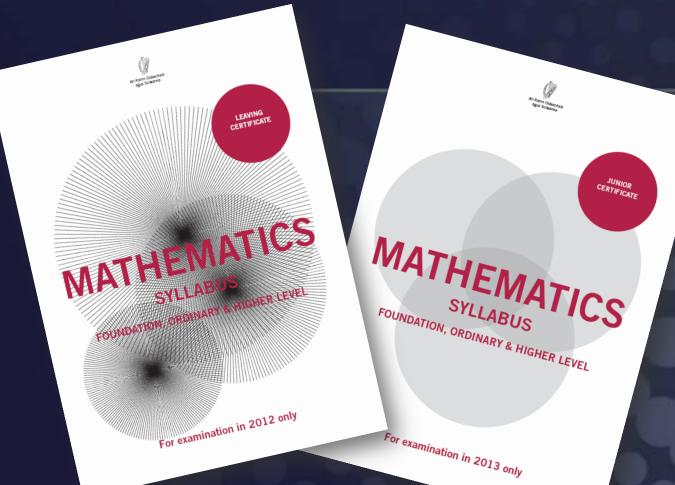
Syllabus & Resources



Junior Certificate Syllabus

•	Section A	Pages
	Intro, aims & objectives etc	5-8
	Syllabus Overview	9-11
	Strands 1 & 2 (pink pages)	13-20
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•	<u>Appendix</u>	
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	(2000 syllabus-blue booklet)	

Leaving Certificate Syllabus

•	Section A	Pages
	Intro, aims & objectives etc	5-8
	Syllabus Overview	9-13
	Strands 1 & 2 (pink pages)	15-23
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•	<u>Appendix</u>	
	Trigonometric Formulae	27
•	Section B	
	Geometry Course	29-76
•	Section C	
	Retained syllabus material	77-99
	(1994 syllabus)	

Junior Cert	lunior Cert Strand 1 Probability				
Горіс	Description of topic Students learn about	Learning outcomes Students should be able to			
1.1 Counting	Listing outcomes of experiments in a systematic way.	List all possible outcomes of an experiment apply the fundamental principle of counting.			
1.2 Concepts of probability	The probability of an event occurring: student progress from informal to formal descriptions of probability. Predicting and determining probabilities. Difference between experimental and theoretical probability.	 decide whether an everyday event is likely or unlikely to occur recognise that probability is a measure on a scale of 0-1 of how likely an event is to occur use set theory to discuss experiments, outcomes, sample spaces use the language of probability to discuss events, 			
	theoretical probability.	including those with equally likely outcomes - estimate probabilities from experimental data - recognise that, if an experiment is repeated, there will be different outcomes and that increasing the number of times an experiment is repeated generally leads to better estimates of probability - associate the probability of an event with its long- run, relative frequency			
1.3 Outcomes of simple andom processes	Finding the probability of equally likely outcomes.	 apply the principle that, in the case of equally likely outcomes, the probability is given by the number of outcomes of interest divided by the total number of outcomes (examples using coins, dice, spinners, urns with different coloured objects, playing cards, etc.) use binary / counting methods to solve problems involving successive random events where only 			
		two possible outcomes apply to each event			

& Ls 1, 2, 4, 5

Student's CD

Leaving Cert Strand 1 Probability				
Students learn about	Students working at FL should be able to	In addition, students working at OL should be able to	In addition, students working at HL should be able to	
1.1 Counting	list outcomes of an experiment apply the fundamental principle of counting	- count the arrangements of n distinct objects (n!) - count the number of ways of arranging r objects from n distinct objects	 count the number of ways of selecting r objects from n distinct objects 	
1.2 Concepts of probability	event is likely or unlikely to happen recognise that probability is a measure on a scale of 0-1 of how likely an event is to occur connect with set theory; discuss experiments, outcomes, sample spaces use the language of probability to discuss events, including those with equally likely outcomes estimate probabilities from experimental data recognise that, if an experiment is repeated, there will be different outcomes and that increasing the number of times an experiment is repeated generally leads to better estimates of probability associate the probability of an event with its long run relative frequency	- discuss basic rules of probability (AND/ OR, mutually exclusive) through the use of Venn Diagrams - calculate expected value and understand that this does not need to be one of the outcomes - recognise the role of expected value in decision making and explore the issue of fair games	 extend their understanding of the basic rules of probability (AND/OR, mutually exclusive) through the use of formulae Addition Rule: P(A ∪ B) = P(A) + P(B) - P(A ∩ B) Multiplication Rule (Independent Events): P(A ∩ B) = P(A) × P(B) Multiplication Rule (General Case): P(A ∩ B) = P(A) × P(B A) solve problems involving conditional probability in a systematic way appreciate that in general P(A B) ≠ P(B A) examine the implications of P(A B) ≠ P(B A) in context 	

T & Ls 1, 2, 3, 4, 5

Student's CD

Leaving Cert Strand 1 Probability cont.

J	
Students learn about	
1.3 Outcomes of random processes	

Students working at FL should be able to

- construct sample spaces to show all possible outcomes for two independent events
 apply the principle that in the
- case of equally likely outcomes the probability is given by the number of outcomes of interest divided by the total number of outcomes (examples using coins, dice, spinners, urns with coloured objects, playing cards etc.)

In addition, students working at OL should be able to

- find the probability that two independent events both occur
- apply an understanding of Bernoulli trials*
- solve problems
 involving up to 3
 Bernoulli trials
- calculate the probability that the 1st success occurs on the nth Bernoulli trial where n is specified

In addition, students working at HL should be able to

- solve problems involving calculating the probability of k successes in n repeated Bernoulli trials (normal approximation not required)
- calculate the probability that the kth success occurs on the nth Bernoulli trial
- use simulations to explore the variability of sample statistics from a known population and to construct sampling distributions
- solve problems involving reading probabilities from the normal distribution tables

T & Ls 2, 3, 4, 5

Student's CD

Probability

- Teaching & Learning Plans
- Student's CD
- Handbooks

All available on projectmaths.ie

Student Resources

Available on ncca.ie/projectmaths

Content Course Modules 3, 4 & 5

JUNIOR CERTIFICATE

LEAVING CERTIFICATE

- 1. Probability Scale
- 2. Relative Frequency
- 3. Fundamental Principle of Counting
- 4. Outcomes of simple random processes
- 5. Basic set theory (HL)
- 6. Equally likely outcomes
- 7. Single Events questions
- 8. Multiple event questions
- 9. Tree Diagrams (HL)
- All Junior Certificate Content
- 2. Arrangements and Selections
- 3. Set theory
- 4. Conditional Probability
- 5. Expected Value
- 6. Bernoulli Trials
- 7. Normal Distribution
- 8. Empirical Rule
- 9. Standard Normal Distribution (HL)
- 10. Standard Scores (z values) (HL)
- 11. Hypothesis Testing using Margin of Error (HL)

Junior Cert Strand 1 Statistics

Topic	Description of topic	Learning outcomes
	Students learn about	Students should be able to
1.4 Statistical	The use of statistics to gather information	engage in discussions about the purpose of
reasoning	from a selection of the population with	statistics and recognise misconceptions and
with an aim	the intention of making generalisations	misuses of statistics
to becoming	about the whole population. They consider	 work with different types of data (categorical/
a statistically	situations where statistics are misused	numerical/ordinal discrete/continuous) in order to
aware consumer	and learn to evaluate the reliability and	clarify the problem at hand
	quality of data and data sources.	– evaluate reliability of data and data sources
1.5 Finding,	Formulating a statistics question based	 clarify the problem at hand
collecting and	on data that vary allows for distinction	– formulate one (or more) questions that can be
organising data	between different types of data.	answered with data
		 explore different ways of collecting data
		 generate data, or source data from other sources
		including the internet
		– select a sample (Simple Random Sample)
		 recognise the importance of representativeness so
		as to avoid biased samples
		 design a plan and collect data on the basis of
		above knowledge
		– summarise data in diagrammatic form including
		spread sheets
	10.0	

Data
Handling
Cycle

Junior Cert Strand 1 Statistics cont.

	Jamor Corectiana i Clationico Conti					
Topic	Description of topic	Learning outcomes				
	Students learn about	Students should be able to				
1.6	Methods of representing data.	Graphical				
Representing	Students develop a sense that data can	 select appropriate graphical or numerical methods 				
data graphically	convey information and that organising	to describe the sample (univariate data only)				
and numerically	data in different ways can help clarify	 evaluate the effectiveness of different displays 				
	what the data have to tell us. They see	in representing the findings of a statistical				
	a data set as a whole and so are able to	investigation conducted by others				
	use fractions, quartiles and median to	 use pie charts, bar charts, line plots, histograms 				
	describe the data.	(equal intervals), s <u>tem and leaf plots</u> to display data				
		– use back-to-back stem and leaf plots to compare				
		data sets				
	Mean of a grouped frequency	Numerical				
	distribution.	 use a variety of summary statistics to analyse the 				
		data: central tendency – <u>mean, median, mode</u>				
		variability – <u>range</u>				
		– use stem plots to calculate quartiles and inter-				
		quartile range				
1.7 Analysing,	Drawing conclusions from data; limitations	– interpret graphical summaries of data				
interpreting	of conclusions.	– relate the interpretation to the original question				
and drawing		– recognise how sampling variability influences the				
conclusions		use of sample information to make statements				
from data		about the population				
		– draw conclusions from graphical and numerical				
		summaries of data, recognising assumptions and				
		limitations				

Data
Handling
Cycle

Student's CD

Leaving Cert Strand 1 Statistics

Leaving Cert Strand 1 Statistics					
Students learn about	Students working at FL should be able to	In addition, students working at OL should be able to	In addition, students working at HL should be able to		
1.4 Statistical reasoning with an aim to becoming a statistically aware consumer	 engage in discussions about the purpose of statistics and recognise misconceptions and misuses of statistics discuss populations and samples decide to what extent conclusions can be generalised work with different types of data (categorical/numerical/ordinal, discrete/continuous) in order to clarify the problem at hand 	– work with different types of bivariate data			
1.5 Finding, collecting and organising data	 clarify the problem at hand formulate one (or more) questions that can be answered with data explore different ways of collecting data generate data, or source data from other sources including the internet select a sample (Simple Random Sample) recognise the importance of randomisation and the role of the control group in studies design a plan and collect data on the basis of above knowledge 	 discuss different types of studies: sample surveys, observational studies and designed experiments design a plan and collect data on the basis of above knowledge 	 recognise the importance of representativeness so as to avoid biased samples recognise biases, limitations and ethical issues of each type of study select a sample (stratified, cluster, quota, etc. – no formulae required, just definitions of these) design a plan and collect data on the basis of above knowledge 		

Data
Handling
Cycle

Leaving Cert Strand 1 Statistics cont.

Students learn about

1.6 Representing data graphically

and numerically

Students working at FL should be able to

Graphical

- select appropriate graphical or numerical methods to describe the sample (univariate data only)
- evaluate the effectiveness of different displays in representing the findings of a statistical investigation conducted by others
- use stem and leaf plots and histograms (equal intervals) to display data

Numerical

- use a variety of summary statistics to decribe the data
- central tendency: mean, median, mode
- · variability: range

In addition, students working at OL should be able to

Graphical

- describe the sample (both univariate and bivariate data) by selecting appropriate graphical or numerical methods
- explore the distribution of data, including concepts of symmetry and skewness
- compare data sets using back to back stem and leaf plots
- determine the relationship between variables using scatterplots
- recognise that correlation is a value from -1 to +1 and that it measures the extent of linear relationship between two variables
- match correlation coefficient values to appropriate scatter plots

Numerical

- recognise standard deviation as a measure of variability
- use a calculator to calculate standard deviation
- use a stem and leaf plot to calculate quartiles and the interquartile range

In addition, students working at HL should be able to

Graphical

- analyse plots of the data to explain differences in measures of centre and spread
- draw the line of best fit by eye
- make predictions based on the line of best fit
- calculate the correlation coefficient by calculator and understand that correlation does not imply causality

Numerical

- recognise the existence and effect of outliers
- use percentiles to assign relative standing
- use the interquartile range appropriately when analysing data

Document

Data
Handling
Cycle

Document

Leaving Cert Strand 1 Statistics cont.

Students learn about	Students working at FL should be able to	In addition, students working at OL should be able to	In addition, students working at HL should be able to
1.7 Analysing, interpreting and drawing inferences from data*	 recognise how sampling variability influences the use of sample information to make statements about the population develop appropriate tools to describe variability, drawing inferences about the population from the sample interpret the analysis relate the interpretation to the original question 	- interpret a histogram in terms of distribution of data - make decisions based on the empirical rule	 recognise the concept of a hypothesis test calculate the margin of error (¹√n) for a population proportion conduct a hypothesis test on a population proportion using the margin of error

Statistics

- Data handling Cycle
- Student CD
- "How to use Census at School"
- ICT Course
- Handbooks

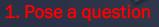
All available on projectmaths.ie

Student Resources

Available on ncca.ie/projectmaths

Content Course Modules 1 & 2

- (a) Primary sources:
 - (i) Observational studies (JCHL, LCOL)
 - (ii) Designed experiments (JC)
- (b) Secondary sources
- Sampling: (i) Random (JC)
 - (ii) Stratified (LCHL)
 - (iii) Cluster (LCHL)
 - (iv) Quota (LCHL)



(C@S)

Generate & Collect
Data

(0.005)



(a) Reliability of Data (JCHL)

- (b) Summarise Data (Spreadsheets)
- (c) Types of Data JC

4. Interpret the Results

(a)

(b)

3. Analyse the

Mean (JCHL)

Median (JC)

Range (JCOL)

(Calculator)

Interquartile (JCHL)

Standard Deviation

Mode (JC)

Types of data:

Categorical/Numerical(JC)

- (a) Univariate Categorical (JC)
 - Pie Charts (JC)
 - Bar Charts (JC)
 - Line Plots (JC)

Univariate Numeric

- Histograms (JC)
- Stem and Leaf(JC)
- Back to Back (JCHL) Line plots (JC)
- (b) Bivariate (LC)

Bivariate Numeric

Scatter plots (LCOL)
Correlation (LCOL)

DL)

(c) Histograms

Spread

Symmetry (LCOL)
Skewness (LCOL)

(d) Line of best fit (LCHL)

Central Tendency

Correlation Coefficient Meaning of (LCOL) Calculate (LCHL)

Misuses and Misconceptions

Census at School (C@S)

Synthetic Geometry

- Theorems and Constructions on Student's CD
- Student Activities
- Theorems in your own words

All available on projectmaths.ie

- >Teachers
 - ► Strand 2
 - ➤ Junior Cycle (Senior Cycle)
 - Supplementary Material

Junior Cert Strand 2 Geometry & Trigonometry

Topic	Description of topic Students learn about	Learning outcomes Students should be able to
2.3 Co-ordinate Geometry	Co-ordinating the plane. Properties of lines and line segments including midpoint, slope, distance and the equation of a line in the form. $y - y_1 = m(x - x_1)$ $y = mx + c$ $ax + by + c = 0 \text{ where } a, b, c, \text{ are integers and } m \text{ is the slope of the line}$	- explore the properties of points, lines and line segments including the equation of a line
	Intersection of lines. Parallel and perpendicular lines and the relationships between the slopes.	- find the point of intersection of two lines, including algebraically - find the slopes of parallel and perpendicular lines
2.4 Trigonometry	Right-angled triangles: theorem of Pythagoras. Trigonometric ratios	- apply the result of the theorem of Pythagoras to solve right-angled triangle problems of a simple nature involving heights and distances - use trigonometric ratios to solve problems involving angles (integer
	Trigonometric ratios in surd form for angles of 30°, 45° and 60° Right-angled triangles Decimal and DMS values of angles.	values) between 0° and 90° – solve problems involving surds – solve problems involving right- angled triangles – manipulate measure of angles in

T & Ls Co-ordinate Plane (Teachers) & Distance

T&L8

Leaving Cert Strand 2 Geometry & Trigonometry

Students learn about	Students working at FL should be able to	In addition, students working at OL should be able to	In addition, students working at HL should be able to
2.2 Co-ordinate geometry	 use slopes to show that two lines are parallel perpendicular 	 calculate the area of a triangle recognise the fact that the relationships y= mx+c, y-y₁ = m (x- x₁) and ax + by + c = 0 are linear solve problems involving slopes of lines recognise that (x-h)² + (y-k)² = r² represents the relationship between the x and y coordinates of points on a circle centre (h, k) and radius r solve problems involving a line and a circle with centre (0, 0) 	 solve problems involving the perpendicular distance from a point to a line the angle between two lines divide a line segment in a given ratio m:n recognise that x²+y²+2gx+2fy+c = 0 represents the relationship between the x and y co-ordinates of points on a circle centre (-g,-f) and radius r where r = √ (g²+f²-c) solve problems involving a line and a circle

Student's CD

Leaving Cert Strand 2 Geometry & Trigonometry cont.

Students learn about	Students working at FL should be able to	In addition, students working at OL should be able to	In addition, students working at HL should be able to
T&L8	 solve problems that involve finding heights and distances from right-angled triangles (2D only) use of the theorem of Pythagoras to solve problems (2D only) solve problems that involve calculating the cosine, sine and tangent of angles between 0° and 90° 	 use trigonometry to calculate the area of a triangle use the sine and cosine rules to solve problems (2D) define sin θ and cos θ for all values of θ define tan θ calculate the area of a sector of a circle and the length of an arc and solve problems involving these calculations T & L 9 	 use trigonometry to solve problems in 3D graph the trigonometric functions sine, cosine, tangent graph trigonometric functions of type aSin nθ, aCos nθ for a, n ∈ N solve trigonometric equations such as Sin nθ = 0 and Cos nθ = ½ giving all solutions use the radian measure of angles derive the trigonometric formulae 1, 2, 3, 4, 5, 6, 7, 9 (see appendix) apply the trigonometric formulae 1-24 (see appendix)
2.4 Transformation geometry	 investigate enlargements paying attention to centre of enlargement scale factor k, where 0<k<1, k="">1 k∈Q</k<1,> area solve problems involving enlargements 	Student's	

Student's CD

T & L 10

End of T & L 9 is start of this section

T & L Radians
(Teachers)

Common Introductory Course for First Years

Strand	Learning outcomes Students should be able to
Strand 1: 1.1 Counting	Iist outcomes of an experiment
Strand 1: 1.2 Concepts of probability It is expected that the conduct of	apply the fundamental principle of counting decide whether an everyday event is likely or unlikely to happen appreciate that probability is a quantity that gives a measure on a scale of 0 - 1 of how likely an event is to occur
experiments (including simulations), both individually and in groups, will form the primary vehicle through which the knowledge, understanding and skills in probability are developed.	
Strand 1: 1.5 Finding, collecting and organising data	 pose a question and reflect on the question in the light of data collected plan an investigation involving statistics select a sample and appreciate the importance of representativeness so as to avoid biased samples design a plan and collect data on the basis of above knowledge
Strand 1: 1.6 Representing data graphically and numerically	 select appropriate graphical or numerical methods to describe the sample (univariate data only) use stem and leaf plots. line plots and bar charts to display data

T&L1

Student's CD

Data
Handling
Cycle

Common Introductory Course for First Years cont.

Strand	Learning outcomes
	Students should be able to
Strand 2: 2.1 Synthetic Geometry	convince themselves through investigation that theorems 1-6 are true
(see Geometry Course for Post-	 construct
primary School Mathematics)	 the bisector of a given angle, using only compass and straight edge
	the perpendicular bisector of a segment, using only compass and
The geometrical results should	straight edge
be first encountered through	4. a line perpendicular to a given line I, passing through a given point on I
discovery and investigation.	a line parallel to a given line I, through a given point
	6. divide a line segment into 2, 3 equal segments, without measuring it
	8. a line segment of given length on a given ray
Strand 2: 2.2 Transformation	 use drawings to show central symmetry and axial symmetry
geometry	
Strand 2: 2.3 Co-ordinate	 coordinate the plane
geometry	 locate points on the plane using coordinates

Student's CD

T & L Co-ordinate Plane (Teachers)

www.projectmaths.ie



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Leagan Gaeilge

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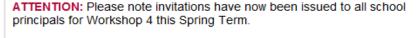
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Material Created by

Teachers

Modular Courses

Examination Papers



Strand 1 Senior Cycle
Strand 2 Junior Cycle

Strand 3

Strand 4

Strand 5

Matha

Teacher Handbooks



Teaching & Learning Plans



Junior Certificate Sample papers for 2011 Now Available.

Click here to access.

New material now available online.

The official sample papers and two new T&L Plans are now available on the Project Maths website.. Video

Watch a video about Project Maths



Latest News

10 January 2011– Junior Certificate Sample papers for 2011 Now Available.

16 December 2010– New material now available online.

08 December 2010— UPDATE: SOME WORKSHOPS CANCELLED DUE TO WEATHER CONDITIONS

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Project Maths

Project Maths is a curriculum and assessment project in post-primary mathematics that began in 2008, arising from the NCCA Review of Mathematics. The project involves a phased change in the mathematics syllabus at junior cycle and senior cycle, with a corresponding incremental change in the examinations.

An initial group of 24 schools introduced the first two revised syllabus strands in September 2008, and these have been refined in light of this experience. In September 2010, these schools take the final step with the introduction of the fifth strand of the revised syllabuses.

National roll-out of the changes began in September 2010, with the introduction of strands 1 and 2 in all schools. The changes will continue in September 2011 and 2012, until all five strands have been introduced in all schools.

Use the links below to find out more about the project, to look at student resources for strands 1 and 2, or to see what the revised syllabuses contain. There are also links to useful websites that contain other resources for mathematics.



This section contains information about Project Maths for parents and students. as well as background information on the project. It also contains some Frequently Asked Questions.



There are some useful resources available on Curriculum in Action and other websites. See inside for comments on and links to these sites.



Syllabuses are being introduced on a phased basis, with corresponding changes to the examinations. This section contains the syllabuses and assessment arrangements for the initial group of schools and also the syllabuses for all other schools.



A selection of resources for students can be accessed through this section. Some of these are multimedia presentations.



