

## NATURAL SCIENCES TRIPOS, PART IA

MICHAELMAS 2004

LENT 2005

EASTER 2005

## BIOLOGY OF CELLS

Course Organiser: Dr J. P. Carr E-mail: john.carr@plantsci.cam.ac.uk

All lectures take place in the *Babbage Lecture Theatre, New Museums Site* on M. W. F. 10

DR S. H. P. MADDELL

The Living Cell. (Four lectures, beginning 8 Oct.)

PROF. D. J. ELLAR

Macromolecules in the Cell. (Five lectures, beginning 18 Oct.)

DR J. M. DAVIES

Membranes: Molecular Superstructures. (Five lectures, beginning 29 Oct.)

DR A. SMITH AND DR J. GRIFFIN

The Chemistry of Life. (Ten lectures, beginning 10 Nov.)

DR D. K. SUMMERS

Hunting the Gene. (Seven lectures, beginning 21 Jan.)

DR M. WELCH

Genes in Action. (Six lectures, beginning 7 Feb.)

PROF. D. GLOVER

The Genetic Revolution. (Six lectures, beginning 21 Feb.)

PROF. R. A. LASKEY

Cell Proliferation. (Five lectures, beginning 7 Mar.)

DR A. WEBB

Cell Signalling. (Six lectures, beginning 29 Apr.)

PROF. J. SMITH

Development. (Six lectures, beginning 13 May)

**Practical work** takes place in the *Zoological Laboratory* at 11–1 and 2–4 on M. or W. or F. For those doing Geology, practical times are 12–1 and 2–5; and for those doing Materials and Mineral Sciences times are 11–12 and 2–5. Students should register for all biological practical courses on Tu. 5 Oct. between 2.00 and 3.45 in the *Senate House*.

## CHEMISTRY

Course Organiser: Dr J. H. Keeler E-mail: James.Keeler@ch.cam.ac.uk

All lectures will be given in *Bristol-Myers Squibb Lecture Theatre, Department of Chemistry, Lensfield Road* on Tu. Th. S. 10

DR P. D. WOTHERS

Shapes and Structures of Molecules. (Nineteen lectures)

DR W. P. NOLAN

Reactions and Mechanisms in Organic Chemistry. (Five lectures)

DR P. D. WOTHERS

Chemistry of the Elements. (Twelve lectures)

DR W. P. NOLAN

Reactions and Mechanisms in Organic Chemistry. (Nine lectures, continued)

DR J. H. KEELER

Energetics and Equilibria. (Nine lectures)

DR S. CLARKE

Kinetics of Reactions. (Six lectures)

DR P. D. WOTHERS

Chemistry of the Elements. (Twelve lectures)

**Practical Chemistry:** M. W. F. 10–12 or 11–1 and 2–5; Tu. Th. 11–1 and 2–5. Students should register in the *Department of Chemistry, Lensfield Road*, between 8.30 and 12.30 or 2 and 4.30 on Tu. 5 Oct. when they will be assigned attendance on the morning and afternoon periods of one particular day in either odd weeks (beginning Th. 7 Oct.) or even weeks (beginning Th. 14 Oct.) of the Michaelmas term

## ELEMENTARY MATHEMATICS FOR BIOLOGISTS

Course Organiser: Dr R. W. Broadhurst E-mail: rwb1002@cam.ac.uk  
Course Website: www.phar.cam.ac.uk/teaching/EMB/

Elementary Mathematics for Biologists is intended for students who do not have A-level Mathematics.

Lectures will be given at 9 a.m. in the *Rayleigh Lecture Theatre, New Museums Site*

DR J. ROGERS

Introduction. (One lecture, 8 Oct.) F.

DR J. ROGERS

Trigonometry and Graphs. (Three lectures, 29 Oct.–5 Nov.) M. F.

PROF. P. A. MCNAUGHTON

Logarithms and Raising to Powers. (Two lectures, 8–12 Nov.) M. F.

DR R. W. BROADHURST

Calculus I. (Five lectures, 15–29 Nov.) M. F.

DR F. H. KING

**Examples classes**Introduction to Computing and Excel. (Five sessions) (11–25 Oct.) M. F. 8.30–10 *Titan Rooms 1 and 2, New Museums Site*

THE LECTURERS

**Examples classes\*** (Five classes, 3 Nov.–1 Dec.) W. 9 *Large Classroom, Department of Pharmacology*

DR R. W. BROADHURST

Calculus II. (Six lectures, 21 Jan.–7 Feb.) M. F.

DR J. ALCÁNTARA

Statistics. (Ten lectures, 11 Feb.–14 Mar.) M. F.

DR J. ALCÁNTARA

Curve Fitting. (Two lectures, 29 Apr.–2 May) M. F.

PROF. P. A. MCNAUGHTON

Frequency Analysis. (Two lectures, 6–9 May) M. F.

THE LECTURERS

Revision lectures. (Three lectures, 13–20 May) M. F.

THE LECTURERS

**Examples classes\*** (Two classes, 4, 11 May) W. 8.30–10 *PWF facility, Titan Rooms, (Two classes, 18, 25 May) W. 9 Large Classroom, Department of Pharmacology*

\* **Examples classes:** Two of the exercises in each of the Michaelmas and Lent Terms and one from the Easter Term will be assessed with marks counting towards the examination.

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## NATURAL SCIENCES TRIPOS, PART IA (continued)

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## EVOLUTION AND BEHAVIOUR

Course Organiser: Dr R. Preece E-mail: r.c.preece@zoo.cam.ac.uk

All lectures are held on Tu. Th. Sa. at 11 in the *Main Lecture Theatre, Department of Zoology*

DR W. A. FOSTER  
Introduction to Evolutionary Biology. (Four lectures, beginning 7 Oct.)

DR F. BALLOUX  
Evolutionary Genetics. (Eight lectures, beginning 16 Oct.)

DR A. BARBROOK  
Early Events in Evolution. (Three lectures, beginning 4 Nov.)

DR B. J. GLOVER  
The Origin and Evolution of Plants. (Five lectures, beginning 11 Nov.)

DR B. J. GLOVER  
Diversification of Angiosperms. (Four lectures, beginning 23 Nov.)

PROF. M. E. AKAM  
The Organisation of Animal Diversity. (Six lectures, beginning 20 Jan.)

DR R. S. K. BARNES  
Major Changes and Major Constraints in Animal Evolution. (Six lectures, beginning 3 Feb.)

DR N. CLAYTON, PROF. E. B. KEVERNE AND PROF. A. DICKINSON  
Evolution of Behaviour. (Twelve lectures, beginning 17 Feb.)

PROF. A. DICKINSON, DR N. CLAYTON, DR P. LEE AND DR M. PETRAGLIA  
Primate and Human Evolution and Behaviour. (Twelve lectures, beginning 28 Apr.)

**Practical work:** M. 12–5 (alternate weeks) or Tu. 12–5 (alternate weeks) *Department of Zoology*. Students should register for all biological practical courses on Tu. 5 Oct. between 2.00 and 3.45 in the *Senate House*.

## GEOLOGY

Course Organiser: Dr N. Hovius E-mail: nhovius@esc.cam.ac.uk

All lectures are given in the *Physiology Lecture Room*, adjacent to the Department of Earth Sciences, on M. W. F. 11

PROF. J. A. JACKSON AND DR M. HOLNESS  
Earth as a Planet and Volcanic Processes. (Twenty-four lectures)

PROF. S. CONWAY-MORRIS  
Palaeobiology. (Eleven lectures)

DR N. HOVIUS  
Earth Surface Processes and Sediments. (Twelve lectures)

DR N. H. WOODCOCK  
Introduction to Geology of Arran. (One lecture)

**Field Course in Arran**  
Party A. 17–25 March  
Party B. 7–15 April  
Party C. 14–22 April

DR N. H. WOODCOCK  
Britain's Geology: Solving the Jigsaw. (Five lectures)

PROF. J. A. JACKSON AND PROF. S. CONWAY-MORRIS  
Planet Earth: the Bigger Picture. (Seven lectures)

**Practical work:** There are three one-hour practicals to be taken per week: students choose one from each set (Set 1: F. 12, S. 10, M. 9, M. 10; Set 2: M. 12, Tu. 10, W. 9, W. 10; Set 3: W. 12, Th. 10, F. 9, F. 10). Students must register for practical classes in the *Department of Earth Sciences* on Tuesday, 5 Oct. between 9.30 and 1 or 2.30 and 5.

**Long Vacation Course:** A course on Geological Field Methods will be given 19–29 Sept 2005 for students intending to take a geological subject in Part IB.

## MATERIALS AND MINERAL SCIENCES

Course Organiser: Prof. T. W. Clyne E-mail: Part IA@msm.cam.ac.uk

This course is offered jointly by the Department of Materials Science and Metallurgy and the Department of Earth Sciences.

All lectures are held in the *Physiology Lecture Theatre* on M.W. F. 12

PROF. M. A. CARPENTER  
Organisation of atoms in crystals. (Eight lectures)

DR S. A. T. REDFERN  
Order and Disorder. (Eight lectures)

DR J. L. DRISCOLL  
Materials and Devices. (Eight lectures)

DR Z. H. BARBER  
Microstructure. (Twelve lectures)

PROF. T. W. CLYNE  
Mechanical Behaviour of Solids. (Twelve lectures)

PROF. A. L. GREER  
Biomaterials. (Six lectures)

DR S. A. T. REDFERN  
Materials under Extreme Conditions. (Six lectures)

**Practical work:** Two two-hour periods each week, one to be taken on M. 2–4, Tu. 11–1, W. 10–12 or W. 2–4; and the other on Th. 11–1, F. 10–12, F. 2–4 or M. 10–12, starting Thursday, 7 Oct. at 11 a.m. Students should register for practical work at the *Tilley Lecture Theatre, South Wing, Department of Earth Sciences* between 9.30 and 12.30 or 2.30 and 4.30 on Tu. 5 Oct.

Note: Students are advised to leave one or other of the periods Tu. 11–1 and Th. 11–1 available for the Computing Course for Physical Scientists (see p. 175).

## NATURAL SCIENCES TRIPOS, PART IA (continued)

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## MATHEMATICS

Course Organiser: E-mail: nst@maths.cam.ac.uk

All students should also attend at least the first lecture of the Computing Course for Physical Scientists given in the Michaelmas Term (see below).

All lectures are held on Tu. Th. S. and will start at 9 a.m. promptly.

**Course A**

DR I. R. PARRY

Mathematics I. *Zoology Lecture Theatre***Examples Class** W. 4.30–6 (Two classes, 10, 24 Nov.) *Arts School, Bene't Street, Room A*

DR M. J. PERRY

Mathematics II. (Sixteen lectures, ending 24 Feb.) *Zoology Lecture Theatre***Examples Class** W. 4.30–6 (Two classes, 2, 16 Feb.) *Arts School, Bene't Street, Room A*

DR H. E. MASON

Mathematics III. (Twelve lectures) *Zoology Lecture Theatre***Course B**

DR R. ANSORGE

Mathematics I. *Chemical Laboratory***Examples Class** W. 4.30–6 (Four classes, 20 Oct., 3, 17 Nov., 1 Dec.) *Arts School, Bene't Street, Room A*

DR F. H. KING

Computing Techniques and Applications. (Six lectures, beginning 26 Feb.) *Chemical Laboratory***Practical work.** see comment below

DR M. G. WORSTER

Mathematics II. (Sixteen lectures, ending 26 Feb.) *Chemical Laboratory***Examples Class** W. 4.30–6 (Two classes, 9, 23 Feb.) *Arts School, Bene't Street, Room A*

PROF. J. WILLIS

Mathematics III. (Twelve lectures) *Chemical Laboratory*

DR F. H. KING

Computing Techniques and Applications. (Six lectures, beginning 26 Feb.) *Chemical Laboratory***Practical work.** see comment below

Associated with the Computing Techniques and Applications course there will be an assessed computing exercise which will be taken into account by the Examiners. The assessments will take place in the afternoons of 9, 10, and 11 May 2005 in the *Foyer of the Babbage Lecture Theatre*. Further details will be issued during the first lecture of the Computing Course for Physical Scientists (see below).

## COMPUTING COURSE FOR PHYSICAL SCIENTISTS

**Course A** is intended to be that which is normally taken. **Course B** takes place outside lecture term and is intended for undergraduates reading *Evolution and Behaviour*. The two courses will be identical in content.

**Course A**

DR F. H. KING

Scientific Computing. Tu. S. 11 (Six lectures, beginning 9 Nov.) or Th. S. 11 (Six lectures, beginning 11 Nov.) *Chemical Laboratory, Lensfield Road*

**Practical work:** Registration for a total of one hour of formal practical work will take place in the first lecture. The computing facilities used for the practical work will be available for informal use throughout the year.

**Course B**

DR F. H. KING

Scientific Computing. Th. F. 9 (Two days, beginning 2 Dec.) *Titan Teaching Room, New Museums Site*

**Practical work:** Formal practical work will be included in the two-day period. The computing facilities used for the practical work will be available for informal use throughout the year.

## NATURAL SCIENCES TRIPOS, PART IA (continued)

MICHAELMAS 2004

LENT 2005

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## PHYSICS

Course Organiser: Dr G. A. C. Jones E-mail: IA-physics@phy.cam.ac.uk

**Courses A and B** are alternatives which cover the same syllabus. Those intending to continue with physics in later years can attend either course without disadvantage. **Course A** may be more suitable for students who took single-subject mathematics at A-level. Students are recommended to attend **course PC** 'Computing Course for Physical Scientists' (see p. 175) unless they are familiar with spreadsheets and computer-aided algebra.

All lectures are on M. W. F. at 9

**Course A** is given in the *Cockcroft Lecture Theatre, New Museums Site;***Course B** is given in the *Chemical Laboratory, Lensfield Road.***Course A**

DR D. A. GREEN  
Mechanics and Relativity. (First twenty lectures)  
DR G. A. C. JONES  
Fields, Oscillations and Waves. (Last four lectures)

DR G. A. C. JONES  
Fields, Oscillations and Waves. (First sixteen lectures)  
PROF. M. S. LONGAIR  
Statistical and Quantum Physics. (Last eight lectures)

PROF. M. S. LONGAIR  
The same continued.

**Course B**

DR P. DUFFETT-SMITH  
Mechanics and Relativity. (First twenty lectures)  
DR J. RILEY  
Fields, Oscillations and Waves. (Last four lectures)

DR J. RILEY  
Fields, Oscillations and Waves. (First sixteen lectures)  
DR P. ALEXANDER  
Statistical and Quantum Physics. (Last eight lectures)

DR P. ALEXANDER  
The same continued.

**Laboratory Work**

DR C. A. HANIFF AND OTHERS  
Experimental Physics. M. or Tu. or Th. or F. 2-6  
Students attend one afternoon every fortnight.

DR G. A. C. JONES AND OTHERS  
The same continued.

DR C. J. B. FORD AND OTHERS  
The same continued.

**Laboratory Work** takes place at the *Cavendish Laboratory (West Cambridge)*. All students must attend an introductory talk and register for **Laboratory Work** at 11.30 a.m. on W. 6 Oct. at the *Cavendish Laboratory*. The Laboratory may be approached by the Madingley Road, or via the Coton cycle and footpath. For cyclists and pedestrians the latter is strongly recommended. **Laboratory work is continuously assessed.**

## PHYSIOLOGY OF ORGANISMS

Course Organiser: Prof. A. C. Crawford E-mail: ac151@cam.ac.uk  
Course website: [www.physiol.cam.ac.uk/PartIA/PhysiolOfOrg.html](http://www.physiol.cam.ac.uk/PartIA/PhysiolOfOrg.html)

All lectures take place in the *Physiology Main Lecture Theatre* at Tu. Th. S. 12.

DR C. J. SCHWIENING  
Cells in Water. (Three lectures, 7-12 Oct.)  
PROF. A. C. CRAWFORD  
Nerve, Synapse and Sense Organs. (Five lectures, 14-23 Oct.)  
PROF. R. C. THOMAS  
The Structure and Function of Muscle. (Three lectures, 26-30 Oct.)  
DR C. J. SCHWIENING  
Cardiac Physiology. (Three lectures, 2-6 Nov.)  
DR MICHAEL J. MASON  
Animal O<sub>2</sub> Acquisition and Respiration. (Three lectures, 9-13 Nov.)  
DR S. O. SAGE  
Osmo- and Ionic Regulation in Animals. (Four lectures, 16-23 Nov.)  
DR D. J. TOLHURST  
Animal Nutrient Acquisition. (Three lectures, 25-30 Oct.)

DR MATTHEW J. MASON  
Homeostasis. (Five lectures, 20-29 Jan.)  
DR J. M. HIBBERD  
Plant Physiology: an Introduction. (Four lectures, 1-8 Feb.)  
DR D. E. HANKE  
Plant Hormones. (Four lectures, 10-17 Feb.)  
PROF. H. GRIFFITHS  
Plant Adaptations and Interactions. (Five lectures, 19 Feb.-1 Mar.)  
DR K. JOHNSTONE AND DR J. DAVIES  
Physiology of Plant - Microbe Interactions. (Six lectures, 3-15 Mar.)

DR D. J. TOLHURST  
Food Intake and Energy Balance. (Three lectures, 28 Apr. - 3 May)  
PROF. S. H. P. MADDRELL  
Integrative Animal Physiology. (Six lectures, 5-17 May)  
DR C. J. SCHWIENING AND OTHERS  
Comparing the Physiology of Plants and Animals. (Two seminars, 19, 21 May)

**Practical Work** W. or F. 12-1 and 2-5

The same continued.

The same continued.

**Practical Work:** Students should register for all biological practical courses on Tu. 5 Oct. between 2.00 and 3.45 in the *Senate House*.

## NATURAL SCIENCES TRIPOS, PART IA (continued) AND PART IB

MICHAELMAS 2004

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### QUANTITATIVE BIOLOGY

Course Organiser: Prof. C. A. Gilligan E-mail: [chris.gilligan@plantsci.cam.ac.uk](mailto:chris.gilligan@plantsci.cam.ac.uk)

Quantitative Biology is intended for those students who have studied Mathematics at 'A' level. It does not provide a qualification for offering Mathematics in Part IB of the Natural Sciences Tripos.

New material, comprising the course syllabus will be presented in the Tuesday and Thursday lectures. Additional worked examples, together with revision to aid the transition from 'A' level will be presented in the Saturday lectures. There will be no more than six Saturday lectures during the Michaelmas and Lent terms and three in the Easter term.

Lectures will be held in the *Large Lecture Theatre, Department of Plant Sciences*, **Computer practicals in the Titan Teaching Room, New Museum Site**, **Examples classes in the Arts School, Room B, New Museum Site**, unless otherwise stated.

#### Lectures. Tu. Th. 9

PROF. C. A. GILLIGAN

Introduction to the Growth and Decline of Populations.  
(Ten lectures, 7 Oct. – 9 Nov.)

PROF. C. P. ELLINGTON

Physiological Modelling. (Six lectures, 11–30 Nov.)

MR J. J. TRAPP

Introduction to Modelling of Interacting  
Populations. (Seven lectures, 20 Jan.–  
10 Feb.)

DR J. GOG

Interacting Populations: Ecological  
Applications. (Four lectures, 15–24 Feb.)

DR W. AMOS

Introduction to Statistical Methods. (Five  
lectures, 1–15 Mar.)

DR R. JOHNSTONE

Optimisation and Game Theory. (Four  
lectures, 28 Apr. – 10 May)

DR W. AMOS

Introduction to Statistical Methods. (Four  
lectures, 12–24 May)

#### Supplementary lectures. S. 9

These lectures are to aid the transition from A level, and to present worked examples from the syllabus.

**Examples classes and Computer Practicals** Th. 2–3.15, 3.30–4.45 or 4.45–6

PROF. C. A. GILLIGAN, PROF. C. P. ELLINGTON AND DR R.  
JOHNSTONE

MR J. J. TRAPP, DR J. GOG, DR W. AMOS, AND DR R.  
JOHNSTONE

DR R. JOHNSTONE

**Examples Classes:** Students should register for all biological practical courses on Tu. 5 Oct. between 2.00 and 3.45 in the *Senate House*.

## PART IB

### ADVANCED PHYSICS

Course Organiser: Dr C. J. B. Ford E-mail [IB-advanced-physics@phy.cam.ac.uk](mailto:IB-advanced-physics@phy.cam.ac.uk)

Lectures are given in the *Cockcroft Lecture Theatre, New Museums Site*, unless otherwise stated.

DR C. J. FORD

Electromagnetism. Tu. Th. Sa. 9 (Not last two Sa.)

DR J. ELLIS

Classical Dynamics. (First ten lectures) Tu. Th.  
Sa. 9

DR W. ALLISON

Statistical Physics. (Last nine lectures) Tu. Th. 9

DR W. ALLISON

The same continued. (First seven lectures)

Those not taking NST Part IB Mathematics:

DR S. WITHINGTON

Mathematics and Theoretical Physics. M. F. 11 *Room B,  
Arts School, Bene't Street*

Those taking NST Part IB Mathematics:

PROF. M. WARNER

Methods of Mathematical Physics. M. W. 9  
*Room 1, Mill Lane Lecture Rooms*

#### Laboratory Work

DR R. D. E. SAUNDERS

Systems and Measurement.

DR R. J. BUTCHER

Waves and Optics.

**Laboratory Work** takes place at the *Cavendish Laboratory (West Cambridge)*. The experimental laboratories are open M. 2–6, Tu. 10–6, Th. 10–6 and F. 2–6. Students will be allocated periods within these times. All students must attend an introductory talk and register for **Laboratory Work** at 2.30 p.m. on W. 6 Oct. at the *Cavendish Laboratory*. **Laboratory work is continuously assessed.**