
$[a, b]$	the closed interval $\{x \in \mathbb{R}: a \leqslant x \leqslant b\}$
$[a, b)$	the interval $\{x \in \mathbb{R}: a \leqslant x < b\}$
$(a, b]$	the interval $\{x \in \mathbb{R}: a < x \leqslant b\}$
(a, b)	the open interval $\{x \in \mathbb{R}: a < x < b\}$
yRx	y is related to x by the relation R
$y \sim x$	y is equivalent to x, in the context of some equivalence relation

2. Miscellaneous Symbols

$=$	is equal to
$\neq$	is not equal to
$\equiv$	is identical to or is congruent to
$\approx$	is approximately equal to
$\cong$	is isomorphic to
$\propto$	is proportional to
$<, \ll$	is less than, is much less than
$\leqslant, \not>$	is less than or equal to, is not greater than
$>, \gg$	is greater than, is much greater than
$\geqslant, \not<$	is greater than or equal to, is not less than
∞	infinity

3. Operations

$a + b$	a plus b
$a - b$	a minus b
$a \times b$; ab; $a.b$	a multiplied by b
$a \div b$; $\frac{a}{b}$; a/b	a divided by b
$a : b$	the ratio of a to b
$\sum\limits_{i=1}^{n} a_i$	$a_1 + a_2 + \ldots + a_n$
$\sqrt{a}$	the positive square root of the real number a
$\lvert a \rvert$	the modulus of the real number a
$n!$	n factorial for $n \in \mathbb{N}$ ($0! = 1$)
$\binom{n}{r}$	the binomial coefficient $\dfrac{n!}{r!(n-r)!}$, for $n \in \mathbb{N}$, $0 \leqslant r \leqslant n$
	the binomial coefficient $\dfrac{n(n-1)\ldots(n-r+1)}{r!}$, for $n \in \mathbb{Q}$, $r \in \mathbb{N}$

4. Functions

f	function f
f (x)	the value of the function f at x
f $: A \to B$	f is a function under which each element of set A has an image in set B
f $: x \mapsto y$	the function f maps the element x to the element y
f^{-1}	the inverse of the function f
g $\circ$ f; gf	the composite function of f and g which is defined by $(g \circ f)(x)$ or gf $(x) = g(f(x))$
$\lim_{x \to a} f(x)$	the limit of f(x) as x tends to a
$\Delta x; \delta x$	an increment of x
$\dfrac{dy}{dx}$	the derivative of y with respect to x
$\dfrac{d^n y}{dx^n}$	the nth derivative of y with respect to x
f $'(x)$, f $''(x)$, …, f$^{(n)}(x)$	the first, second, …, nth derivatives of f(x) with respect to x
$\displaystyle\int y \, dx$	indefinite integral of y with respect to x
$\displaystyle\int_a^b y \, dx$	the definite integral of y with respect to x for values of x between a and b
$\dfrac{\partial y}{\partial x}$	the partial derivative of y with respect to x
$\dot{x}$, $\ddot{x}$, …	the first, second, … derivatives of x with respect to time

5. Exponential and Logarithmic Functions

e	base of natural logarithms
e^x; exp x	exponential function of x
$\log_a x$	logarithm to the base a of x
ln x	natural logarithm of x
lg x	logarithm of x to base 10

6. Circular and Hyperbolic Functions and Relations

sin, cos, tan, cosec, sec, cot	the circular functions
$\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$, $\csc^{-1}$, $\sec^{-1}$, $\cot^{-1}$	the inverse circular relations
sinh, cosh, tanh, cosech, sech, coth	the hyperbolic functions
$\sinh^{-1}$, $\cosh^{-1}$, $\tanh^{-1}$, $\operatorname{cosech}^{-1}$, sech^{-1}, $\coth^{-1}$	the inverse hyperbolic relations

7. Complex Numbers

i	square root of -1
z	a complex number, $z = x + iy$
	$= r(\cos\theta + i\sin\theta)$, $r \in \mathbb{R}_0^+$
	$= re^{i\theta}$, $r \in \mathbb{R}_0^+$
Re z	the real part of z, Re $(x + iy) = x$
Im z	the imaginary part of z, Im $(x + iy) = y$
$|z|$	the modulus of z, $|x + iy| = \sqrt{(x^2 + y^2)}$, $|r(\cos\theta + i\sin\theta)| = r$
arg z	the argument of z, $\arg(r(\cos\theta + i\sin\theta)) = \theta$, $-\pi$, $\theta \oslash \pi$
z^*	the complex conjugate of z, $(x + iy)^* = x - iy$

8. Matrices

$\mathbf{M}$	a matrix $\mathbf{M}$
$\mathbf{M}^{-1}$	the inverse of the square matrix $\mathbf{M}$
$\mathbf{M}^{T}$	the transpose of the matrix $\mathbf{M}$
det $\mathbf{M}$	the determinant of the square matrix $\mathbf{M}$

9. Vectors

$\mathbf{a}$	the vector $\mathbf{a}$
$\overrightarrow{AB}$	the vector represented in magnitude and direction by the directed line segment AB
$\hat{\mathbf{a}}$	a unit vector in the direction of the vector $\mathbf{a}$
$\mathbf{i}$, $\mathbf{j}$, $\mathbf{k}$	unit vectors in the directions of the cartesian coordinate axes
$|\mathbf{a}|$	the magnitude of $\mathbf{a}$
$|\overrightarrow{AB}|$	the magnitude of $\overrightarrow{AB}$
$\mathbf{a} \cdot \mathbf{b}$	the scalar product of $\mathbf{a}$ and $\mathbf{b}$
$\mathbf{a} \times \mathbf{b}$	the vector product of $\mathbf{a}$ and $\mathbf{b}$

10. Probability and Statistics

A, B, C, etc.	events
$A \cup B$	union of events A and B
$A \cap B$	intersection of the events A and B
P(A)	probability of the event A
A'	complement of the event A, the event 'not A'
P($A|B$)	probability of the event A given the event B
X, Y, R, etc.	random variables
x, y, r, etc.	values of the random variables X, Y, R, etc.
x_1, x_2, …	observations
f_1, f_2, …	frequencies with which the observations x_1, x_2, … occur
$p(x)$	the value of the probability function P($X = x$) of the discrete random variable X
p_1, p_2, …	probabilities of the values x_1, x_2, … of the discrete random variable X
f(x), g(x), …	the value of the probability density function of the continuous random variable X
F(x), G(x), …	the value of the (cumulative) distribution function P($X \oslash x$) of the random variable X
E(X)	expectation of the random variable X
E[g(X)]	expectation of g(X)
Var(X)	variance of the random variable X
G(t)	the value of the probability generating function for a random variable which takes integer values
B(n, p)	binomial distribution, parameters n and p
N(μ,σ^2)	normal distribution, mean μ and variance σ^2
μ	population mean
σ^2	population variance
σ	population standard deviation
$\bar{x}$	sample mean
s^2	unbiased estimate of population variance from a sample, $$s^2 = \frac{1}{n-1}\Sigma (x - \bar{x})^2$$
ϕ	probability density function of the standardised normal variable with distribution N(0, 1)
Φ	corresponding cumulative distribution function
ρ	linear product-moment correlation coefficient for a population
r	linear product-moment correlation coefficient for a sample
Cov(X, Y)	covariance of X and Y

8.   Other information

Equality and inclusion

We have taken great care in the preparation of this syllabus and assessment materials to avoid bias of any kind. To comply with the UK Equality Act (2010), we have designed this qualification with the aim of avoiding direct and indirect discrimination.

The standard assessment arrangements may present unnecessary barriers for candidates with disabilities or learning difficulties. Arrangements can be put in place for these candidates to enable them to access the assessments and receive recognition of their attainment. Access arrangements will not be agreed if they give candidates an unfair advantage over others or if they compromise the standards being assessed.

Candidates who are unable to access the assessment of any component may be eligible to receive an award based on the parts of the assessment they have taken.

Information on access arrangements is in the *Cambridge Handbook* at
www.cambridgeinternational.org/eoguide

Language

This syllabus and the associated assessment materials are available in English only.

Making entries

Exams officers are responsible for submitting entries to Cambridge International. We encourage them to work closely with you to make sure they enter the right number of candidates for the right combination of syllabus components. Entry option codes and instructions for submitting entries are in the *Cambridge Guide to Making Entries*. Your exams officer has a copy of this guide.

Exam administration

To keep our exams secure, we produce question papers for different areas of the world, known as 'administrative zones'. We allocate all Cambridge schools to one administrative zone determined by their location. Each zone has a specific timetable. Some of our syllabuses offer candidates different assessment options. An entry option code is used to identify the components the candidate will take relevant to the administrative zone and the available assessment options.

Retakes

Candidates can retake the whole qualification as many times as they want to. This is a linear qualification so candidates cannot re-sit individual components.

Grading and reporting

Cambridge O Level results are shown by one of the grades A*, A, B, C, D or E, indicating the standard achieved, A* being the highest and E the lowest. 'Ungraded' indicates that the candidate's performance fell short of the standard required for grade E. 'Ungraded' will be reported on the statement of results but not on the certificate. The letters Q (pending), X (no result) and Y (to be issued) may also appear on the statement of results but not on the certificate.

How students and teachers can use the grades

Assessment at Cambridge O Level has two purposes:

- to measure learning and achievement

  The assessment:

  – confirms achievement and performance in relation to the knowledge, understanding and skills specified in the syllabus, to the levels described in the grade descriptions.

- to show likely future success

  The outcomes:

  – help predict which students are well prepared for a particular course or career and/or which students are more likely to be successful

  – help students choose the most suitable course or career.