PROGRAMME SPECIFICATION

Awarding body/institution: Queen Mary

Teaching institution (if different from above): Queen Mary

If accredited by a professional/statutory body, please give the name, date of last accreditation visit, approximate date of next visit and details of exemptions that will be given to QMUL graduates:
Not applicable

Name of the final award: BSc in Natural Sciences

Duration of Study/Period of Registration: Three years

Programme title: Natural Sciences

UCAS code: CFG0 QAA Benchmark Group: Physics, astronomy and astrophysics

Criteria for admission to the programme: Normally three A-levels with a minimum of 280 points. This must include at least two sciences or one science with mathematics.

Aims of the programme: The programme aims to teach students good numerate and scientific skills. It will provide an education across a range of sciences in order to develop technically competent science graduates with the specialist and transferable skills sought by industry and the professions and to provide academic teachers and researchers for the future suitably trained for the more interdisciplinary fields. It will provide a broad exposure to science and scientific skills through studying at least three experimental sciences and mathematics to the extent appropriate. The breadth will be provided by six “themes” (and perhaps more in the future) each of which may have Core and Suggested modules in addition to the constraints of pre-requisites (see “Structure” below). It will allow students to developed specialised knowledge of one or more subjects by studying these in greater depth if they wish to.

Learning outcomes for the programme:

Students who qualify with a BSc degree having remained on this programme throughout, as learning outcomes, should have:

- Had experience of several scientific disciplines taken to an advanced level at which their relevance to topics of current scientific research or concern may be appreciated in some depth.
- Completed courses giving an in-depth knowledge of at least two disciplines
- Had experience of independent work including aspects of scientific research through project work
- Substantially developed their experimental and computational skills through the laboratory work associated with course modules
- Substantially developed transferable skills (communication, management, problem-solving, critical reasoning, etc) through specific course modules on these subjects or through material embedded in modules throughout the programme
Teaching, learning and assessment strategies: Programmes are constructed within a modular course structure in which each student takes eight course units (modules) per year. Our overall strategy is to achieve a balance, appropriate to the aims of each course unit, between teaching (lectures; practical laboratory work; small-group tutorials) and learning by students (peer discussion; exercise classes; coursework and essay assignments; independent work in laboratories and computer studies; teach-yourself computer packages and the Internet; videos; textbooks and supplementary reading).

Tutorials, exercise classes or laboratories, are provided for many courses: tutorials are used to reinforce students' knowledge and understanding in conceptually challenging courses, such as those on quantum and statistical physics, whilst exercise classes are used to develop the specific skills needed in other courses. Laboratories are used to develop experimental skills, including the acquisition of data and the analysis of uncertainties of observation. In addition students learn to write a scientific account of their experimental observation. Finally, review and experimental projects are used to develop students' investigative skills.

Assessment is by a mixture of continuous assessment and formal written examinations at the end of each year. We use a variety of in-course assessments to enable students to get quick feedback as to their performance. These include weekly coursework (marked and returned on a weekly basis), essay assignments, mid-term tests carried out in a lecture slot, performance in exercise classes and tutorials, laboratory and project reports. These in-course assessments are combined with formal final written examination results and oral examinations (on project reports) to produce the final mark for the course unit.

Programme structure(s) and requirements, levels and courses

See Table appended.

Indicators of Quality (please include details of: SSLC meetings, student feedback mechanisms, personal tutor arrangements, programme induction, programme review and monitoring.)

Each student enters the Department via the College Induction Process plus a Physics Department Induction. Each student is assigned to a personal tutor who acts throughout the student's Degree studies to help with choice of modules and with any problems that may affect a student's studies. Teaching and Learning policy is decided by a Departmental Teaching Committee on which sit all the programme organisers. To assess how well our policy is implemented we have a variety of feedback mechanisms. There is a Student Staff Liaison Committee (SSLC) which meets once per term to consider student concerns and to monitor the results of student questionnaires circulated in each course unit. The Staff Convenor of the SSLC sits on the Teaching Committee and reports back student views and suggestions. Each course organiser submits a report on his/her course after the final examination which is considered by the Teaching Committee. The programme of study will be subject to review by the Natural Sciences Working Party on an annual basis.
Employers Links.
Please provide details of any links with employers e.g.
- Details of advisory panels that include current or potential employers. - NA
- Organisations that regularly employ graduates from this programme and the roles that graduates undertake. - NA
- Student prizes donated by organisations that may offer employment to graduates from this programme. - Not applicable until significant numbers of students have graduated.

If there are no links with employers consider the learning outcomes and transferable skills and explain how these might be used to inform employers about the qualities and skills a graduate from this programme might be expected to have. See QAA templates attached to guidelines.

See learning outcomes above. These are necessarily generic to all science and engineering graduates, and many employers who do not require a specific single honour degree do recognise their value. Especially the numeracy, the analytic skills and hopefully the transferable skills gained from the increasing use of e.g. Writing in the Disciplines in the modules in the programme. In addition, Natural Science graduates have the breadth resulting from the combination of subjects studied, whether they concentrate on the Physical Sciences or the Life Sciences or even more so if they take a combination of these.

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<thead>
<tr>
<th>Person Completing Programme Specification</th>
<th>D.J. Dunstan</th>
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<tbody>
<tr>
<td>Person responsible for management of programme</td>
<td>D.J. Dunstan</td>
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<td>Date programme specification agreed by Department or teaching and learning committee</td>
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<tr>
<td>Date of completion of programme specification:</td>
<td>23rd May 2007</td>
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<td>Date of approval by Faculty Board/EB:</td>
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<td>Date of update/amendment:</td>
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<td>Theme</td>
<td>Atoms and the Universe</td>
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<tr>
<td>Theme Leader</td>
<td>David Dunstan</td>
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<tr>
<td>Assisted by</td>
<td>Shoufeng Yang</td>
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<td>Timetabler</td>
<td>Kevin Donovan</td>
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**First Year**

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<tr>
<th><strong>Semester 1</strong></th>
<th><strong>PHY116 From Newton to Einstein</strong> 31, 33, 41</th>
<th><strong>PHY121 Mathematical Techniques I</strong> 14, 44</th>
<th><strong>GEG131 Earth: Portrait of a Planet</strong> 23, 24, 43</th>
<th><strong>SBS005 The Diversity of Life</strong> 22, 24</th>
<th><strong>DCS113 Logic and Discrete Sciences</strong> 15, 16, 33</th>
<th><strong>PHY121 Mathematical Techniques I</strong> 14, 44</th>
<th><strong>MAT100 Materials Science I: Properties of Matter</strong> 41, 42, 56</th>
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<td></td>
<td><strong>PHY101 Our Universe</strong> 14, 26, 53</td>
<td><strong>PHY122 Mathematical Techniques II</strong> 32, 34, 42</td>
<td><strong>SBS008 Heredity and Gene Action</strong> 53, 55</td>
<td><strong>DCS100 Procedural Programming</strong> 56, 57</td>
<td><strong>MAS108 Probability I</strong> 34, 45, 52</td>
<td><strong>PHY121 Mathematical Techniques I</strong> 14, 44</td>
<td><strong>PHY108 Condensed Matter</strong> 32, 34, 55</td>
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<tr>
<th><strong>Semester 2</strong></th>
<th><strong>PHY215 Quantum Physics</strong> 21, 23, 54</th>
<th><strong>PHY101 Our Universe</strong> 14, 26, 53</th>
<th><strong>GEG119 Global Environment Issues</strong> 41, 42</th>
<th><strong>SBS110 Evolution</strong> 22, 24</th>
<th><strong>DCS129 Probability and Matrices</strong> 25, 32</th>
<th><strong>PHY122 Mathematical Techniques 2</strong> 32, 34, 42</th>
<th><strong>MAT200 Mechanics of Solids</strong> 15, 31, 44</th>
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<td><strong>GEG132 Earth: Portrait of a Planet</strong> 23, 24, 43</td>
<td><strong>GEG119 Global Environment Issues</strong> 41, 42</td>
<td><strong>SBS104 Object Oriented Programming</strong> 33, 34</td>
<td><strong>DCS129 Probability and Matrices</strong> 25, 32</td>
<td><strong>MAS113 Fundamentals of Statistics I</strong> 12, 45, 52</td>
<td><strong>PHY215 Quantum Physics</strong> 21, 23, 54</td>
<td><strong>MAT203 Introduction to Functional Materials</strong> 42, 53</td>
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**Bold** – timetable clashes, to be resolved.
### Second Year

<table>
<thead>
<tr>
<th>Semester 3</th>
<th>*PHY302 Nuclear Physics and Astrophysics 41, 46, 55</th>
<th>*GEG232 Environmental Pollution 42, 43</th>
<th>*SBS633 Evolutionary Genetics 12, 14</th>
<th>DCS210 Algorithms and Data Structures DCS-219 Specification and Reasoning 15, 16, 43</th>
<th>*PHY218 Mathematical Techniques 3 13, 32, 34</th>
<th>*MAS228 Probability II 28, 41, 46</th>
<th><strong>MAT301 Deformation of Solids 13, 52, 53</strong></th>
<th>PHY214 Thermal and Kinetic Physics 12, 14, 25</th>
<th>***MAT300 Materials Science II: Energy concepts. 11, 25, 54</th>
<th>MAT302 Biomaterials and Biomechanics 14, 32, 33</th>
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<tbody>
<tr>
<td>Semester 4</td>
<td>*PHY319 Quantum Mechanics A 13, 24, 43</td>
<td>*GEG233 Ice Age Earth 33, 34 PHYxxx Energy TBD</td>
<td>*SBS642 Genes and Bioinformatics 41, 43</td>
<td>DCS-103 Language and Communication 22, 23, 24, 25</td>
<td>*MAS232 Statistical Modelling I 23, 44, 47</td>
<td>*MAT400 Structure characterisation 22, 48, 49</td>
<td>MAT401 Materials and the Environment 11, 14, 17</td>
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### Third Year

| Semester 5 | *PHY213 Space Time and Gravity 34, 52, 53  
PHY300 Synoptic Physics  
*Independent Project* | *GEG236 Hazards 17, 18, 19  
*GEG317 Quaternary Palaeoenvironments 31, 32  
*GEG321 Environmental Management 42  
*Independent Project*  
*SBS643 Chromosome and Population Genetics 41, 43  
*Independent Project* | DCS333 Algorithms and Complexity 22, 23  
*Independent Project* | MAS338 Probability III 15, 16, 23, 28  
*MAS339 Statistical Modelling II 18, 43, 53, 57, 58  
MAS343 Introduction to Mathematical Finance 12, 28, 37  
*Independent Project* | PHY550 Solid State Physics 12, 14, 23  
*Independent Project*  
*MAT501 Failure of Solids 17, 27, 28* |
|----------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Semester 6 | *MAS 313 Cosmology 23, 42, 44*  
*GEG322 Geodiversity and Geoconservation 44, 45*  
*SBS426 Mammals and Evolution 11, 13* | *DCS326 Artificial Intelligence 27, 28, 55  
DCS-303 Computational Genomics 42, 44  
DCS301 Computability 42, 43* | *MAS314 Design of Experiments 23, 34, 52, 54  
MAS340 Statistical Modelling III 16, 24, 41, 42, 43  
MAS345 Further Topics in Mathematical Finance 23, 26, 28, 58* | PHY403 Statistical Physics 33, 45, 54  
*MAT603 Materials Science 3: Thermodynamics and Kinetics of Phase Transformations 22, 28, 53* |