NATURAL SCIENCES TRIPOS, PART III

MICHAELMAS 2008 **LENT 2009** **EASTER 2009**

ASTROPHYSICS

Course Website: http://www.ast.cam.ac.uk/teaching/undergrad/partiii/partiiicourseguide03.html

All lectures will be held in *the Centre for Mathematical Sciences meeting rooms (MR), Clarkson Road except * which will be held at the Institute of Astronomy, Madingley Road and † in the Pippard Lecture Theatre (P) or Small Lecture Theatre (S) in the Cavendish Laboratory (West Cambridge).*

DR N. W. EVANS
Astrophysical Dynamics. M. W. F. 9, *MR14*
DR O. RINNE
General Relativity. M. W. F. 10, *MR3*
DR F. K. PRIESTLEY, PROF. D. MCKENZIE AND DR A. DEUSS†
Physics of the Earth as a Planet. M. W. F. 10, *(P)*
DR A. CHALLINOR, PROF. A. C. DAVIS, DR H. PEIRIS
Cosmology. M. W. F. 11, *MR9*
PROF. A. C. DAVIS
Quantum Field Theory. Tu. Th. S. 9, *MR2*
DR C. A. TOUT AND DR J. J. ELDRIDGE
Structure and Evolution of Stars. Tu. Th. S. 10, *MR11*
PROF. M. A. THOMSON†
Particle Physics. Tu. Th. S. 10, *(S)*
DR G. I. OGILVIE
Astrophysical Fluid Dynamics. Tu. Th. S. 11, *MR11*
DR J. S. SANDERS*
Introduction to Unix and Computing (5 lectures daily, starting Th. 9 October) *024, CTA*

PROF. R. C. KENNICUTT
Galaxies. M. W. F. 9, *MR15*
PROF. M. PETTINI
Physical Cosmology. M. W. F. 10, *MR15*
DR H. S. REALL
Black Holes. M. W. F. 11, *MR9*
PROF. E. P. S. SHELLARD
Advanced Cosmology Tu. Th. 9, *MR4*
PROF. M. R. E. PROCTOR AND DR L. J. SILVERS
Stellar and Planetary Magnetic Fields. Tu. Th. S. 10, *MR11*
PROF. J. E. PRINGLE
Accretion Discs. Tu. Th. 11, *MR11*

BIOCHEMISTRY

Course Organiser: Prof. C. J. Howe (email: ch26@mole.bio.cam.ac.uk)
Course Website: http://www.bioc.cam.ac.uk/teaching/partii/index.html

Lectures are given in the *Department of Biochemistry.*

The course starts with an introductory lecture by PROF. HOWE at 9 a.m. on M. 6 Oct. in the *Lecture Theatre in the Sanger Building, Department of Biochemistry*, *Old Addenbrooke's Site.*

Research Techniques lectures will be held in the *Lecture Theatre in the Sanger Building, Department of Biochemistry, Old Addenbrooke's site.* Detailed time-tables will be posted in the *Department of Biochemistry.*

Option course lectures take place throughout the day in Lent Term and are held in the *Hopkins Building, Department of Biochemistry, Downing site*. Detailed time-tables will be posted in the *Department of Biochemistry.*

Research project support
DEPARTMENTAL STAFF
Laboratory Safety, Preparation of Scientific Figures and Scientific Reports, Record Keeping, Experimental Design, Seminar Presentation. 6–17 Oct.

Research Technique Lectures Tu. Th. 5
DEPARTMENTAL STAFF AND OTHERS
Organiser: Dr D. Nietlispach (pg-admin@bioc.cam.ac.uk)
Molecular Biology. (Five lectures)
Bioinformatics overview (One lecture)
Protein Expression and Purification. (Four lectures)
Analytical Techniques in Protein and Peptide Characterization. (Three lectures)
Structure Determination by NMR and X-ray Crystallography. (Four lectures)

Research Project Symposium
PROF. C. J. HOWE AND DR T. R. HESKETH (Joint chairs)
Presentation of interim reports. 8–9 Dec.

Research Technique Lectures Tu. Th. 5
DEPARTMENTAL STAFF AND OTHERS
Organiser: Dr D. Nietlispach (pg-admin@bioc.cam.ac.uk)
Protein-Protein Interactions in Solution. (Five lectures)
Molecular Modelling and Computational Biochemistry. (Two lectures)
Proteomics and Functional Genomics. (Six lectures)
Microscopy and Imaging. (Four lectures)

Options lectures
1. PROF. G. P. C. SALMOND AND OTHERS
Bacterial virulence and antimicrobial chemotherapy (Fifteen lectures)
Option Organiser: Prof. G. P. C. Salmond
2. PROF. J. O. THOMAS AND OTHERS
Proteins, nucleic acids and their interactions (Fifteen lectures)
Option Organiser: Prof. J. O. Thomas
3. DR J. HIRST AND OTHERS
Mitochondria and bioenergetics (Fifteen lectures)
Option organiser: Dr J. Hirst

Research Project Symposium
PROF. C. J. HOWE AND DR T. R. HESKETH (Joint chairs)
Presentation of final reports. 7– 8 May

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NATURAL SCIENCES TRIPOS, PART III (continued)

MICHAELMAS 2008	LENT 2009	EASTER 2009
	4. DR P. DUPREE AND OTHERS Plant cell and molecular biology (Fifteen lectures) 5. PROF. C. W. J. SMITH AND OTHERS Control of gene expression in eukaryotes (Fifteen lectures in part joint with Part II Zoology.) Option Organisers: Prof. C. W. J. Smith and Dr T. Krude 6. PROF. K. SIDDLE AND OTHERS Medical biochemistry – Obesity and diabetes from genes to pathology (Fifteen lectures) Option Organiser: Prof. K. Siddle 7. DR F. HOLLFELDER AND OTHERS Enzyme mechanisms and chemical biology (Fifteen lectures) Option Organiser: Dr F. Hollfelder 9. DR T. R. HESKETH AND OTHERS Cancer – Oncogenes, tumour suppressor genes, apoptosis and carcinogenesis (Fifteen lectures in part joint with Option A (module 3) of Part II Pathology.) Option Organisers: Dr T. R. Hesketh and Dr P. Edwards 10. DR F. R. LIVESEY AND OTHERS Stem cell biology (Fifteen lectures) Option Organiser: Dr F. R. Livesey 12. PROF. T. L. BLUNDELL AND OTHERS Biotechnology (Fifteen lectures) Option Organiser: Dr K. Lilley	

CHEMISTRY

Course Organiser: Dr J. H. Keeler (email: jhk10@cam.ac.uk)
Course Website: www-teach.ch.cam.ac.uk

Students must register for the course in the *Department of Chemistry, Lensfield Road,* between 0900 and 1600 on Tu. 7 Oct.

A booklet containing details of the times of the lecture courses will be given out on registration. Others interested in the lecture courses can obtain a copy of this booklet on application to the Course Organiser. This information is also available on the website, www-teach.ch.cam.ac.uk

All students must attend an introductory talk concerning the course at 10 a.m. on W. 8 Oct. in *the Wolfson Lecture Theatre*.

All lectures will be given in the *Department of Chemistry, Lensfield Road* unless otherwise stated.

NATURAL SCIENCES TRIPOS, PART III (continued)

MICHAELMAS 2008 **LENT 2009** **EASTER 2009**

EXPERIMENTAL AND THEORETICAL PHYSICS

Departmental Contact: Dr Padman (email: III-physics@phy.cam.ac.uk)
Course Website: www.phy.cam.ac.uk/teaching/

Students must offer 3 courses from **Major Options**, together with 3 courses from **Minor Options. Quantum Field Theory** may be substituted for one **Major Option**. Courses from **Interdisciplinary Topics**, **Nuclear Power Engineering** and **Further Work** may each be substituted for one **Minor Option**. **Advanced Quantum Field Theory** may be substituted for two **Minor Options**.

The courses from the **Major Options** and **Minor Options**, **Nuclear Power Engineering** and **Quantum Field Theory** are examined at the start of the term following that in which they are given. **Advanced Quantum Field Theory** and courses from the **Interdisciplinary Topics** will be examined in June. The Entrepreneurship course from **Further Work** is continually assessed.

All students are recommended to attend the **Non-examinable courses**.

The course will begin with a meeting on the first Wednesday of Full Term (8 Oct.) at 12.30 p.m. in the *Small Lecture Theatre*.

Lectures are given at the *Cavendish Laboratory (West Cambridge)* unless otherwise stated.

The lecture rooms are indicated as follows:

(P) *Pippard Lecture Theatre*, (S) *Small Lecture Theatre*, (M) *Mott Seminar Room*.

All Part III Mathematics courses are given in the *Centre for Mathematical Sciences, Clarkson Road* in the rooms indicated in parentheses.

Major Options

PROF. H. SIRRINGHAUS *(P)*
Advanced Quantum Condensed Matter Physics. T. Th. S. 11

PROF. U. STEINER *(S)*
Soft Matter. Tu. Th. S. 10

DR P. ALEXANDER, PROF. A. C. FABIAN AND PROF. A. N. LASENBY *(S)*
Astrophysics and Cosmology. M. W. F. 9

PROF. M. A. THOMSON *(S)*
Particle Physics. M. W. F. 11

DR K. F. PRIESTLEY, PROF. D. MCKENZIE AND DR A. DEUSS *(S)* Physics of the Earth as a Planet. M. W. F. 10

PROF. P. B. LITTLEWOOD *(S)*
Quantum Condensed Matter Field Theory. Tu. Th. S. 12

DR M. K. KÖHL AND DR Z. HADZIBABIC *(S)*
Atomic and Optical Physics. M. W. F. 12

Quantum Field Theory

The following course from Part III Mathematics (p. 143) may be offered for examination.

PROF. A. C. DAVIS
Quantum Field Theory. Tu. Th. S. 9 (CMS MR2)

Minor Options

Twelve-lecture courses beginning in the second week of term.

DR J. R. BATLEY *(S)*
Gauge Field Theory. Tu. Th. 9 (beginning 22 Jan.)

PROF. D. J. C. MACKAY *(P)*
Information Theory, Pattern Recognition and Neural Networks. M. W. 2 (beginning 26 Jan.)

DR C. G. LESTER *(S)*
The Frontiers of Particle Physics. M. F. 9 (beginning 23 Jan.)

DR J. COLE *(M)*
The Frontiers of Experimental Condensed Matter Physics. M. F. 9 (beginning 23 Jan.)

PROF. G. G. LONZARICH *(M)*
Superconductivity and Quantum Coherence. T. Th. 11 (beginning 22 Jan.)

DR C. H. W. BARNES *(S)*
Quantum Information. M. F. 10 (beginning 23 Jan.)

PROF. B. D. SIMONS *(M)*
Phase Transitions and Collective Phenomena. Tu. Th. 12 (beginning 22 Jan.)

DR R. D. E. SAUNDERS *(S)*
The Frontiers of Observational Astrophysics. W. F. 11 (beginning 23 Jan.)

DR R. E. ANSORGE AND OTHERS *(S)*
Medical Physics. Tu. Th. 2 (beginning 22 Jan.)

DR J. GUCK *(S)*
Biological Physics. M. W. 12 (beginning 26 Jan.)

DR C. J. B. FORD *(M)*
The Physics of Nanoelectronic Systems. M. W. 10 (beginning 26 Jan.)

DR M. P. HOBSON *(S)*
General Relativity. Tu. Th. 10 (beginning 22 Jan.)

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NATURAL SCIENCES TRIPOS, PART III (continued)

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Advanced Quantum Field Theory	The following course from Part III Mathematics (p. 144) may be offered for examination in place of **two** minor options. PROF. N. DOREY Advanced Quantum Field Theory. Tu. Th. S. 11 (CMS MR3)	
Nuclear Power Engineering	The following course from Part IIB Engineering (p. 128) may be offered for examination in place of **one** minor option. DR G. T. PARKS *(venue to be confirmed)* Nuclear Power Engineering. M. 12, W. 9 (beginning 19 Jan.)	
Interdisciplinary Topics	PROF. D. J. C. MACKAY AND OTHERS *(S)* Materials, Electronics and Renewable Energy. (Interdisciplinary course). Tu. Th. 12.15 (beginning 22 Jan.) DR M. HERZOG AND OTHERS *(Tilley LT)* Climate Change. (Interdisciplinary course). Tu. Th. 10 (beginning 22 Jan.) PROF. R. L. JONES AND OTHERS *(venue to be confirmed)* Atmospheric Chemistry and Global Change. (Interdisciplinary course). Tu. Th. 9 (beginning 22 Jan.)	
Examples Classes		DR J. R. BATLEY AND OTHERS *(P)* Examples Classes in General Physics. Tu. F. 2–4 (Nine classes, beginning 24 Apr., no class on 8 May)
Non-examinable courses THE STAFF OF THE CAVENDISH LABORATORY Postgraduate Research Opportunities at the Cavendish. Reception on Th. 20 Nov. at 1 p.m. in the Foyer of the Pippard Lecture Theatre. Exhibition from 17 Nov. to 28 Nov.	DR J. N. BUTTERFIELD *(S)* Philosophy of Physics. F. 12 (Four lectures beginning 16 Jan.) DR R. C. JENNINGS *(S)* Ethics of Physics. F. 12 (Four lectures beginning 13 Feb.) THE STAFF OF THE CAVENDISH LABORATORY Current Research Work in the Cavendish Laboratory. Open Days for students reading Part II or Part III Physics W. 2–5 The Open Days will start with introductory talks at 2 p.m. in the *Cavendish Laboratory* Research in the *TCM Group* (4 Feb. 2.15 in *TCM Seminar Room*)	
PROF. P. B. LITTLEWOOD AND OTHERS Cavendish Physical Society seminars. W. 4.15 (Alternate weeks beginning 15 Oct.)	PROF. P. B. LITTLEWOOD AND OTHERS The same continued.	PROF. P. B. LITTLEWOOD AND OTHERS The same continued.
Further Work DR D. F. BUSCHER Long Vacation Project.	DR S. VYAKARNAM AND OTHERS (*Mill Lane Lecture Theatre 6*) Entrepreneurship. M. Th. 4 (beginning 19 Jan.)	
Project Work DR R. PADMAN AND OTHERS Project Work.	DR R. PADMAN AND OTHERS The same continued.	DR R. PADMAN AND OTHERS The same continued.

NATURAL SCIENCES TRIPOS, PART III (continued)

MICHAELMAS 2008	LENT 2009	EASTER 2009

GEOLOGICAL SCIENCES AND MINERAL SCIENCES

Website: http://www.esc.cam.ac.uk/new/v10/teaching/geology/ii-iii/courses.html
Coursework website: https://camtools.caret.cam.ac.uk/

Students attend the seminar course in the Michaelmas Term and take three options in the Lent and Easter Term.

Seminar Course
A series of seminars will be run during the Michaelmas Term. Tu. 5 Tilley Lecture Theatre; Th. 5 Harker Room

Option M6 Diffraction, Electron Microscopy and Microanalysis
DR C. PETRONE, DR J. COLE, DR C. J. HOWARD AND A. N. OTHER
Convenor: Prof. M. T. Dove
Lectures. Th. 2, F. 9 *Harker 2*
Practicals. Th. 3–4.30, F. 10–11.30 *IB Minerals Laboratory*

Option 6 Continental Tectonics and Mountains
PROF. J. A. JACKSON AND PROF. D. MCKENZIE
Convenor: Prof. J. A. Jackson
Lectures. Tu. Th. 2 *Tilley Lecture Theatre.*
Practicals. Tu. Th. 3–4.30 *Petrology Laboratory*
The same continued. (Eight revision sessions)

Option 7 Oceanic and Continental Margins
PROF. R. S. WHITE, DR F. TILMANN, DR J. MACLENNAN AND DR J. HAINES
Convenor: Prof. R. S. White
Lectures. W. F. 9 *Harker Room*
Practicals. W. F. 10–11.30 *Petrology Laboratory*
The same continued. (Eight revision sessions)

Option 8 Magmatic Processes
DR S. GIBSON, DR M. HOLNESS AND PROF. A. WOODS
Convenor: Dr S. Gibson
Lectures. M. W. 2 *Harker Room*
Practicals. M. W 3–4.30 *Petrology Laboratory*
The same continued. (Eight revision sessions)

Option 9 Quaternary Oceans and Climate Change (IDP2)
PROF. H. ELDERFIELD AND OTHERS
Convenor: Prof. H. Elderfield
Lectures. Tu. Th. 10 *Tilley Lecture Theatre.*
Practicals. Tu. Th. 11–12 and Other *Petrology Laboratory*
The same continued. (Eight revision sessions)

Option 10 Ancient Ecosystems
DR N. J. BUTTERFIELD AND PROF. S. CONWAY MORRIS, DR A. TURCHYN AND A. N. OTHER
Convenor: Dr N. J. Butterfield
Lectures. M. 9, F. 2 *Harker Room*
Practicals. M. 10–11 F. 3–4.30 *Palaeontology Laboratory*
The same continued. (Eight revision sessions)

Option M4 Mechanical Behaviour of Minerals
PROF. S. A. T. REDFERN, DR M. DARAKTCHIEV AND DR A. WALKER
Convenor: Prof. S. A. T. Redfern
Lectures. M. 9, F. 2 *Harker 2*
Practicals. M. 10–11, F. 3–4.30 *1B Minerals Laboratory*
The same continued. (Eight revision sessions)

Option M5 Computational Methods in Crystal Physics
PROF. E. ARTACHO, DR K. TRACHENKO AND A. N. OTHER
Convenor: Prof. E. Artacho
Lectures: W. F. 9 *Harker 2*
Practicals. W. F. 10–11.30 IB *Harker 2*
The same continued. (Eight revision sessions)

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NATURAL SCIENCES TRIPOS, PART III (continued)

MICHAELMAS 2008 **LENT 2009** **EASTER 2009**

MATERIALS SCIENCE AND METALLURGY

Course Organiser: Dr Z. H. Barber (email: PartIII@msm.cam.ac.uk)
Course Website: www.msm.cam.ac.uk/teaching/PtIII/

A detailed timetable is available on the Department website, as above.

All lectures will be given in the *Austin Lecture Room.*

DR N. A. RUTTER
T1 Thermal Analysis. (Four lectures)
DR C. DUCATI
T2 Electron Microscopy and Analysis. (Eight lectures)
DR H. J. STONE
T3 Optical, X-Ray and Neutron Techniques. (Six lectures)
PROF. P. A. MIDGLEY
M1 Electron and Photons in Solids. (Twelve lectures)
DR J. A. LITTLE AND DR K. M. KNOWLES
M4 Surface Engineering. (Twelve lectures)
PROF. C. J. HUMPHREYS AND DR R. A. OLIVER
M10 Semiconductor Nanostructures for Devices. (Twelve lectures)
DR R. E. CAMERON
M11 Biomaterials. (Twelve lectures)
DR K. G. SANDEMAN AND DR B. A. GLOWACKI
M13 Magnetic and Superconducting Materials. (Twelve lectures)
DR E. R. WALLACH
M14 Joining. (Twelve lectures)
PROF. G. T. BURSTEIN
M15 Corrosion and Protection. (Twelve lectures)
DR P. D. BRISTOWE
M16 Materials Modelling. (Twelve lectures)

Speakers from Industry
Details available from the Department website.

Visit to Industry
Details available from the Department website.

Project
Group project

Management, Language and Computing Options
Details available from the Department website.

DR Z. H. BARBER
M2 Thin Films. (Twelve lectures)
DR R. V. KUMAR
M3 Extraction and Recycling. (Twelve lectures)
DR C. RAE
M5 Deformation Kinetics. (Twelve lectures)
PROF. A. H. WINDLE
M6 Polymeric Materials and Carbon Nanotubes. (Twelve lectures)
DR N. D. MATHUR
M7 Electronic Ceramics. (Twelve lectures)
PROF. A. L. GREER AND DR B. A. GLOWACKI
M8 Glasses and Nanomaterials. (Twelve lectures)
PROF. A. K. CHEETHAM
M9. Functional Inorganic Materials. (Twelve lectures)
DR E. R. WALLACH
M12 Materials: Energy and Sustainability. (Twelve lectures)

Speakers from Industry
Details available from the Department website.

Visit to Industry
Details available from the Department website.

Project
Individual research project

Management, Language and Computing Options
Details available from the Department website.

Examples Classes
Timetable available on the Department website.