Lectures Proposed by the Board of the Faculty of Mathematics

MATHEMATICAL TRIPOS

Lectures proposed by the Board of the Faculty of Mathematics. Graduates of the University who are not reading for any University Examination may attend without payment any lectures proposed by the Faculty Board of Mathematics.

Part IA students are recommended to attend the induction session which will be held from 9.30 a.m. to 10.45 a.m. on Wednesday 7 October 2009, *in the Cockcroft Lecture Theatre.*

A meeting will be held for all Part IA students on Friday 30 April 2010 at 2.00 p.m. in *Mill Lane Room 3* to discuss examinations and examination techniques.

Note that the non-examinable courses on **Topics in the History of Mathematics** will be of interest to all students reading the Mathematical Tripos. Full details are given below.

MICHAELMAS 2009 **LENT 2010** **EASTER 2010**

PART IA

Lectures for Part IA of the Mathematical Tripos will be held in the *Cockcroft Lecture Theatre* unless otherwise stated.

Numbers and Sets
PROF. A. G. THOMASON
M. W. F. 10
Groups
PROF. J. SAXL
M. W. F. 11
Vectors and Matrices
DR S. J. COWLEY
Tu. Th. S. 10
Differential Equations
PROF. M. G. WORSTER
Tu. Th. S. 11

Non-Examinable Courses
Topics in the History of Mathematics: Ancients to the Renaissance
DR P. BURSILL-HALL
W. F. 4, *Centre for Mathematical Sciences, Room 3*
Introduction to Mechanics
DR S. T. C. SIKLOS
Tu. Th. 12, *Arts School, Room B, Bene't Street* (Twelve lectures)

Analysis I
PROF. G. P. PATERNAIN
M. W. F. 11
Dynamics and Relativity
DR S. T. C. SIKLOS
M. W. F. 12 *Arts School Room A, Bene't Street*
Vector Calculus
DR J. M. EVANS
Tu. Th. S. 10
Probability
PROF. G. R. GRIMMETT
Tu. Th. S. 11

Non-Examinable Course
Topics in the History of Mathematics: Renaissance to the 19th Century
DR P. BURSILL-HALL
W. F. 4, *Centre for Mathematical Sciences, Room 3*

Metric and Topological Spaces*
DR I. SMITH
M. W. F. 10, *Mill Lane Room 3* (Twelve lectures)
Variational Principles*
DR D. M. A. STUART
M. W. F. 11, *Mill Lane Room 3* (Twelve lectures)
Optimisation*
PROF. R. R. WEBER
M. W. F. 12, *Mill Lane Room 3* (Twelve lectures)
Computational Projects*
DR S. J. COWLEY
Tu. Th. 10 (Eight lectures)

Non-Examinable Course
Concepts in Theoretical Physics
DR D. TONG AND DR N. BERLOFF
Tu. Th. 11 (Eight lectures)

* Examined in Part IB of the Tripos

continued >

Faculty of Mathematics (continued)

MATHEMATICAL TRIPOS, PART IB

Lectures for Part IB of the Mathematical Tripos will be held in *Mill Lane Lecture Rooms, Room 3* unless otherwise stated.

MICHAELMAS 2009

Methods
DR C. P. CAULFIELD
M. W. F. 9

Analysis II
DR A. G. KOVALEV
M. W. F. 10

Linear Algebra
DR T. A. FISHER
M. W. F. 11

Markov Chains
PROF. Y. M. SUHOV
Tu. Th. 10 (Twelve lectures)

Quantum Mechanics
PROF. N. DOREY
Tu. Th. 11

Fluid Dynamics
PROF. H. E. HUPPERT
Tu. Th. 12

Non-Examinable Course
Topics in the History of Mathematics: Ancients to the Renaissance
DR P. BURSILL-HALL
W. F. 4, *Centre for Mathematical Sciences, Room 3*

LENT 2010

Complex Analysis
PROF. J. M. E. HYLAND
M. W. 9

Groups, Rings and Modules
DR R. D. CAMINA
M. W. F. 10

Electromagnetism
DR N. G. BERLOFF
M. W. 11

Complex Methods
PROF. G. W. GIBBONS
M. W. 12

Numerical Analysis
PROF. A. ISERLES
Tu. Th. 9

Statistics
DR R. J. SAMWORTH
Tu. Th. 10

Geometry
PROF. B. J. TOTARO
Tu. Th. 11

Fluid Dynamics
PROF. H. E. HUPPERT
Tu. Th. 12

Non-Examinable Course
Topics in the History of Mathematics: Renaissance to the 19th Century
DR P. BURSILL-HALL
W. F. 4, *Centre for Mathematical Sciences, Room 3*

EASTER 2010

Metric and Topological Spaces
DR I. SMITH
M. W. F. 10 (Twelve lectures)

Variational Principles
DR D. M. A. STUART
M. W. F. 11 (Twelve lectures)

Optimisation
PROF. R. R. WEBER
M. W. F. 12 (Twelve lectures)

Faculty of Mathematics (continued)

MATHEMATICAL TRIPOS PART II

Lectures will be held in the Meeting Rooms (MR) of the *Centre for Mathematical Sciences, Clarkson Road,* unless otherwise stated.

A meeting will be held on Wednesday 9 June 2010 for finalists who may continue to Part III of the Tripos in 2009–10. The meeting will be held in *MR2 at the Centre for Mathematical Sciences* at 11.15 a.m.

MICHAELMAS 20099 **LENT 2010** **EASTER 2010**

C COURSES

Topics in Analysis
DR N. WICKRAMASEKERA
M. W. F. 10, *MR2*
Computational Projects
DR S. J. COWLEY
F. 9 Oct. 2–4, *MR2* (One lecture)
Dynamical Systems
DR J. M. STEWART
Tu. Th. S. 9, *MR3*
Number Theory
PROF. J. H. COATES
Tu. Th. S. 10, *MR2*
Classical Dynamics
DR P. D. D'EATH
Tu. Th. S. 12, *MR3*

Statistical Modelling
DR R. NICKL AND DR S. DE ROOIJ
M. W. F. 9, *MR4*
Further Complex Methods
PROF. T. FOKAS
M. W. F. 11, *MR2*
Cosmology
PROF. A. C. DAVIS
M. W. F. 12, *MR2*
Mathematical Biology
PROF. R. E. GOLDSTEIN
Tu. Th. S. 9, *MR3*
Coding and Cryptography
PROF. T. W. KÖRNER
Tu. Th. S. 11, *MR2*
Geometry and Groups
DR T. K. CARNE
Tu. Th. S. 12, *MR2*

D COURSES

Probability and Measure
PROF. J. R. NORRIS
M W. F. 9, *MR3*
Numerical Analysis
DR A. SHADRIN
M. W. F. 9, *MR4*
Waves
PROF. J. R. LISTER
M. W. F 10, *MR3*
Principles of Statistics
PROF. A. P. DAWID
M. W. F. 10, *MR4*
Optimisation and Control
PROF. L. C. G. ROGERS
M. W. 11, *MR3*
Partial Differential Equations
PROF. P. MARKOWICH
M. W. F. 11, *MR4*
Principles of Quantum Mechanics
DR B. ALLANACH
M. W. F. 12, *MR2*
Algebraic Geometry
PROF. I. GROJNOWSKI
M. W. F. 12, *MR4*
Riemann Surfaces
PROF. P. M. H. WILSON
Tu. Th. 9, *MR4*
Asymptotic Methods
DR C. SPARBER
Tu. Th. 10, *MR3*
Galois Theory
DR T. YOSHIDA
Tu. Th. S. 11, *MR2*
Electrodynamics
PROF. M. J. PERRY
Tu. Th. 11, *MR3*
Graph Theory
DR P. A. RUSSELL
Tu. Th. S. 12, *MR2*

The following course is non-examinable
Topics in the History of Mathematics: Ancients to the Renaissance
DR P. BURSILL-HALL
W. F. 4, *Centre for Mathematical Sciences, Room 3*

Logic and Set Theory
PROF. I. B. LEADER
M. W. F. 9, *MR2*
Fluid Dynamics
PROF. M. R. E. PROCTOR
M. W. F. 9, *MR3*
Representation Theory
DR S. MARTIN
M. W. F. 10, *MR2*
Applications of Quantum Mechanics
PROF. R. R. HORGAN
M. W. F. 10, *MR3*
Algebraic Topology
DR J. RASMUSSEN
M. W. F. 11, *MR3*
Applied Probability
PROF. Y. M. SUHOV
M. W. F. 12, *MR3*
Linear Analysis
DR B. SCHLEIN
M. W. F. 12, *MR4*
Stochastic Financial Models
DR M. R. TEHRANCHI
Tu. Th. S. 9, *MR2*
Differential Geometry
DR M. DAFERMOS
Tu. Th. S. 9, *MR4*
General Relativity
DR R. M. WILLIAMS
Tu. Th. 10, *MR2*
Number Fields
PROF. N. I. SHEPHERD-BARRON
Tu. Th. 10, *MR3*
Statistical Physics
DR M. WINGATE
Tu. Th. 11, *MR3*
Integrable Systems
DR. M. DUNAJSKI
Tu. Th. 12, *MR3*

The following courses are non-examinable
Topics in the History of Mathematics: Renaissance to the 19th Century
DR P. BURSILL-HALL
W. F. 4, *Centre for Mathematical Sciences, Room 3*
Laboratory Demonstrations in Fluid Dynamics
DR S. B. DALZIEL
Tu. or Th. 2, *Fluids Laboratory* (Four sessions, beginning 21 *or* 26 January)

continued >

Faculty of Mathematics (continued)

MATHEMATICAL TRIPOS, PART III

All lectures are held at the *Centre for Mathematical Sciences, Clarkson Road* unless otherwise stated. There will be a meeting in *MR2* on Wednesday 7 October 2009 at 9.30 a.m. for all those who intend to offer courses in Part III.

There is a series of meetings for Part III students in MR2, Centre for Mathematical Sciences, at 4.15 p.m. on the following topics:
14 October 2009: PhD applications to Cambridge and other universities
21 October 2009: Exams and lectures
28 October 2009: Research opportunities in Cambridge
4 November 2009: How to write a Part III essay

MICHAELMAS 2009

Quantum Field Theory
PROF. A. C. DAVIS
Tu. Th. 5, *MR2*

Astrophysical Fluid Dynamics
PROF. M. R. E. PROCTOR
M. W. F. 9, *MR5*

Advanced Financial Models
DR M. TEHRANCHI
M. W. F. 9, *MR9*

Methods in Analysis
DR B. SCHLEIN
M. W. F. 10, *MR5*

Commutative Algebra
DR S. J. WADSLEY
M. W. F. 10, *MR9*

Cosmology
DR A. D. CHALLINOR AND PROF. J. D. BARROW
M. W. F. 10, *MR13*

General Relativity
DR O. RINNE
M. W. F. 11, *MR2*

Linear Analysis
DR D. J. H. GARLING
M. W. F. 11, *MR5*

Differential Geometry
DR J. A. ROSS
M. W. F. 9, *MR2*

Structure and Evolution of Stars
DR J. J. ELDRIDGE
M. W. F. 11, *MR13*

Mathematics of Operational Research
PROF. F. P. KELLY AND MR N. S. WALTON
M. W. F. 12, *MR3*

Algebraic Number Theory
DR V. DOKCHITSER
M. W. F. 12, *MR5*

Geophysical and Environmental Fluid Dynamics
DR S. B. DALZIEL
M. W. F. 12, *MR9*

Quantum Information Theory
DR N. DATTA
M. W. F. 12, *MR12*

Numerical Solution of Differential Equations
PROF. A. ISERLES
M. W. F. 12, *MR13*

Symmetry and Particle Physics
PROF. M. B. GREEN
M. W. F. 12, *MR14*

Category Theory
PROF. P. T. JOHNSTONE
Tu. Th. S. 9, *MR5*

Local Fields
DR T. A. FISHER
Tu. Th. 9, *MR12*

Reaction – Diffusion Equations
DR K. FELLNER
Tu. Th. 9, *MR13*

Combinatorics
PROF. A. G. THOMASON
Tu. Th. 10, *MR4*

Approximation Theory
DR A. SHADRIN
Tu. Th. S. 10, *MR5*

LENT 2010

Complex Manifolds
PROF. P. M. H. WILSON
M. W. F. 9, *MR5*

The Standard Model
PROF. H. OSBORN
M. W. F. 9, *MR9*

Fluid Dynamics of Energy
DR C. P. CAULFIELD AND PROF. A. W. WOODS
M. W. F. 9, *MR13*

Planetary System Dynamics
DR M. C. WYATT
M. W. F. 10, *MR4*

String Theory
DR D. TONG
M. W. F. 10, *MR9*

Stochastic Networks
MR N. S. WALTON
M. W. 10, *MR12*

Iwasawa Theory of Elliptic Curves with Complex Multiplication
PROF. J. H. COATES
M. W. F. 10, *MR14*

Applications of Differential Geometry to Physics
PROF. M. J. PERRY
M. W. F. 11, *MR4*

Topics in Groups
PROF. J. SAXL
M. W. F. 11, *MR5*

Spectral Geometry
DR D. BARDEN
M. W. F. 11, *MR11*

Galaxies
PROF. R. C. KENNICUTT
M. W. F. 11, *MR13*

Applied Bayesian Statistics
PROF. D. SPIEGELHALTER
M. W. 11, *MR14 and CATAM Room* (Eleven lectures and five classes)

Atiyah Singer Index Theorem
DR A. J. WASSERMANN
M. W. 12, *MR5*

Time Series+
DR R. B. GRAMACY
M. W. F. 12, *MR9* (First eight lectures)

Monte Carlo Inference+
DR R. B. GRAMACY
M. W. F. 12, *MR9* (Last sixteen lectures)

Topics in Calculus and Algebra
PROF. I. GROJNOWSKI
M.W. F. 12, *MR12*

Black Holes
DR H. S. REALL
M. W. F. 12, *MR13*

Statistics in Medical Practice++
PROF. D. J. SPIEGELHALTER et al.
W. 4–6pm, *MR14* (Six hours)

Set Theory and Logic
DR T. E. FORSTER
Tu. Th. S. 9, *MR5*

Quantum Control
DR S. G. SCHIRMER
Tu. Th. 10, *MR9*

EASTER 2010

Solitons and Instantons
DR D. M. A. STUART
M. Tu. Th. F. 9, *MR9*

Supergravity
PROF. G. W. GIBBONS
M. Tu. Th. F. 11, *MR9*

Applied Statistics
DR B. D. M. TOM
Tu. Th. 10, *MR12* (Four lectures and four classes)

+ These two courses constitute the twenty –four hour course in Time Series and Monte Carlo Inference
++ These two courses constitute the sixteen hour course in Biostatistics

Faculty of Mathematics (continued)

MATHEMATICAL TRIPOS, PART III (continued)

MICHAELMAS 2009

Lie Groups, Lie Algebras and their Representations
PROF. B. J. TOTARO
M. W. F. 11, *MR9*
Applied Statistics
DR S. M. PITTS
Tu. Th. 10, *MR12*
Slow Viscous Flow
PROF. J. R. LISTER AND DR D. J. R. VELLA
Tu. Th. S. 10, *MR13*
Algebraic Topology
DR J. RASMUSSEN
Tu. Th. S. 11, *MR9*
Topics in Fourier Analysis and Complex Variable
PROF. T. W. KÖRNER
Tu. Th. S. 11, *MR11*
Statistical Theory
DR R. J. SAMWORTH
Tu. Th. 11, *MR12*
Algebraic Geometry
DR C. BIRKAR
Tu. Th. S. 12, *MR4*
Additive Combinatorics
PROF. W. T. GOWERS
Tu. Th. 12, *MR5*
Biological Physics
PROF. R. E. GOLDSTEIN
M. W. F. 12, *MR12*
Advanced Probability
DR I. BAILLEUL
Tu. Th. S. 12, *MR12*
Quantum Information, Entanglement and Nonlocality
DR A. P. A. KENT, DR B. GROISMAN AND DR J. OPPENHEIM
Tu. Th. 12, *MR13*
Perturbation and Stability Methods
PROF J. M. RALLISON AND PROF. N. PEAKE
Tu. Th. S. 12, *MR14*
Statistical Field Theory
PROF. R. R. HORGAN
M. W. F. 9, *MR11*

The following course is non-examinable
Demonstrations in Fluid Dynamics
DR S. B. DALZIEL
Th. 2, *Fluids Laboratory*

LENT 2010

Solidification of Fluids
PROF. M. G. WORSTER AND DR J. A. NEUFELD
Tu. Th. S. 9, *MR13*
Actuarial Statistics
DR S. M. PITTS
Tu. Th. 9, *MR14*
Probabilistic Combinatorics
PROF. B. BOLLOBAS
Tu. Th. 10, *MR4*
The X-Ray Transform in Geometry and Dynamics
PROF. G. P. PATERNAIN
Tu. Th. S. 10, *MR5*
Quantum Computing
DR A. SHORT
Tu. Th. 9, *MR12*
Nonparametric Statistical Theory
DR R. NICKL
Tu. Th. 10, *MR12*
Topics in Representation Theory
DR C. J. B. BROOKES
Tu. Th. S. 10, *MR13*
Topics in Analytic Number Theory
DR T. SANDERS
Tu. Th. 11, *MR4*
Stochastic Calculus
DR N. BERESTYCKI
Tu. Th. S. 11, *MR5*
Advanced Quantum Field Theory
PROF. N. DOREY
Tu. Th. S. 11, *MR9*
Survival Data++
DR P. TREASURE
Tu. Th. 11, *MR12* (Ten lectures)
Wave Scattering in Inhomogeneous Media
DR O. RATH-SPIVACK
Tu. Th. 11, *MR13*
Ramsey Theory
PROF. I. B. LEADER
Tu. Th. 12, *MR4*
Elliptic Curves
DR T. DOKCHITSER
Tu. Th. S. 12, *MR5*
Polar Oceans and Climate Change
PROF. P. WADHAMS
Tu. Th. 12, *MR11*
Schramm-Loewner Evolutions
PROF. J. R. NORRIS
Tu. Th. 12, *MR12*
Supersymmetry
DR B. ALLANACH
Tu. Th. 9, *MR11*
Astrophysical Dynamics
PROF. N. W. EVANS
M. W. F. 9, *MR12*

EASTER 2010

+ These two courses constitute the twenty –four hour course in Time Series and Monte Carlo Inference
++ These two courses constitute the sixteen hour course in Biostatistics

continued >

Faculty of Mathematics (continued)

COURSES INTENDED FOR GRADUATES (NON-EXAMINABLE)

MICHAELMAS 2009

Derived Algebraic Geometry
DR J. P. PRIDHAM
M. W. F. 9, *MR13*

Medical Imaging and Boundary Value Problems
PROF. T. FOKAS
M. W. F. 11, *MR11*

Philosophy of Physics
DR J. N. BUTTERFIELD
M. 4.30–6, *MR13*

Gluon Scattering Amplitudes, Twistors and Integrability
DR M. WOLF
Tu. 2, *MR12*

Concentration of Measure
DR N. BERESTYCKI AND DR R. NICKL
M. 2–4, *MR13*

LENT 2010

An Introduction to the Singularity Theory for Geometric Variational Problems
DR N. WICKRAMASEKERA AND PROF. L. SIMON
M. W. F. 10, *MR5*

Representation Theory and Practice
DR R. PARKER
M. W. F. 10, *MR13*

Philosophy of Physics
DR J. N. BUTTERFIELD
M. 4.30–6, *MR13*

Galois Representations
DR T. YOSHIDA
Tu. Th. S. 10, *MR11*

Topics in Algebraic Geometry
DR C. BIRKAR
Tu. Th. S. 11, *MR11*

EASTER 2010

Geometric Combinatorics
DR B. BUKH
M. W. F. 10, *MR4*

Graph Ramsey Theory
DR D. CONLON
M. W. F. 11, *MR4*

Introduction to Twistor Theory
MS I. M. M. BORZYM
M. Tu. Th. F. 12, *MR9*

Hamiltonion Quantisation of Constrained Systems
DR P. D. D'EATH
Tu. Th. 10, *MR11*

Gravitational Instantons
DR M. DUNAJSKI
Tu. Th. 2, *MR9*

M.PHIL. IN STATISTICAL SCIENCE

Lectures are held in *the Centre for Mathematical Sciences,* unless otherwise stated.

Advanced Financial Models
DR M. TEHRANCHI
M. W. F. 9, *MR9*

Introduction to Probability
DR N. BERESTYCKI
M. W. 11, *MR12*

Mathematics of Operational Research
PROF. F. P. KELLY AND MR N. S. WALTON
M. W. F. 12, *MR3*

Applied Statistics
DR S. M. PITTS
Tu. Th. 10, *MR12*

Statistical Theory
DR R. J. SAMWORTH
Tu. Th. 11, *MR12*

Applied Bayesian Statistics
PROF. D. SPIEGELHALTER
M. W. 11, *MR14 and CATAM Room* (eleven lectures and five classes)

Time Series+
DR R. B. GRAMACY
M. W. F. 12, *MR9* (first eight lectures)

Monte Carlo Inference+
DR R. B. GRAMACY
M. W. F. 12, *MR9* (last sixteen lectures)

Statistics in Medical Practice++
PROF. D. J. SPIEGELHALTER et al.
W. 4–6pm, *MR14* (Six hours)

Actuarial Statistics
DR S. M. PITTS
Tu. Th. 9, *MR14*

Nonparametric Statistical Theory
DR R. NICKL
Tu. Th. 10, *MR12*

Survival Data++
DR P. TREASURE
Tu. Th. 11, *MR12* (ten lectures)

Applied Statistics
DR B. D. M. TOM
Tu. Th. 10, *MR12* (four lectures and four classes)

\+ These two courses constitute the twenty –four hour course in Time Series and Monte Carlo Inference
++ These two courses constitute the sixteen hour course in Biostatistics

M.PHIL. IN COMPUTATIONAL BIOLOGY

Lectures are held in *the Centre for Mathematical Sciences,* unless otherwise stated.

Genome Informatics
DR G. MICKLEM AND OTHERS
M. 3–4, *MR15*, 4–5, *CATAM Lab*

Disease Dynamics
DR J. GOG AND OTHERS
Tu. Th. 10, *MR15*

Functional Genomics
PROF. S. TAVARÉ AND OTHERS
M.W. 12–2, *MR15* and *CATAM Lab*

Structural Biology
DR J. HUPPERT AND OTHERS
W. F. 10, *MR15*

Systems Biology
DR J. PAULSSON
M. W. 2–4, *MR5*

Network Biology
PROF. L. WERNISCH
Tu. 10, *MR15* and F. 11 *MR15*

Computational Neuroscience
DR S. EGLEN
Tu. Th 12, *MR15*

Statistical Genetics
PROF. S. TAVARÉ AND DR V. PLAGNOL
W. F. 11, *MR15*

Methods and Models in Genomics
DR P. LIO
W. F. 11–1, *MR15*