



UNIVERSITY COLLEGE LONDON

Department of Physics and Astronomy

UNDERGRADUATE BROCHURE

Physics (part-time) Programme

SESSION 2005/2006

Dates of College Terms

The College terms for the session 2005/2006 are:

First Term:	Monday 26 September 2005 – Friday 16 December 2005	(12 weeks)
Second Term:	Monday 9 January 2006 – Friday 24 March 2006	(11 weeks)
Third Term:	Monday 24 April 2006 – Friday 9 June 2006	(7 weeks)

Please note that lectures on the evening degree course usually do not start until the second week of the first term and sometimes encroach into the first week and/or last week of the Easter vacation. The Induction Evening for new students is usually held on the Wednesday of the first week of the first term.

While every effort has been made to ensure the accuracy of the information in this document, the Department cannot accept responsibility for any errors or omissions contained herein.

*A copy of this handbook can be found on the Department web site:
www.phys.ucl.ac.uk*

See also the dedicated web site at: www.phys.ucl.ac.uk/part-time/PTPhysics/

FOREWORD

Thank you for your enquiry about studying Physics at University College London, one of the foremost universities in Britain and the world.

The general teaching aim of the Department is to deliver teaching programmes designed to develop a student's full potential, using the research strengths and experience of the staff in a challenging, but friendly and supportive, environment. During the course of a B.Sc. here you will not only acquire an in-depth understanding of physics, but also gain a sufficiently broad education in specialist and transferable skills to facilitate progression to a wide variety of careers, both within and outside the physics profession.

We hope that you will join us at the Department of Physics and Astronomy at UCL, but whatever your choice we wish you success in your studies!

Professor Jonathan Tennyson

Head of Department

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IMPORTANT NOTE

The part-time evening Physics degree is run in collaboration with Birkbeck College, our neighbouring fellow institution of the University of London. The degree operates as a University of London intercollegiate course under Birkbeck regulations which are specially adapted to suit part-time evening courses. Birkbeck is responsible for processing the enrolment of students and receiving fee payments. However the academic side of the programme is run entirely by UCL with all teaching and examining taking place within the Department of Physics and Astronomy at UCL. Students enjoy all the facilities available to any UCL student, such as the library, computing resources, the Students' Union, and the various amenities within the Department of Physics and Astronomy, as well as those of Birkbeck.

1. THE COURSE STRUCTURE

The course leading to the degree of B.Sc. in Physics is structured into three levels which a student undertakes sequentially. All levels of the degree include physics lectures and physics practical classes. At levels 1 and 2 there are also lectures in mathematics.

LEVEL 1 Courses at this level are introductory in nature.

LEVEL 2 Includes some courses of an introductory nature which complete a basic course in physics begun at level 1. The remainder are of an intermediate standard linking directly with more specialised courses taken at level 3.

LEVEL 3 Courses at this level are more advanced, and cover all areas of physics. Students are required to include project work at this level.

2. DURATION OF DEGREE PROGRAMME AND COURSE SEQUENCE

The course is normally spread over four years of part-time study involving attendance on three evenings per week (6pm to 9pm). One year is spent at each of levels 1 and 2 with two years required to take the modules at level 3. The degree comprises 11 course units of study with two-and-a-half being taken at levels 1 and 2 and three in each of the years devoted to level 3. Course modules at levels 1 and 2 are given annually; those at level 3 are divided between alternate years, as shown below. They may be entered in either year of the cycle.

Note that the second term lecture courses run on into the first week of the Easter vacation. This is in order to accommodate the mid-term week of discussion classes. Some of the revision classes may also be held during the Easter vacation.

3. FEES

4. DETAILS OF PHYSICS COURSES

AT LEVEL ONE:

Course Unit Value	Course Number	Course Title
0.5	1B28	Thermal Physics
0.5	1B72	Waves and Modern Physics
0.5	1B70	Physics Laboratory and Computing I
1	1B71	Mathematics for Physics I

AT LEVEL TWO:

Course Unit Value	Course Number	Course Title
0.5	1B47	Classical Mechanics
0.5	2B22	Quantum Physics
0.5	2201	Electricity and Magnetism 1
0.5	2B70	Physics Laboratory and Computing II
0.5	2246	Mathematics 3

AT LEVEL THREE:

LECTURE COURSES (only half of the courses are taught in any given year)

Even years starting in 2006/2007:

Course Unit Value	Course Number	Course Title
0.5	2B28	Statistical Thermodynamics and Condensed Matter Physics
0.5	3C25	Solid State Physics
0.5	3C43	Lasers and Modern Optics
0.5	3302	Electricity and Magnetism 2
0.5	3C74	Topics in Modern Cosmology

Odd years starting in 2007/2008:

Course Unit Value	Course Number	Course Title
0.5	2B24	Atomic and Molecular Physics
0.5	2B27	Environmental Physics
0.5	3C24	Nuclear and Particle Physics
0.5	3C26	Quantum Mechanics
0.5	3C75	Principles and Practice of Electronics

PRACTICAL COURSES

Students in the third *year* take the 0.5 unit 3C70, *Physics Practical*.

Students in the fourth *year* take the 0.5 unit 3C80, *Physics Practical and Project*.

4.1. Advancement Through The Levels

- Admission to courses at level 2 is normally conditional upon having passed (or been exempted from) the examinations on all the courses at level 1.
- Admission to courses at level 3 is normally conditional upon having passed (or been exempted from) the examinations on all the courses at level 2.

4.2 Mathematical Techniques

- The physics courses at Level 1 are designed to be taken in parallel with, or following on from 1B71, *Mathematics for Physics*.
- At Level 2, 2B22, *Quantum Physics*, is designed to be taken after or in parallel with 2246, *Mathematics 3*.
- The more mathematical courses at Level 3 may only be taken with or following 2246.

4.3 Experimental Work

The course contains the following practical courses:

- LEVEL 1** Physics Laboratory with Computing I
- LEVEL 2** Physics Laboratory and Computing II
- LEVEL 3** An initial ‘taught course’ is taken in the student’s third year (the 0.5 unit 3C70, *Physics Practical*), followed in a student’s fourth year by a course with a project element (the 0.5 unit 3C80, *Physics Practical and Project*).

The laboratory taught courses are each assessed on coursework assignments, including any computing component. Course 3C80, *Physics Practical and Project* is assessed by both coursework assignments and on a project report.

5. EXAMINATIONS

Each lecture course will be examined in April/May (sometimes extending into June) in the third term of the session in which it is completed. Students who have not

followed a course satisfactorily may be denied entry to the examination. Students who wish to defer entry must seek permission from the Course Tutor. Applicants should note that, in contrast to the lectures and practical classes, all examinations are held during the daytime.

5.1 Referrals

Candidates who narrowly fail an examination at levels 1 and 2 will normally be offered the chance to improve their performance via an oral examination held in early September. Students who are 'referred' in this way must first complete over the summer vacation *all* questions on the examination for which they are referred. Completion of the paper to a good standard and a satisfactory performance in the oral are required before a passing grade is awarded for the course.

Note: The re-assessment scheme at UCL is currently under review and the arrangements may differ from those described above.

6. AWARD OF A DEGREE

In order to be awarded the B.Sc. degree a student must have:

- (i) completed the prescribed course of study,
- (ii) been successful in examinations to the value of at least 9 course-units.

6.1 Course Assessment

At Levels One and Two

- For lecture courses except *Mathematics for Physics*, *Mathematics 3*, *Electricity and Magnetism 1* and *Quantum Physics* (1B71, 2246, 2201, 2B22), 85% of the credit is assigned to the examination and 15% to continuous assessment based on problems set throughout the course. For 1B71, 2246, 2201 and 2B22, 90% of the credit is assigned to the examination and 10% to continuous assessment based on problems set throughout the course
- For Physics Practical, 1B70 and 2B70, 100% of the credit is via continuous assessment, 67% on laboratory notebooks and reports, and 33% on Computing course work.

At Level Three

- For lecture courses except *Environmental Physics* (2B27), 90% of the credit is assigned to the examination and 10% to continuous assessment based on problems set throughout the course. For 2B27, 80% of the credit is assigned to the

examination and 20% to continuous assessment based on one essay and problems set throughout the course

- For *Physics Practical*, 3C70, credit is 100% via continuous assessment based on laboratory notebooks and reports. For *Physics Practical and Project*, 3C80, credit is 100% via continuous assessment divided into 50% based on laboratory notebooks and 50% on performance in the project. The latter will include a project report, poster production and short talk.

6.2 Scheme For The Award Of Honours

Candidates will be examined on all components of the course except those from which they have been exempted under Advanced Student or other University Regulations. Under University Regulations a candidate who has completed and passed nine course-units or more qualifies for a B.Sc. degree and will be considered for the award of Honours. Honours will be assessed on the basis of:

- the best four half course-units at level I,
- the best four half course-units at level II,

and

- the eleven best half course-units at level III,

totalling nine-and-a-half course units. Full course units are considered as two half-units for this purpose.

The percentage marks for each course module are combined to form a weighted average, the weighting depending on the level of the course. Modules at level I are given a weighting of *one*, at level II *three*, and level III *four* – per course unit in each case. An initial assessment of Honours Class is based on this weighted average, M , according to the following scheme:

Range of Marks M	Degree Classification
$M \geq 70\%$	First Class
$70 > M \geq 60$	Upper Second
$60 > M \geq 50$	Lower Second
$50 > M \geq 40$	Third
$40 > M \geq 35$	Pass

The Examiners may take note of all relevant information, including performance in any other course units, in any oral examination, and any special factors, such as certified illness or disability, before making the final recommendation for Honours Class.

7. PASTORAL SUPPORT

7.1 The Course Tutor

The tutor with overall responsibility for the degree is Dr Malcolm Coupland. It is his responsibility to advise students on all matters affecting their progress through the degree. He will normally be available to students in the hour before lectures start in his room, L3/B4 off Lab 3 on the third floor of the Physics & Astronomy Building, on Mondays and Wednesdays in term time. He is also on duty in Lab 1 or Lab 2 on Tuesday or Thursday evenings from 6 to 9 p.m. where students will be able to consult him between lecture evenings. His telephone number is 7679 3290.



7.2 Personal Tutors

Each student starting the degree will be assigned a personal tutor who will arrange, on one evening per week in term time, to be available in the hour before the start of classes or at 6 pm on a day when there are no classes. The role of the personal tutor is to provide help and encouragement in dealing with the Level 1 courses. You may also wish to discuss non-academic matters affecting your studies, although for some of these your tutor may well refer you to the Course Tutor, Dr Coupland.

Please note that no individual remedial tuition can be provided.

8. RESPONDING TO PRESSURES OF LIFE

It inevitably happens that for some students at some stage of their course the pressures of life outside the College will threaten to disrupt their studies. If and when this happens to you, you should inform the Course Tutor of the situation as soon as possible. There are a variety of actions that can be taken to alleviate the pressure. You might wish to withdraw from some of the courses you are taking in a particular year and take those courses in the following year. The latest that you can withdraw from a course is the end of the first week of the second term unless there are unusual academic reasons or medical reasons when a medical certificate must be presented. If the situation is so serious that you feel you need to cease attending College for a while then this is possible. By arrangement with the Course Tutor you can take a break in studies of up to two years. It is recommended that you do not *plan* on taking more than the normal four years to complete the degree programme since experience has shown that students' performance invariably deteriorates significantly when they are taking courses piecemeal. In a year that you are only retaking courses that you had previously completed but failed at the examination you will be charged a reduced fee.

9. COMPLETION BY FULL-TIME STUDY

Transfer to a degree (including Physics) involving full-time study is possible for students who are able to attend courses in the daytime. Credit which may be transferred and the conditions under which transfer will be allowed will depend on the degree to which transfer is sought. Interested students should discuss the possibilities with the Course Tutor, Dr Coupland. A common question asked is "By doing one or more years of full-time study, can I complete my degree in less than four years?" The answer to this questions is "No".

10. FACILITIES AND ACTIVITIES FOR PART-TIME STUDENTS

Within the Department of Physics and Astronomy the following facilities are made available in the evenings for the use of part-time students:

10.1 Student common room

There is an Undergraduate Student Common Room provided within the Department on the top floor of the Physics Building. In this area are hot and cold drinks machines and the part-time students' pigeon holes. Students are expected to keep the Common Room tidy.

10.2 Photocopy machines

Evening students are allowed to use the photocopying machines located on the ground floor of the Department. Photocopy cards can be purchased from the Course Tutor.

10.3 Departmental Undergraduate Library

The Department has a small library which is specifically for its own undergraduates' use. It is housed on the top floor of the Physics and Astronomy building in room A21. The library carries a number of copies of the courses books for 1st and 2nd year lectures and also useful reference books and some course books for 3rd and 4th year courses. The Library is managed by a member of the academic staff but manned by undergraduates who are paid by the Department for this work. Apart from books, it also provides a small area for study and work. A modest charge of £15 is made to students wanting to join the Library. This fee is a "once only" fee and no other charges are made throughout a student's time in the Department. This money is used to buy books for the library.

10.4 Past Exam Papers

Examination papers from 1997 onwards for each course module can be found on the College Library web site (<http://exam-papers.ucl.ac.uk>) along with papers of all other examination held within the College. A UCL computing account is required in order to have access.

10.5 Course text book discounts

Some course text books may be obtained from the Department at reduced prices. In particular, this includes the first year Maths text by *Boas* and the general Physics text by *Serway and Jewet*.

10.6 The Event Horizon

This is a Student Society which has an association with the Institute of Physics (see below). It offers social events, arranges lectures by visiting speakers from other Universities and organises visits to external research organisations and industry. The Annual Membership is £3, or £10 for four years.

10.7 Cumberland Lodge Weekend

Every year early in November a group of approximately 50 students and several members of the academic staff from the Department spend the weekend at Cumberland Lodge – a beautiful country house close to Royal Lodge, the Queen Mother's residence – in Windsor Great Park. The intention is to get students and staff away from the College environment and to get them to know each other better and to discuss interesting problems in physics and astronomy in an informal and very pleasant environment. Undergraduates from all years and a few postgraduate students take part. Talks are given by members of staff and invited people from outside College. Topics include some of the research activities of the Department, sometimes

a light-hearted look at science and there is a scientific debate on a topic chosen by the students. The weekend concludes with a general discussion period during which students can give their opinions about the Department, the lecture courses, or indeed any topic which they wish to raise. In addition to the talks, ample time is available for informal discussions and for social activities, two of the most popular of which are walking in Windsor Great Park and the Saturday night party.

Students travel to Cumberland Lodge by an arranged coach leaving the College site on the Friday afternoon and returning to London after tea on the Sunday evening. The fee, including transportation and all meals, is around £40. This is considerably less than the actual cost owing to the large subsidies provided by the Department and by the St Catherine's Foundation which runs Cumberland Lodge. Students invariably enjoy the weekend and regard it as excellent value for money. You are encouraged to book early as places are limited; the sign-up list is usually posted outside the Massey lecture theatre.

10.8 University College London Union (UCLU)

The College has a very active Students' Union located at 25 Gordon Street, the building adjacent to the Physics Building. There are several bars and coffee bars, a shop and hairdressing salon within the Union building. In addition there are a vast number of societies catering for all tastes and interests to which one can belong. The Union holds a Freshers Fair in the college cloisters at the beginning of the first term where all the societies, sports clubs and other union activities have stalls and provide information. The Union also has two sports grounds at Shenley in Hertfordshire (where the departmental staff/student cricket match and barbecue takes place during the summer term after the examinations) and at Chislehurst in Kent. The Union provides basic advice on such things as financial matters, welfare, housing, council tax, legal problems, health etc and there are full-time Sabbatical Officers (existing students who take a year out) on hand to help. The Union also runs a night line for students who are in trouble or just need to talk to someone during the hours when the College and Union are closed.

10.9 University of London Union (ULU)

The building for this is on Malet Street which is just to the south of UCL, north of Birkbeck. You will need a valid student identity card to be allowed in. It has a multitude of facilities including a swimming pool in the basement and a refectory on the top floor. It can be a place to meet students from other colleges in the University of London.

10.10 Birkbeck College

Birkbeck is located in Malet Street immediately to the south of UCL. Students on the course will be issued with a Birkbeck identity card and will have access to all the facilities at Birkbeck as well as those mentioned above at UCL. Birkbeck is the

college of the University of London which specialises in degrees for mature students. They offer nursery facilities in the evenings, career advice and counselling, and they have their own students' union and bar. See the Birkbeck Prospectus or Birkbeck Students' Handbook for more information, or phone the Birkbeck Registry on 020 7631 6390.

10.11 The Institute of Physics (IoP)

New students will be offered at a reduced rate of only £6 membership of the Institute of Physics for the three or four years of their degree course. The IoP is the professional body for physicists and also astronomers. Membership brings with it the monthly publication *Physics World* which contains informative scientific articles as well as news of the Institute's activities and a diary.

10.12 The Royal Astronomical Society (RAS)

Students with an interest in astronomy are encouraged to join the Royal Astronomical Society as Junior Members and to attend RAS discussion meetings and monthly Astronomy and Geophysics meetings which occur on the second Friday of each month from October to May. UCL students are the closest, geographically, to the location of these meetings (Saville Row, just off Oxford Street) of all the astronomy students in the UK and should take advantage if timetables and commitments permit. You can get information about the RAS from Prof I Howarth (Secretary to RAS Council) – indh@star.ucl.ac.uk. A notice about the programmes of the RAS meetings will be on display in the Department, but it is easy to remember that the second Friday of (nearly) every month is the RAS day. The discussion meetings usually run from 10.30am until 3.30pm and are followed, after tea, by the monthly Astronomy and Geophysics meetings of the Society which all Members and Fellows are warmly invited to attend.

10.13 Computer facilities

Within the Department there are PCs available in the teaching labs for student use. These are primarily used for the laboratory courses but can be used for report writing etc. when no lab course is being given. (NB: In such cases, safety considerations dictate that there must always be a technician or staff member aware that you are in the laboratory.) These computers have no connection to the internet but do provide limited access the College network.

The College Information Services Division (ISD) also manages a large number of computers which are sited in 'clusters' around the College. These computers have a wider choice of software and provide internet access. To enable you to use these, at the beginning of the first term, you will be allocated an account id and an e-mail address. One of these clusters is located within the Department in Room D104/5 on the first floor and is available for booking. It is open from 09:00 to 21:00. This cluster is used for teaching purposes but outside teaching times it can be used by all students.

However, towards the end of term as reports and essays become due these computers tend to become booked very quickly so remember to plan well ahead.

There are also a number of other clusters around the college, including some with Macintosh machines. Time on these machines must normally be reserved in advance and further information about booking is available from the Information Systems Helpdesk located in the basement of the Lewis' Building (corner of Gower Street and Gower Place). Students must be registered with ISD in the College to obtain a valid account for use of college cluster systems.

Birkbeck also has computing facilities which you will have access to.

10.14 Software

The college managed PCs run *Windows NT* via networked terminal servers. For reasons of compatibility on the Departmental machines in the labs, a large proportion of the software available is Microsoft in origin. To be compatible with software running on the managed cluster machines the departmental laboratory computers have the same versions of the main software packages on them which are thought to be useful to our students, namely Microsoft Excel and Word. Most of the Department computers now run under the *Windows XP* operating system.

11. ADMISSION TO THE COURSE

Admission is based on evidence of your capability to follow the course. This may be shown in a variety of ways, such as A-level achievement in Mathematics and Physics to about grade "C" or equivalent grades in BTEC qualifications, or satisfactory grades in a university access course or foundation level course such as the Certificate in Science courses run by Birkbeck. If you are uncertain as to whether you might be qualified or have no formal qualifications, admissions advice may be obtained from the Course Tutor.

12. CONTACTS

The Course Tutor is:



Dr Malcolm Coupland

Department of Physics and Astronomy

University College

London WC1E 6BT

telephone: 020 7679 3290

e-mail: ptphysics@ucl.ac.uk

Application forms may be obtained from Malcolm Coupland at the above address or by telephoning Christine Johnston on 020 7679 3943 or by e-mailing her at christine.johnston@ucl.ac.uk

Application forms and the Prospectus may also be obtained from the Birkbeck College Registry in Malet Street, London WC1 7HX, telephone 020 7631 6390.

IMPORTANT ANNOUNCEMENT

This year, 2008, we will be admitting students only into years two or three of the evening Physics degree programme. In 2009 we will only admit students into year three and thereafter there will be no more admissions onto the course since it is being progressively phased out. Current course information may be found at www.phys.ucl.ac.uk