The University of Nottingham

UNITED KINGDOM · CHINA · MALAYSIA

# School of Biosciences

# Microbiology

## Course Handbook

## 2016-2017

Please note that all of the information given in this Student Course Handbook was correct at the time of going to press; Schools reserve the right to amend course structures or information and amend, substitute or withdraw modules detailed in this publication. Comments or feedback on the contents of this handbook are welcome, and will be used in the revised edition for 2017-2018. Any comments concerning this publication should be addressed to Kathy Wilson (Programme Manager) at the Sutton Bonington Campus or e-mail Kathy.Wilson@Nottingham.ac.uk.

This handbook is available in alternative formats. Please contact Kathy Wilson by emailing Kathy.Wilson@Nottingham.ac.uk or the Student Services Centre at the Sutton Bonington Campus to request an alternative format.

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# 1 Dates for Your Diary

**Term dates**

*Autumn Term*
Monday 26 September 2016 – Friday 16 December 2016

*Spring Term*
Monday 16 January 2017 – Friday 7 April 2017

*Summer Term*
Monday 8 May 2017 – Friday 23 June 2017

**Semester dates**

*Autumn Semester*
Monday 26 September 2016 – Saturday 28 January 2017

*Spring Semester*
Monday 30 January 2017 – Friday 23 June 2017

**Exam dates**

*Autumn Semester*
Monday 16 January 2017 to Saturday 28 January 2017 – including Saturday 21 January 2017

*Spring Semester*
Monday 22 May 2017 to Saturday 10 June 2017 – including Saturday 27 May and Saturday 3 June 2017

*Late summer resits*
Monday 21 August 2017 to Wednesday 30 August 2017 – excluding Saturday 26 August 2017

# 2 Course Handbook

This Manual is designed to give you all the information you need to allow you to progress your studies at Nottingham. It describes the various procedures and practices that are in place which are designed to help you achieve your goals. From time to time these have to be changed to meet new requirements put upon us by the University, and changes are also made based on student opinion. Therefore at any time, if you have a positive suggestion which can bring about some improvement in what we do, please bring these to the attention of the Student Guild who are represented on a number of School Committees.

# 3 The School of Biosciences

The School of Biosciences is part of the Faculty of Science and is based mainly on the Sutton Bonington campus; the BSc/MSci Environmental Science and BSc Environmental Biology degrees are located at the University Park campus.

The School of Biosciences has over 80 academic members of staff, 895 undergraduate students and about 550 research and taught postgraduate students. Academic staff are allotted to one of five Divisions which reflect specific areas of teaching and research: Agricultural and Environmental Sciences, Animal Sciences, Food Sciences, Nutritional Sciences, and Plant and Crop Sciences.

You can find full and detailed information about the School and its staff on our Website http://www.nottingham.ac.uk/biosciences/index.aspx

# 4 Advice

One of the first people you will meet is your Personal Tutor. Your Personal Tutor will be a member of academic staff with whom you have regular meetings, sometimes as part of a group. Your Tutor is there to give you help and support in person as well as guidance in academic matters. You should make every effort to establish a good relationship. Your Tutor will provide you with advice and details of your exam performance so it is essential that you discuss your progress, in confidence, with him/her at regular intervals.

**Here are a few pieces of free advice; they come from fellow undergraduate students and from academic staff who helped us prepare this document.**

- Most lecturers teach at a faster pace than you may be used to from school or college.
- Develop good note taking skills early in your university career.
- Lectures are progressive, i.e. each one builds on the last. Missing lectures is therefore dangerous, as is ignoring things that you didn't fully understand at the time.
- Module Conveners may issue a book list. Check with academic staff and 2nd and 3rd year students which are the most valuable to buy. You may not be able to afford them all. Books on your reading lists can be borrowed from the Libraries.
- You should expect to work outside of class time. This may include reading, rewriting your notes, doing coursework, writing reports, etc.
- Don't be afraid of asking questions in lectures. Lecturers like to know that students are following what they are saying. The question you ask may be exactly what other students were wondering but were afraid to ask. Most lecturers will provide opportunities for questions. You can also ask for help outside of lecture time.

- Don’t be afraid to approach staff for help. Their offices are accessible to you and they have telephones and email. They are busy people but a large part of their work involves dealing with students. Please see “office hours” section for further details of how to make appointments with academic staff.
- Make use of their time, advice, experience and expertise.
- Remember that activities continue after the exams and that you are required to remain at the University until the end of each Semester.
- Never hesitate to see the lecturer if you are having difficulty with his/her module or don’t understand why you were given a particular mark.
- Handing in coursework late means losing marks. 5% will be lost for every working day late.
- The School has a Learning Community Forum with staff and student representatives from each year. Use this system to make constructive comments about your course.
- If you become ill and have to miss more than a couple of days, or a coursework deadline, or if your performance in an exam is affected, go to see your tutor and complete an Extenuating Circumstances Form and on the website: http://www.nottingham.ac.uk/academicservices/qualitymanual/assessmentandawards/extenuating-circumstances-policy-and-procedures.aspx
- Missing an exam for any reason is extremely serious and should be avoided if at all possible. Let your Tutor know IMMEDIATELY and complete an extenuating circumstances form available as above.
- Check your email daily and Moodle updates; otherwise you may miss vital information.

# 5 Student Commitment

Students are expected to access their e-mail accounts regularly as this is the main means of communication. Please do not use any other personal email account which you may have for communication within the University. If you do, you risk losing out on important information.

You are required to:

- **Read** this handbook and other documents referred to so that you are clear about the structure of your degree course and what is expected of you.
- **Abide** by University Ordinances, Regulations and other codes of practice (e.g. Computing, Safety etc.).
- Read **notices** placed on official notice boards, these provide an important primary channel of general communication and may advertise such information as re-arrangements to the teaching timetable.

  *It is wise to carry a diary in which to note appointments with tutors, module conveners, course diary, etc.*

# 6 Your School and Your Studies

**Teaching Staff -** Lecturers are responsible for teaching components of modules and for setting and marking assignments and examinations.

Each module has a **Convener** who is responsible for its organisation. At the start of the module, the Convener will issue to each student a document describing its aims, content, objectives, transferable skills, methods of assessment, dates for submission and return of coursework and penalties for late submission. Students will be given coursework turnaround details. S/he will also conduct a feedback exercise at the end of the module to gauge student opinion.

Each course has a **Course Director**, responsible for overseeing its structure and smooth running. The Course Director ensures balance between modules and liaises regularly with other staff to ensure that appropriate teaching and learning are provided. The **Course Directors** are directly responsible to the **Assistant Pro-Vice-Chancellor for Teaching and Learning** for ensuring that all levels of the teaching management structure operate efficiently. They should be notified of any significant problems. **Heads of Division** are ultimately responsible for the services provided by their staff.

The **Assistant Pro-Vice-Chancellor for Teaching and Learning** overseas the organisation and management of teaching across the School.

The **Semester 1 Tutor** is responsible for maintaining a balance of work between the core Semester 1 modules. S/he appoints student representatives and holds meetings at which any matters which students may wish to raise can be discussed. Don't be afraid to make your views known!

A list of the staff who hold these positions are included in this handbook (see Staff Roles section). Students should feel able to approach any of them with concerns they may have about aspects of their education. Your Personal Tutor can advise you and make the appropriate contacts.

# 7 Staff Roles

| **Role In School** | **Staff Member** | **Location** *See key at end of table* | **Tel** | **Email @nottingham.ac.uk** |
|---|---|---|---|---|
| Head of School | Prof Simon Langley-Evans | MB | 16139 | Simon.Langley-Evans |
| Director of Operations | Dr Sarah Johnson | MB | 16000 | Sarah.Johnson |
| PA to Head of School and School Manager (Academic Administration) | Ms Susan Blencowe | MB | 16010 | Susan.Blencowe |
| Sutton Bonington Programme Manager | Ms K J Wilson | Barn | 16002 | Kathy.Wilson |
| Sutton Bonington Manager | Miss Helen Wells | Barn | 86504 | Helen.Wells |
| 4-Year Degree Tutor (Euro. Cert.) | Rachel Jessop | BBSB | 16162 | Rachel.Jessop |
| Marketing Manager | Ms Helen Rotherforth | MB | 16607 | Helen.Rotherforth |
| Sutton Bonington Programme Administration | Mrs Gill Fox | Barn | 86501 | Gillian.Fox |
| IT Support Officer | Mr Dave Walters | JCG | 16511 | Dave.Walters |
| U21 Co-ordinator | Rachel Jessop | BBSB | 16162 | Rachel.Jessop |
| Sutton Bonington Administrator | Mrs E Staves | Barn | 86504 | Elena.Staves |
| Sutton Bonington Senior Administrator | Mrs L Eaves | Barn | 86508 | Linda.Eaves |

**Building Locations**

BBSB = Bioenergy and Brewing Science Building
GB = Gateway Building
MB = Main Building
SL = South Lab Building
SO = School Office, Main Building
JCG = James Cameron Gifford Library

| **Heads of Division** | **Name** | **Building** *See key at end of table* | **Tel** | **Email @nottingham.ac.uk** |
|---|---|---|---|---|
| Animal Sciences | Prof P Garnsworthy | SL | 16065 | Phil.Garnsworthy |
| Agricultural and Environmental Sciences | Prof S Mooney | GB | 16257 | Sacha.Mooney |
| Food Sciences | Prof Tim Foster | FS | 16246 | Tim.Foster |
| Nutritional Sciences | Prof Andy Salter | NL | 16120 | Andy.Salter |
| Plant and Crop Sciences | Prof M Holdsworth | PCS | 16323 | Mike.Holdsworth |

| **Key Roles** | **Name** | **Building** | **Tel** | **Email @nottingham.ac.uk** |
|---|---|---|---|---|
| Warden Bonington Hall | Dr I Hardy | SL | 16052 | Ian.Hardy |
| Senior Tutors | Prof M R Luck<br>Dr L Bailey | SL | 16309<br>16255 | Martin.Luck<br>Liz.Bailey |
| Semester 1 Tutor | Dr K Pyke | PCS | 13216 | Kevin.Pyke |
| Exam. Officer | Dr M Elmes | NL | 16183 | Matthew.J.Elmes |
| Study Abroad Co-ordinator | Dr Marcus Alcocer | NL | 16103 | Marcus.Alcocer |
| Biosciences Director of Learning and Teaching | Dr Fiona McCullough | NL | 16118 | Fiona.Mccullough |
| Malaysia School Coordinator | Dr Marcus Alcocer | PCS | 16013 | Marcus.Alcocer |
| Industrial Placement Officers & School Placement Officers | Dr J Wayte<br>Rachel Jessop | BioB | 16171<br>14380 | Judith.Wayte<br>Rachel.Jessop |

**Building Locations**

BioB = Bioenergy Building
FS = Food Sciences
GB = Gateway Building
NL = North Lab
PCS= Plant and Crop Sciences
SL = South Lab Building

| **Course Directors** | **Name** | **Building** *See key at end of table* | **Tel** | **Email @nottingham.ac.uk** |
|---|---|---|---|---|
| Agriculture<br>Agricultural and Crop Science<br>Agricultural and Environmental Science<br>Agricultural and Livestock<br>International Agricultural Science | Prof P Wilson | SL | 16075 | Paul.Wilson |
| Animal Science | Dr D Sweetman | SL | 16019 | Dylan.Sweetman |
| Applied Biology & Biotechnology | Dr Nagamani Bora (Mani) | PCS | TBC | Nagamani.Bora |
| Environmental Biology | Dr Ruth Blunt | Gateway Building, SB, or B47, Life Sciences, UP | 16288 | Ruth.Blunt |
| Environmental Science | Dr Ruth Blunt | Gateway Building, SB, or B47, Life Sciences, UP | 16288 | Ruth.Blunt |
| Food Science & Nutrition and Food Science | Dr D Gray | FS | 16147 | David.Gray |
| Microbiology | Dr J Hobman | FS | 16166 | Jon.Hobman |
| Master of Nutrition and Dietetics | Dr F McCullough | NL | 16118 | Fiona.Mccullough |
| Nutrition | Dr P Jethwa<br>Dr J Majewicz | NL<br>NL | 16604<br>16106 | Preeti.Jethwa<br>Jon.Majewicz |
| Plant Science | Dr Kevin Pyke | PCS | 13216 | Kevin.Pyke |

**Building Locations**

FS= Food Sciences Building
GB = Gateway Building
NL = North Lab Building
PCS= Plant and Crop Sciences
SL = South Lab Building

# 8 Academic Staff and Locations

| Name | Room | Telephone Number | Divisions* |
|---|---|---|---|
| Dr R Alberio | B223, South Laboratory Building | 0115 951 6304 | AS |
| Dr M Alcocer | 49E, 2nd Floor, North Laboratory Bldg | 0115 951 6103 | NS |
| Dr R Anand-Ivell | B216, South Laboratory Building | 0115 951 6298 | AS |
| Mrs A Avery | 49D, North Laboratory Building | 0115 951 6238 | NS |
| Dr E Bailey | C21, The Gateway Building | 0115 951 6255 | AES |
| Dr M Bell | B228, South Laboratory Building | 0115 951 6056 | AES |
| Ms M Benlloch Tinoco | A18 Biosciences. Main Building | 0115 951 6146 | MB |
| Prof M J Bennett | C06, Plant Sciences Building | 0115 951 3255 | PCS |
| Dr A Bishopp | A15, Plant Sciences Building | 0115 951 6108 | PCS |
| Dr R Blunt | B47, Life Sciences Building **or** C18 Gateway Building | 0115 951 3238 | AES |
| Dr N Bora | B06, Bioenergy and Brewing Science Bldg | 0115 951 6011 | PCS |
| Dr J Brameld | 43, 1st Floor, North Laboratory Bldg | 0115 951 6133 | NS |
| Prof M Broadley | A05, Plant Sciences Building | 0115 951 6382 | PCS |
| Dr K Brown | B30a, Food Science Building | 0115 951 6509 | FS |
| Dr N Chapman | 306, South Laboratory Building | 0115 951 6082 | PCS |
| Dr L Coneyworth | 58, 2nd Floor, North Laboratory Bldg | 0115 951 6124 | NS |
| Prof I F Connerton | B28, Food Sciences Building | 0115 951 6119 | FS |
| Dr D Cook | C04, Bioenergy and Brewing Science Bldg | 0115 951 6245 | FS |
| Prof N Crout | C19, The Gateway Building | 0115 951 6253 | AES |
| Prof C E R Dodd | B30, Food Science Building | 0115 951 6163 | FS |
| Dr S Egan | C21 School of Veterinary Medicine and Science | 0115 951 6659 | VS |
| Dr M Elmes | 53, 2nd Floor, North Laboratory Bldg | 0115 951 6183 | NS |
| Dr I Fisk | A28, FS Building | 0115 951 6037 | FS |
| Dr R Ford | C03, Bioenergy and Brewing Science Bldg | 0115 951 6685 | FS |
| Prof T Foster | B29, FS Building | 0115 951 6246 | FS |
| Dr M J Foulkes | 312, South Laboratory Building | 0115 951 6024 | PCS |
| Dr R G Fray | C33, Plant Sciences Building | 0115 951 6371 | PCS |
| Dr A P French | C08a, Plant Sciences Building | 0115 951 6108 | PCS |
| Prof P C Garnsworthy | B203, South Laboratory Building | 0115 951 6065 | AS |
| Dr Z Gonzalez-Carranza | C11, Plant Sciences Building | 0115 951 6335 | PCS |
| Dr N Graham | C30, Plant Sciences Building | 0115 951 6681 | PCS |
| Dr D Gray | A29, FS Building | 0115 951 6147 | FS |
| Dr D Greetham | A20 Food Science | 0115 951 6578 | FS |
| Prof S E Harding | A15, The Limes | 0115 951 6148 | FS |
| Dr I Hardy | C26, The Gateway Building | 0115 951 6052 | AES |
| Dr J Harris | C18, Vet School | 0115 951 6316 | AS |
| Dr K Harris-Adams | C311, South Laboratory Building | 0115 951 6066 | AES |
| Dr P J Hill | B21, FS Building | 0115 951 6169 | FS |
| Dr J L Hobman | B22, FS Building | 0115 951 6166 | FS |
| Prof M J Holdsworth | 301B, South Laboratory Building | 0115 951 6046 | PCS |
| Prof J Hort | C10, Bioenergy and Brewing Science Bldg | 0115 951 6222 | FS |

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|---|---|---|---|
| Rachel Jessop | C05, Bioenergy and Brewing Science Bldg | 0115 951 6162 | FS |
| Dr P Jethwa | 55, North Laboratory Building | 0115 951 6604 | NS |
| Miss J Kearns | 30, 1st floor, North Laboratory Bldg | 0115 951 6756 | NS |
| Prof I P King | C21, Plant Sciences Building | 0115 951 6372 | PCS |
| Dr J King | C26, Plant Sciences Building | 0115 951 3205 | PCS |
| Dr B Lomax | C24, The Gateway Building | 0115 951 6258 | AES |
| Prof M R Luck | B207, South Laboratory Building | 0115 951 6309 | AS |
| Dr S Lydon | C08, Plant Sciences Building | 0115 951 6289 | PCS |
| Dr J Majewicz | 37, 1st floor, North Laboratory Building | 0115 951 6106 | NS |
| Dr G Mann | B208, South Laboratory Building | 0115 951 6326 | AS |
| Dr J Margerison | B209 South Laboratory Building | 0115 951 6301 | AS |
| Dr S Mayes | 301C, South Laboratory Building | 0115 951 8062 | PCS |
| Dr F S W McCullogh | 26,1st Floor, North Laboratory Building | 0115 951 6118 | NS |
| Dr K Mellits | B26, FS Building | 0115 951 6172 | FS |
| Dr K M Millar | B67, Vet School | 0115 951 6303 | AS |
| Prof S Mooney | C31, The Gateway Building | 0115 951 6257 | AES |
| Dr E H Murchie | 301C, South Laboratory Building | 0115 951 6082 | PCS |
| Dr A Murton | 49H, 2nd Floor, North Laboratory Building | 0115 823 6592 | NS |
| Dr T Parr | 53A, 2nd Floor, North Laboratory Bldg | 0115 951 6128 | NS |
| Miss J Pearce | 49G, 2nd Floor, North Laboratory Bldg | 0115 951 6105 | NS |
| Dr C Powell | C02, Bioenergy and Brewing Science Bldg | 0115 951 6191 | FS |
| Dr S Price | CO8 Bioenergy and Brewing Science Bldg | 0115 951 6742 | FS |
| Dr K Pyke | C09, Plant Sciences Building | 0115 951 3216 | PCS |
| Dr D Quain | C08 BABS | 0115 951 6160 | FS |
| Dr C Raaff | 26 North Laboratory Bldg | 0115 951 6121 | NS |
| Dr S Ramsden | 308, South Laboratory Building | 0115 951 6078 | AES |
| Dr R Ray | 303, South Laboratory Building | 0115 951 6094 | PCS |
| Dr C E D Rees | B23, FS Building | 0115 951 6167 | FS |
| Prof K Ritz | C22 Gateway Building | 0115 951 6288 | AES |
| Dr T P Robbins | C27, Plant Sciences Building | 0115 951 6329 | PCS |
| Dr A Rosenthal | A24 Food Sciences | 0115 951 6038 | FS |
| Prof A M Salter | 32A, 1st Floor, North Laboratory Bldg | 0115 951 6120 | NS |
| Dr D Scott | B19, FS Building | 0115 951 6221 | FS |
| Prof G Shaw | C29, The Gateway Building | 0115 951 3206 | AES |
| Dr C Siettou | C304 South Laboratory Building | 0115 951 6306 | AES |
| Prof K D Sinclair | B210, South Laboratory Building | 0115 951 6053 | AS |
| Dr M S Sjogersten | C27, The Gateway Building | 0115 951 6239 | AES |
| Dr D L Sparkes | 330, South Laboratory Building | 0115 951 6074 | PCS |
| Dr D Stekel | C20, The Gateway Building | 0115 951 6294 | AES |
| Dr C Stevenson | A57, Vet School | 0115 951 6055 | AS |
| Dr R Stoger | B232, South Laboratory Building | 0115 951 6232 | AS |
| Miss R Stow | 40, 1st floor, North Laboratory Bldg | 0115 951 6170 | NS |
| Dr A Swali | A20, Ground Floor, FS Bldg | 0115 951 6578 | FS |
| Dr R Swarup | C31, Plant Sciences Building | 0115 951 6284 | PCS |
| Dr D Sweetman | B234, South Laboratory Building | 0115 951 6019 | AS |

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|---|---|---|---|
| Dr J A Swift | 57a, Second Floor, North Lab | 0115 951 6178 | NS |
| Dr R Tarlington | School of Veterinary Medicine and Science | 0115 951 6273 | VS |
| Dr M Taylor | 52, 2nd Floor, North Laboratory Bldg | 0115 95 16104 | NS |
| Dr A Waterfall | B224, South Laboratory Building | 0115 951 6307 | AS |
| Dr S Welham | 24, North Laboratory Building | 0115 951 6129 | NS |
| Dr D Wells | C07, Plant Sciences Building | 0115 951 6108 | PCS |
| Dr H West | C28, The Gateway Building | 0115 951 6268 | AES |
| Mrs E Weston | A22, FS Building | 0115 951 6146 | FS |
| Dr G White | B227, South Laboratory Building | 0115 951 6068 | AS |
| Dr K Whitehead | 28A, 1st Floor, North Laboratory Bldg | 0115 951 6136 | NS |
| Prof P Wilson | 332, South Laboratory Building | 0115 951 6075 | AES |
| Prof Z A Wilson | A03, Plant Sciences Building | 0115 951 3235 | PCS |
| Prof J Wiseman | B205, South Laboratory Building | 0115 951 6054 | AS |
| Dr B Wolf | A27, Ground Floor, FS Bldg | 0115 951 6134 | FS |
| Dr S Young | C25, The Gateway Building | 0115 951 6256 | AES |

***Divisional codes**

AES Agricultural & Environmental Sciences
AS Animal Sciences
BBS Bioenergy and Brewing Science Bldg
FS Food Sciences
MB Main Building
NS Nutritional Science
PCS Plant and Crop Sciences
VS School of Veterinary Medicine and Science

# 9 Course Structure, Organisation and Choosing Your Modules

**The Academic Year**

The academic year at Nottingham is based on 2 Semesters (autumn and spring) spread over three terms.

The following definitions might be helpful to you:

- **Credits** indicate a quantity of assessed learning. They contribute to a cumulative indication of modules which a student has completed. One credit equates to approximately 10 hours of study.
- A **Module** is a specified programme of study which is self-contained and attracts a specified number of credits. Examinations are held at the end of most modules. A ten credit module accounts for approximately 100 hours of your time, of which usually no more than 40 hours will be spent in the lecture room or laboratory.
- A **Course of Study** is a set of modules satisfying the requirements for a particular degree and attracting 320 credits for an Ordinary Bachelor degree and 360 credits for an Honours degree.

- The levels in a course of study leading to an Honours degree are as follows:

  - Year 1 (120 credits) Level 1
  - Year 2 (120 credits) Level 2
  - Year 3 (120 credits) Level 3

And for a Master of Nutrition and Dietetics or MSci degree:

  - Year 4 (120 credits) Level 4

Credits achieved in Year 1 are for progression purposes only and will not contribute to the final degree classification.

- A **Semester** is a division of the academic year. It consists of twelve weeks of teaching, coursework and revision, plus two (Autumn Semester) or four (Spring Semester) weeks of assessment and consultation.
  Note: Although each academic year is divided for teaching purposes into two Semesters, there is still a three-term pattern of attendance, with breaks at Christmas, Easter and during the summer.
- A **year** is period of study consisting of an Autumn Semester followed by a Spring Semester. **Assessment** may be by means of written examination papers, oral examinations or coursework. Progression and/or degree classification are based on the outcome of the assessment.
- A **mark** module a numerical indication of the quality of the assessed work completed by a student in each. Marks awarded are subject to the approval of the Board of Examiners and are ratified by an External Examiner.

**Choosing optional modules***

At module advisory days you will be asked to complete a module registration form that details your chosen optional modules for ALL PERIODS, i.e. for modules totalling 120 credits. All entries must include the module code. **All optional choices must be approved and signed by your Course Director.** You will have an opportunity at the beginning of the Autumn/Spring Semesters (the "Two week change of mind period") to make adjustments to your choices for that Semester; you will also need to check that there are no timetable clashes.

Your choice of modules must normally total 60 credits per Semester, and in any event not less than **50 credits** or more than **70 credits** per Semester. To determine how a Full Year module contributes to the number of credits in a given Semester, check the Semester credit split for that module in the Module Catalogue modulecatalogue.nottingham.ac.uk/Nottingham

IT IS YOUR RESPONSIBILITY to see that your combination of modules accords with the Regulations for your course and teaching timetable. **Failure to do so could prevent you from progressing to the next year of the course or from graduating.**
Once you have chosen your optional modules and they have been approved, IT IS YOUR **RESPONSIBILITY** to ensure that you read the Declaration, sign the form and hand it to School Office staff. After that date changes to Full Year and Autumn Semester choices will not be allowed. **Failure to hand in the form by the date displayed may lead to incorrect examination entries and records.**

**There are some courses in Year 1 where there are no optional modules; however this information is useful for Years 2 and 3.*

**Modules outside Biosciences**

If you wish to register for an optional module from outside the School of Biosciences, you should write the module details on your Module Entry Form and obtain a signature in the "Agreed" box from the School that offers the module, as confirmation that the offering School accepts your registration (or email and provide email confirmation).

A complete list of modules within the University can be found in the Catalogue of Modules at modulecatalogue.nottingham.ac.uk/Nottingham

# 10 Microbiology

**Course Director:** Dr Jon Hobman **Telephone**: 0115 951 6166

See "taught" column to check the Semester in which modules are taught

**Qualifying Year (Year 1)**

**Compulsory**

| Code | Title | Credits | Taught |
|---|---|---|---|
| D211P1 | Genes and Cells: 1 | 10 | Autumn |
| C51201 | Micro-Organisms and Disease | 10 | Spring |
| D212P3 | Applied Genetics | 10 | Spring |
| D21BF3 | Microbes and You | 20 | Full Year |
| D21BF7 | The Physiology of Microbes | 20 | Full Year |
| D21BG1 | Biosciences Tutorials (Academic Development) and Foundation Science | 20 | Full Year |
| D21BN2 | Biochemistry – The Building Blocks of Life | 20 | Full Year |

**Students must take 10 credits from this group**

| Code | Title | Credits | Taught |
|---|---|---|---|
| C81SOC | Social Psychology | 10 | Autumn |
| D211F3 | The Biosciences and Global Food Security | 10 | Autumn |
| F11MCW | Molecules that Changed the World | 10 | Autumn |

**Part I (Year 2)**

***Compulsory***

Students must take all modules in this group

| Code | Title | Credits | Taught |
|---|---|---|---|
| C52304 | Medical Microbiology | 10 | Autumn |
| D223F6 | Bacterial Biological Diversity | 10 | Autumn |
| D223F7 | Virology | 10 | Autumn |
| D223N6 | Principles of Immunology | 10 | Autumn |
| D224F9 | Analysis of Bacterial Gene Expression | 10 | Spring |
| D224FA | Microbial Mechanisms of Food Borne Disease | 20 | Spring |
| D224G1 | Professional Skills for Bioscientists | 20 | Spring |

**Students must take 30 credits from this group**

| Code | Title | Credits | Taught |
|---|---|---|---|
| B12303 | Basic Molecular Pharmacology | 10 | Autumn |
| C12365 | Medical Molecular Genetics | 10 | Autumn |
| C72340 | Proteins: Structure and Function | 10 | Autumn |
| D223P0 | Molecular Biology and the Dynamic Cell | 20 | Autumn |
| C12460 | Immunobiology | 10 | Spring |

| | | | |
|---|---|---|---|
| C12461 | Microbial Biotechnology | 10 | Spring |
| C12472 | Parasitology | 10 | Spring |
| C42418 | Bacterial Genes and Development | 10 | Spring |
| D224E4 | Computer Modelling in Science: Introduction (UP) | 20 | Spring |

**Part II (Year 3)**

***Compulsory***

Students must take all modules in this group

| Code | Title | Credits | Taught |
|---|---|---|---|
| D23PRO | Undergraduate Research Project | 40 | Full Year |

AND 20 credits from this group

| Code | Title | Credits | Taught |
|---|---|---|---|
| D235F1 | The Microflora of Foods | 20 | Autumn |
| D235F5 | Molecular Microbiology and Biotechnology | 20 | Autumn |

And 20 credits from this group

| Code | Title | Credits | Taught |
|---|---|---|---|
| D236F5 | Rapid Methods in Microbial Analysis | 10 | Spring |
| D236F6 | Microbial Fermentation | 10 | Spring |
| D236M1 | Virology and Cellular Microbiology | 20 | Spring |

AND 40 credits from this group

| Code | Title | Credits | Taught |
|---|---|---|---|
| B13505 | Molecular Pharmacology | 10 | Autumn |
| C13597 | Pathogens | 10 | Autumn |
| C135P2 | Molecular Plant Pathology | 10 | Autumn |
| C93IIS | Immunity & The Immune System | 10 | Autumn |
| D235F8 | Personal and Professional Development for Food Scientists | 10 | Autumn |
| D235P2 | Plant Cell Signalling | 10 | Autumn |
| C13695 | Parasite Immunology | 10 | Spring |
| C136E6 | Environmental Biotechnology | 10 | Spring |
| C13CDI | Chronic Disease and the Immune System | 10 | Spring |
| D236P3 | Plant Disease Control | 10 | Spring |

# 11 Table of Modules

Revised 20/08/2016

Semester 1
followed by year 1 students in autumn session 2016/17

| Title | Code | Agric (Production) | Agric (Business) | iABM | Ag & C | Ag & LS | Ani Sci | Biotech | Dietetics | Env Biol | Env Sci | Food Sci | Microbio | Nutrition | Nutri and Food Sci | Plant Sci |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Biosciences Tutorials (Academic Development) & Foundation Scienc | D21BG1 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | | | | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 |
| The Biosciences and Global Food Security | D211F3 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | 10 | 10 | 10 | 10 | 10 |
| Biochemistry – The Building Blocks of Life | D21BN2 | 10 of 20 | | | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | | | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 |
| Genes and Cells 1 | D211P1 | 10 | | | 10 | 10 | 10 | 10 | 10 | | | | 10 | 10 | | 10 |
| Animal Biology | D211A2 | 10 | 10 | 10 | | 10 | 10 | | | | | | | | | |
| Introduction to Nutrition | D21BN1 | | | | | 10 of 20 | 10 of 20 | | 10 of 20 | | | 10 | | 10 of 20 | 10 of 20 | |
| Agricultural Business in the Global Economy | D211A3 | | 20 | 20 | | | | | | | | | | | | |
| Microbes and You | D21BF3 | | | | | | | | | | | | 10 of 20 | | | |
| The Physiology of Microbes | D21BF7 | | | | | | | 10 of 20 | | | | | 10 of 20 | | | |
| Dietetics Tutorial (academic Development) | D21BN6 | | | | | | | | 5 of 10 | | | | | | | |
| Introduction to Dietetics | D21BN5 | | | | | | | | 5 of 10 | | | | | | | |
| Food Commodities and Primary Processing | D211F4 | | | | | | | | | | | 10 | | | 10 | |
| Food Materials and Ingredients | D21BF1 | | | | | | | | | | | 10 of 20 | | 10 of 20 | 10 of 20 | |
| The Physiology of Microbes | D21BF7 | | | | | | | | | | | | | | | |
| Introduction to Health Behaviours | D21BN4 | | | | | | | | 10 of 20 | | | | | 10 of 20 | | |
| Global Environmental Processes (UP) | C111E1 | | | | | | | | | 20 | 20 | | | | | |
| Environmental Geoscience (UP) | C111E5 | | | | | | | | | | 20 | | | | | |
| Evolution, Ecology and Behaviour | C11EEB | | | | | | | | | 10 of 20 | | | | | | |
| Dissertation in Environmental Science (UP) | C11BE1 | | | | | | | | | 10 of 20 | 10 of 20 | | | | | |
| Environmental Science and Society | D212E4 | | | | | | | | | | 10 of 20 | | | | | |
| Life on Earth (UP) | C11LOE | | | | | | | | | 10 of 20 | | | | | | |
| Social Psychology UP) | C81SOC | | | | | | | | | | | | 10 | | | |
| Molecules that Changed the World (UP) | F11MCW | | | | | | | | | | | | 10 | | | |
| Plant Science Research Tutorials | D212P5 | | | | 10 | | | | | | | | | | | 10 |

**NB Modules in semesters 2 - 6 may have pre-requisite modules. It is your responsibility to ensure you are taking the appropriate pre-requisites for later modules.**
**Module choices are subject to timetabling constraints. It is therefore important to check the timetable and pre-requisites when making your module choices.**

Black sections: core Grey Sections: recommended options (UP) = Module based at University Park

**Semester 2 followed by students in spring semester 2016/17**

| | | Agric (Production) | Agric (Business) | iABM | Ag & C | Ag & LS | Ani Sci | Biotech | Dietetics | Env Biol | Env Sci | Food Sci | Microbiol | Nutrition | Nutri & Food Sci | Plant Sci |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***General*** | Module No | | | | | | | | | | | | | | | |
| Biosciences Tutorials (Academic Development) and Foundation Scien | D21BG1 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | | | | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 |
| Biochemistry – The Building Blocks of Life | D21BN2 | 10 of 20 | | | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | | | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 | 10 of 20 |
| Applied Genetics | D212P3 | | | | | 10 | 10 | 10 | | | | | 10 | | | 10 |
| Introduction to Nutrition | D21BN1 | | | | | 10 of 20 | 10 of 20 | | 10 of 20 | | | 10 of 20 | | 10 of 20 | 10 of 20 | |
| The Physiology of Microbes | D21BF7 | | | | | | | 10 of 20 | | | | | 10 of 20 | | | |
| Microbes and You | D21BF3 | | | | | | | | | | | | 10 of 20 | | | |
| Food Materials and Ingredients | D21BF1 | | | | | | | | | | | 10 of 20 | | 10 of 20 | 10 of 20 | |
| Contemporary Agricultural Systems | D212A2 | 10 | 10 | 10 | 10 | 10 | | | | 10 | 10 | 10 | | | 10 | |
| The Ecology of Natural and Managed Ecosystems | D211E5 | 20 | 20 | 20 | 20 | | | | | | 20 | | | | | 20 |
| Introduction to Dietetics | D21BN5 | | | | | | | | 5 of 10 | | | | | | | |
| Dietetics Tutorials (academic development | D21BN6 | | | | | | | | 5 of 10 | | | | | | | |
| Introduction to Health Behaviours | D21BN4 | | | | | | | | 10 of 20 | | | | | 10 of 20 | | |
| Grassland Management | D212A1 | 10 | 10 | 10 | 10 | 10 | | | | 10 | 10 | | | | | 10 |
| Microbial Physiology | D212F7 | | | | | | | | | | | 10 | | | | |
| Physiology for Food Scientists | D212F9 | | | | | | | | | | | | | | 10 | |
| Introductory Physiology | D212Z5 | | | | | | 20 | 20 | 20 | | | | | 20 | | |
| Dissertation in Environmental Science (UP) | C11BE1 | | | | | | | | | 10 of 20 | 10 of 20 | | | | | |
| Life on Earth | C11LOE | | | | | | | | | 10 of 20 | | | | | | |
| Evolution, Ecology and Behaviour | C11EEB | | | | | | | | | 10 of 20 | | | | | | |
| Integrated Agri-Food Markets and Marketing | D212A3 | | 20 | 20 | | | | | | | | | | | | |
| Managing Tourism & the Environment: Conflict or Consensus (UP) | N12122 | | | | | | | | | | 10 | | | | | |
| Environmental Science and Society | D212E4 | | | | | | | | | 10 of 20 | 10 of 20 | | | | | |
| The Anthropology of Human Ecology (UP) | AA1017 | | | | | | | | | 10 | 10 | | | | | |
| Microorganisms and Disease (UP) | C51201 | | | | | | | | | 10 | | | 10 | | | |
| Plant Science (UP) | C112P1 | 10 | | | 10 | | | 10 | | 10 | 10 | | | | | 10 |

**NB Modules in semesters 2 - 6 may have pre-requisite modules. It is your responsibility to ensure you are taking the appropriate pre-requisites f**
**Module choices are subject to timetabling constraints. It is therefore important to check the timetable and pre-requisites when making your module choices.**

Black sections: core Grey Sections: recommended options (UP) = Module based at University Park

# 12 Timetable Information

**Academic Year 2016-2017 Week Pattern for the UK CAMPUS**

**Teaching starts Thursday 29 September 2016 (if your modules are taught on either a Thursday or Friday)**

| Syllabus Plus Timetable Week | Teaching Week | Week Commencing | Comments |
|---|---|---|---|
| 1 | 1 | 26/09/2016 | *Registration/Induction* |
| 2 | 2 | 03/10/2016 | Autumn Semester |
| 3 | 3 | 10/10/2016 | Autumn Semester |
| 4 | 4 | 17/10/2016 | Autumn Semester |
| 5 | 5 | 24/10/2016 | Autumn Semester |
| 6 | 6 | 31/10/2016 | Autumn Semester |
| 7 | 7 | 07/11/2016 | Autumn Semester |
| 8 | 8 | 14/11/2016 | Autumn Semester |
| 9 | 9 | 21/11/2016 | Autumn Semester |
| 10 | 10 | 28/11/2016 | Autumn Semester |
| 11 | 11 | 05/12/2016 | Autumn Semester |
| 12 | 12 | 12/12/2016 | *term finishes Friday 16/12/16* |
| 13 | Vacation | 19/12/2016 | Christmas |
| 14 | Vacation | 26/12/2016 | Christmas |
| 15 | Vacation | 02/01/2017 | Christmas |
| 16 | Vacation | 09/01/2017 | Christmas |
| 17 | Assessment | 16/01/2017 | Assessment |
| 18 | Assessment | 23/01/2017 | Assessment |
| 19 | 1 | 30/01/2017 | Spring Semester |
| 20 | 2 | 06/02/2017 | Spring Semester |
| 21 | 3 | 13/02/2017 | Spring Semester |
| 22 | 4 | 20/02/2017 | Spring Semester |
| 23 | 5 | 27/02/2017 | Spring Semester |
| 24 | 6 | 06/03/2017 | Spring Semester |
| 25 | 7 | 13/03/2017 | Spring Semester |
| 26 | 8 | 20/03/2017 | Spring Semester |
| 27 | 9 | 27/03/2017 | Spring Semester |
| 28 | 10 | 03/04/2017 | Spring Semester (ends 07/04//17) |
| 29 | Vacation | 10/04/2017 | Easter (Good Friday 14/04/17) |
| 30 | Vacation | 17/04/2017 | Easter (Easter Monday 17/04/17) |
| 31 | Vacation | 24/04/2017 | Easter |
| 32 | Vacation | 01/05/2017 | Easter |
| 33 | 11 | 08/05/2017 | Spring Semester |
| 34 | 12 | 15/05/2017 | Revision/Assessment |
| 35 | Assessment | 22/05/2017 | Assessment |
| 36 | Assessment | 29/05/2017 | Assessment |
| 37 | Assessment | 05/06/2017 | Assessment |
| 38 | - | 12/06/2017 | - |
| 39 | - | 19/06/2017 | *term finishes Friday 23/06/17* |
| 40 | | 26/06/2017 | |
| 41 | | 03/07/2017 | |
| 42 | | 10/07/2017 | |
| 43 | | 17/07/2017 | |
| 44 | | 24/07/2017 | |
| 45 | | 31/07/2017 | |
| 46 | | 07/08/2017 | |

| | | | |
|---|---|---|---|
| 47 | | 14/08/2017 | |
| 48 | Assessment | 21/08/2017 | Re-sit Period |
| 49 | Assessment | 28/08/2017 | Re-sit Period |
| 50 | | 04/09/2017 | |
| 51 | | 11/09/2017 | |
| 52 | | 18/09/2017 | |

# 13 Teaching Methods

**Lectures**

Throughout your university career, you will find that lectures are the most common method of teaching. It is most important for you to ensure that you have a set of good clear notes based on the lectures **and** your own reading. As you progress through the second and third years of your degree, you will be expected to do increasing amounts of reading; it is therefore useful to develop your reading skills during your first year. Teaching of some modules is complemented by the use of teaching software.

Hints and tips for making the most effective use of the teaching and learning opportunities available to you are provided in S*tudy Skills Guide* given to all students at the beginning of their first year).

**NB books which should be purchased will be identified at the start of teaching - you are advised not to buy any books prior to this unless otherwise indicated in the recommended reading lists at the end of each module synopses.**

**Practical Classes**

Course requirements may require you to take practical classes. These may involve laboratory experiments or observations and analysis of data obtained during the sessions. Practical sessions provide an opportunity to learn and develop additional skills in techniques, observation and analysis. Practical classes also provide an opportunity to extend your knowledge of topics not covered in lectures. For each practical course you will receive a laboratory manual or collection of schedules which will expand on the learning experience of the course.

Some large first year classes are taught simultaneously in adjacent laboratories. Consult the class lists posted on the notice boards to identify the laboratory you will work in. For each practical class, at least one member of academic staff will always be in attendance. S/he will be accompanied by postgraduate students who work as demonstrators. In some cases, technicians may also be present to assist. The teaching team is present in the laboratory to aid your learning experience, so please seek their help as much as you need, and ensure you carry out your work safely, with no harm to yourself or other students. Practical classes provide a valuable opportunity for you to get to know the academic staff in a less formal way and for them to help you. These classes frequently provide an excellent opportunity for you to raise questions from the lecture course with the member of staff and deal with problems you may have.

For all practical classes, you **MUST WEAR** a suitable full-length laboratory coat, which must be buttoned at all times. You will be given a lab coat and safety glasses during Week 1 and advised about any other items you need to purchase. You **MUST** also **WEAR** safety glasses at all times unless advised to the contrary by an academic member of staff.

Safe working and good laboratory practices are essential in the laboratory environment and all laboratory exercises must be formally assessed under the regulations of COSSH. Details of these assessments are noted in the laboratory manual or schedule to draw your attention to specific hazards and the requirements of safe practice. During the introduction to a practical class, the member of staff in charge will give a verbal statement on safety issues.

Food and drink **MUST NOT** be taken into the laboratory.

## Assessed Work

Many modules have an element of student-centred learning, especially in Parts I (Year 2) and II (Year 3) of your course. The work involved in these is assessed and forms part of the overall mark for the module. The proportion of the mark allotted to coursework is identified in each module description. Penalties are applied for late submission of coursework (5% per working day), unless there are extenuating circumstances and appropriate documentation is provided. In general, modules in the School of Bioscience use electronic submission of coursework through Moodle as the means of submission.

## IT Training

IT is increasingly important as a basis of learning, communication and the preparation of your work e.g. dissertation, BSc project thesis and laboratory reports. It is important that you develop/improve your IT skills as you progress through your course.

## Computer-aided Learning (CAL)

Several modules include computer-based teaching material, quizzes, exercises, simulations. In order to use these, you must be registered on the School of Biosciences Network. You may be assessed on some of these packages while using them or in the form of a conventional write-up. You should be prepared to take notes as you work through material on computers.

# 14 Assessment, Progression, Compensation and Reassessment

The University Undergraduate Course Regulations apply to all the School's BSc, MSci and MNutr degrees.

The regulations can be found at:
www.nottingham.ac.uk/academicservices/qualitymanual/studyregulations/studyregulationsforundergraduatecourses.aspx

You should note that:

- The pass mark for a module is 40%.
- **Progression and Compensation (BSc)**: You don't need to pass all modules in order to progress to the next stage of your course. Compensation of failed modules can be achieved in the following ways – if you have:
  (a) passed modules worth at least 80 credits and have a weighted average for the stage of at least 40% with no module marks of less than 30%;
  or
  (b) passed modules worth at least 100 credits and have a weighted average for the stage of at least 50%.
  or
  (c) passed modules worth at least 90 credits, have marks of 30% or more in modules worth at least 110* credits, and have a weighted average for the stage of at least 45%.

  **Progression and Compensation (MNutr):** At the Part I, Part II and Part III stage, no core module can be compensated with the exception of optional modules for which university regulations apply. In addition, students must obtain at least 35% in both the examination and coursework components of these modules, although a mark between 35% and 39% in either the examination or coursework may be compensated by the other component of assessment.

  **Progression (MSci)**: At the end of Part I, students on the MSci degree must achieve an overall average of 55% at first sit in order to progress to Part II.

- **Reassessment:** If you do not reach the criteria for progression at the end of stage of study, you have a right to one re-assessment in each failed module. The form of reassessment is normally the same as for the first sit, with some exceptions (for example some MCQ papers are sometimes replaced with essay-style papers).
  For modules which are assessed by both coursework and exam, the School of Biosciences requires that, if the module has been failed overall, then you must be reassessed in the examination element of that module, even if that component of assessment has been passed.

  In addition, if you have failed the coursework overall (of a module which is assessed by both coursework and examination) you may elect to resubmit remedial coursework. However, if you have passed your coursework overall, you are not entitled to resubmit either the whole coursework or any failed component within your coursework assessments. If you wish to take up the option of remedial coursework, you must make contact with the appropriate module convener (or his/her representative) **within 7 days** of the date of the letter notifying you that you have failed to progress. The module convener will give you a title and submission date for the coursework. Any remedial

coursework must be submitted before the start of the August examination period. However, individual module conveners have the right to set earlier deadlines at the time of setting the coursework.

**Please note: for modules which have both an examination and coursework component, it is not possible for you to be reassessed by resubmitting coursework alone; you are required to retake the examination, even if this element of the module has been passed.**

This policy allows students to maximise their chances of passing the module after reassessment. In Part I (and Part II [Master of Nutrition]), the ORIGINAL marks are carried forward for degree classification purposes. However, reassessment marks may be considered by the examining boards if the candidate is on the borderline between degree classes.

- **Progression after reassessment**: For progression purposes, the higher or highest of the marks obtained in each module (at first attempt or upon re-assessment) are considered and the progression and compensation regulations applied accordingly.

- **Marking Schemes:** see appendices 1-6.

- **Progression Charts:** see appendix 6 and can be viewed at http://goo.gl/N492mp

- **BSc Degree Candidates**

Award of an Honours degree is dependent on completion and submission of a final year project.

When the overall Part I / Part II mark has been computed, it is rounded to provide a single overall integer mark before any degree classification is assigned. Subject to the exception of borderline candidates and those with extenuating circumstances, who may be awarded a higher degree classification, students shall be awarded the class of degree with their overall mark. The classes of honours degree are as follows:-

- First Class - average of 70%+
- Second Class (Division 1) - average of 60-69%.
- Second Class (Division II) - average of 50-59%.
- Third Class - average of 40-49%.

The standardised weighting for the stages of a Bachelor degree will be 33/67 for Parts I and II respectively, and the standardised weighting for an Integrated Master's degree (undergraduate) will be 20/40/40 for Parts I, II and III respectively.

**Borderline Profiling**

Classification borderlines will be based on the overall rounded average mark (credit and stage weighted). Borderline overall averages will be as follows:

| | |
|---|---|
| 2:1–1st | 68, 69 |
| 2:2-2:1 | 58, 59 |
| 3rd-2:2 | 48, 49 |

A student should be given the higher class if either of the following criteria are met:

- Half or more of the final stage credits are in the higher class;
- Half or more of the final and penultimate stage credits are in the higher class

**Further Reading**

Full details of regulations can be viewed on the UoN Quality Manual page at http://goo.gl/qoQPi3

# 15 Extenuating Circumstances

Policy regarding extensions to coursework on grounds of Extenuating Circumstances, Disability or Specific Learning Difficulties Summary:

1) Extensions to coursework will not normally be given unless the student has a specific recommendation from the School's Extenuating Circumstances Committee, or Academic/Disability Support.
2) Extensions will not normally be given as a result of short-term illness of less than 7 days unless the module convenor agrees this.
3) Students with Academic/Disability referrals allowing the option for coursework extension may arrange for a short extension to coursework submission with the module convener, on the basis of particular circumstances, without the need to apply for extenuating circumstances.
4) Students with approved extenuating circumstances may be granted an extension to coursework submission of usually no more than 21 calendar days.

Full details of the school's implementation of University policy is below. Meeting deadlines is an important part of working life. It is important that students develop time management skills and the ability to meet deadlines before undertaking work placements or entering the workforce on graduation. Coursework deadlines are normally set at the start of the module by the module convenor[1], and clearly stated in module documents/introductory teaching sessions. This gives students the opportunity to identify periods of high workload within each Semester and plan their time accordingly. Whilst course teams will try to adapt deadlines to avoid coursework 'hotspots', deadlines are set as appropriate for each individual module and it is the student's responsibility to plan their time accordingly.

Extensions to coursework deadlines can be given in limited circumstances – for example, if students have extenuating circumstances, disability or specific learning difficulties. These are dealt with in the following way.

- Extensions to coursework will not be given to students unless they have a specific recommendation from Academic/Disability Support, the School's Extenuating Circumstances (ECs) committee or the module convenor (see below).

- Students with specific recommendations from Academic/Disability Support may request one extension in advance of the deadline, giving justification for why they need it. Students should not expect to be offered an extension, and it is acceptable for the Module Convenor not to allow one, if it is not possible within the module structure – for example, if the work is subject to a very tight marking turn-around period, such as laboratory practical write-ups. In these circumstances, students should be given notice in advance of the deadline that no extensions can be allowed. If the module convenor feels that an extension is appropriate, the following extension lengths, which have been endorsed by Academic Support, will be followed:

| **Length of Coursework** | **Extension** |
|---|---|
| Up to 2,500 words (or equivalent) | Maximum of 2 calendar days |
| 2,500- 5,000 words (or equivalent) | 2-4 calendar days |
| Final Year Dissertation | Maximum of 5 calendar days |

[1] Where this guidance refers to "module convenor" this can also be taken to include coursework marker/other academic contributor to the module where this person is not the module convenor.

Any further extension would normally only be given on the basis of approved extenuating circumstances.

Any unapproved late submissions will have marks deducted as outlined in the Quality Manual (5% for each working day).

Students who submit coursework late as a result of illness or other circumstances lasting more than 7 days should discuss this with the module convenor or their personal tutor and should submit an EC form in advance of the submission deadline and evidence within 7 days of the submission deadline. If evidence is not available at the time that the form is submitted, it can be submitted within 14 days of the EC form submission. This documentation will be considered via the normal EC process (see: http://www.nottingham.ac.uk/academicservices/qualitymanual/assessmentandawards/extenuating-circumstances-policy-and-procedures.aspx

- If ECs are accepted, an extension to the submission will be agreed and any marks that have been deducted for late submission will be reinstated.

  Any extension (within a teaching Semester) for students with ECs will not normally be for more than 21 calendar days, to ensure that all coursework is submitted prior to the coursework return date. Any submission after the return date will not be accepted but a student may be given a first sit opportunity if they have approved ECs.

# 16 Plagiarism and Paraphrasing

**Plagiarism and Paraphrasing**

This section is also covered in the Study Skills book. It draws upon information available at the following University Web sources together with guidance from staff in the School of Biosciences. **As work is now submitted electronically through Turnitin, be aware the plagiarism is readily-detected**.

**USEFUL ADVICE FOR STUDENTS**

One good method to avoid plagiarism is to make notes from material you have read and construct your essay / report, in your own words, from these notes. It is tempting (and easy) to copy and paste, but this is unacceptable and constitutes an academic misconduct. It is also poor practice to construct a draft by copying and pasting material from multiple sources, with the intention of then paraphrasing the resulting document. Apart from the fact that the end-product may be disjointed, the paraphrasing is often incomplete and the work submitted may contain elements of plagiarised material. It is, however, acceptable to include relevant figures and tables from published work, as long as you acknowledge their source by citing the primary reference for them.

To make a specific point, there may be rare occasions when you have may to quote an author verbatim; this is acceptable if you put the quotation in inverted commas and give the source, but you should have a good reason why you can't put the material in your own words.

**USEFUL WEBSITES**

**Academic integrity and plagiarism**
http://www.nottingham.ac.uk/studyingeffectively/writing/plagiarism/index.aspx

**Quality Manual**
http://www.nottingham.ac.uk/academicservices/qualitymanual/assessmentandawards/academic-misconduct.aspx

**Studying Effectively**
http://www.nottingham.ac.uk/studyingeffectively/home.aspx

**DEFINITION OF AN ACADEMIC MISCONDUCT**

Any activity or behaviour by a student which may give that student, or another student, an unpermitted academic advantage in a summative assessment is considered to be an act of academic misconduct and unacceptable in a scholarly community. Such action(s) will be considered under the University's Regulations on Academic Misconduct and this may lead to a penalty being imposed.

**DEFINITION OF PLAGIARISM**

*The following definition of plagiarism appears in the University Quality Manual:*

Plagiarism: representing another person's work or ideas as one's own, for example by failing to follow convention in acknowledging sources, use of quotation marks etc. This includes the unauthorised use of one student's work by another student and the commissioning, purchase and submission of a piece of work, in part or whole, as the student's own.

Note: A proof-reader may be used to ensure that the meaning of the author is not misrepresented due to the quality and standard of English used, unless a School/Department policy specifically prohibits this. Where permitted, a proof-reader may identify spelling and basic grammar errors. Inaccuracies in academic content should not be corrected nor should the structure of the piece of work be changed; doing so may result in a charge of plagiarism.

**Work in any year of study which is not undertaken in an Examination Room** under the supervision of an invigilator (such as dissertations, essays, project work, experiments, observations, specimen collecting and other similar work), but which is nevertheless required work forming part of the degree, diploma or certificate assessment, must be the student's own and must not contain plagiarised material.

Possible **penalties** for an academic misconduct including plagiarism are:

a) No marks to be awarded in relation to the specific material which is the subject of the act constituting an academic misconduct (thus leading to a reduced overall mark for the piece of course work, dissertation, examination question or examination script in which the specific material appears)

b) Award a mark of zero for the entire piece of course work, dissertation, examination question or examination script in which the academic misconduct has occurred

c) Award a mark of zero for the entire module in which the academic misconduct has occurred

d) Award a mark of zero for all the assessments in the Semester (even where this will lead to a reduction in degree class). In the case of year-long modules, this penalty may affect both Semesters

e) Award a mark of zero for the whole year (even where this will lead to a reduction in degree class)

f) Require the student to take reassessments (as a result of being awarded zero marks) in the following session before being allowed to progress or complete their course

g) Require the student to register with the University and enrol on modules in which they need to take reassessments (as a result of being awarded zero marks) in the following session before being allowed to progress or complete their course

h) Terminate the student's course

i) Withdraw the award of a degree or other qualification from, and issue an amended transcript to, a former student of the University

j) Full details of possible School and University penalties can be found at: www.nottingham.ac.uk/academicservices/qualitymanual/assessment/academic-misconduct.aspx

## ACADEMIC MISCONDUCT

Any activity or behaviour by a student which may give that student, or another student, an unpermitted academic advantage in a summative assessment is considered to be an act of academic misconduct and unacceptable in a scholarly community. Such action(s) will be considered under the University's Regulations on Academic Misconduct and this may lead to a penalty being imposed.

Here is a range of cheating behaviours:

1. False citation (i.e. attributing work to the wrong source)
2. Plagiarism
3. Using unauthorised sources or notes in examinations or tests
4. Dishonestly obtaining material or information prior to examinations
5. Copying from other students
6. Permitting other students to copy your work
7. Soliciting work from others (e.g. individuals, 'editors' or essay banks etc)
8. Submitting your own previously assessed work without acknowledgement (auto plagiarism)

**Unauthorised Collaboration, or Collusion,** occurs where:
Collusion: cooperation in order to gain an unpermitted advantage. This may occur where students have consciously collaborated on a piece of work, in part or whole, and passed it off as their own individual efforts or where one student has authorised another to use their work, in part or whole, and to submit it as their own.
Note: Legitimate input from University tutors or approved readers or scribes is not considered to be collusion.

**Fabrication** may take various forms but is essentially concerned with manufacturing aspects of the work produced. For example, the insertion of made-up information, data, sources, quotes, anecdotes or analysis would all amount to fabrication

**Recycling or unauthorised, multiple submissions.**

The multiple submission by a student of their own material is not, in itself, considered as academic misconduct. Submission of material that has been submitted on a previous occasion for a different summative assessment is, however, unlikely to be academically appropriate. The merit of such material will therefore be a matter of academic judgement and it may attract fewer (or no) marks than would have been the case if it had not been assessed previously

**Note:**
**Plagiarism is regarded as a serious academic misconduct by the University and will be penalised accordingly. Plagiarism can be easily identified by entering suspect passages into search engines. Specialist search engines (e.g. Turnitin) are available to check all submitted work against previously published sources, including coursework submitted by students in the current or previous years. The School of Biosciences uses Turnitin to assist academic staff detect plagiarism; students are required to submit all coursework in electronic form to facilitate automatic on-line detection of plagiarism.**

**All BSc Research Projects must be submitted electronically to be checked by Turnitin along with the necessary hard copies (see Guidelines for BSc Research Projects).**

If a student is required to attend an Academic Misconduct interview within the School for any suspected academic misconduct his/her tutor will be informed of this, together with the Head of School (or nominee), module convenor (or nominee) and the School Manager for Academic Administration (or nominee).

**GUIDANCE TO HELP YOU AVOID COMMITTING PLAGIARISM**

1. You are allowed to use information from other people's work provided you acknowledge the source. This can apply to a statement, Table or Figure. The best way of doing this for Tables and Figures is to add: "After Smith (1988)" or "Modified from Smith (1988)", and include the reference in your reference list.

2. If you are discussing something somebody else has said, you can say, for example: Smith (1987) claimed that coral reefs in the Pacific were damaged by high temperatures in 1975. Or: It has been claimed that high temperatures in 1975 damaged coral reefs in the Pacific (Smith, 1975).

3. It is rarely necessary to quote previous work directly and you should try to avoid doing this. If quotation is unavoidable, you should put the passage in quotation marks, e.g. Smith (1980) described the outcome of unprecedented high temperatures on coral reefs as: "A disaster for the marine communities in the coastal regions of the Indo-Pacific", and then stated that: "The phenomenon appears to be due to unprecedented high temperatures".

**For information on paraphrasing see 8 and 9 below.**

4. Authors should be cited in text either as: Smith (1975), Smith and Allen (1978), Allen (1987, 1989), or as (Smith, 1975; Smith and Allen, 1978; Allen 1987, 1989). Note that these are in chronological, not alphabetic order. When more than two authors are quoted, this should be in the form Allen *et al*. (1993) in the text, but the reference given in your reference list should contain the names of all the authors. Do not use numerically cited or ordered references.

5. In your "References" or "Literature cited" section, the following style (authors, date, title, journal, volume number, page numbers; called the "Harvard" style) should be used and references should be listed alphabetically.

   Provided you are consistent, you may also use any other accepted style - see journals in the library – unless instructed otherwise by the member of staff setting the coursework.

   **Smith, A. J. and Allen, N. B. (1986). Temperatures and coral reefs. *Journal of the Marine Biological Association* 86: 101-123.**

   **Smith, A. J., Jones, K. L. and Allen, N. B. (1988). Death of corals due to high temperatures. *Thermal Biology* 27: 19-34.**

   If the source is only available electronically or is being published "ahead of print", give the DOI number in your reference.
   Some electronic journals do not use page numbers.

6. For books, the following style (author, title underlined or in italics, publisher, place of publication) applies:

Allen, N. B. (1992). *Coral Reef Biology*. Blackwells, London.

7. For chapters in edited volumes, the following style (author, date, title of chapter, title of book underlined or in italics, editors, page numbers, publisher, place of publication) applies:
Smith, A. J. (1987). Temperature and bleaching in corals. In: *Coral Reef Biology* (N. B. Allen and C. K. Hodges, eds.), pp. 65-90. Clumber Press, New York.

8. **Paraphrasing**, i.e. verbatim or almost verbatim restatement of a passage is a form of plagiarism frequently used in essays and dissertations. The following is paraphrased from C. H. Gordon, P. Simmons and G. Wynn (date unknown). *Plagiarism - What It Is And How To Avoid It*. University of British Columbia.

   Students often ask "How much do I have to change a sentence to be sure I'm not plagiarising?" If you have to ask, you are probably about to commit plagiarism! There is no set number of words that you need to change or add to make a passage your own – the originality must come from the development and expression of your own ideas.

   Original work demands original thought. You should try and separate your ideas from those of others. If you use another author's conclusions then acknowledge them. If you come to the same conclusions as another author you should still acknowledge them. Once a piece of work is complete, look at each part and ask yourself if the ideas expressed are entirely your own, and whether the general language or choice of words is your own. If the answer to either is "no" the work should be credited to the original author.

9. Examples

   **9.1 Original**

   From Smith (1992):
   The author has found that corals respond to high temperatures by expelling their zooxanthellae. This causes them to go white, a phenomenon known as "bleaching." Such corals soon become covered in algae, which makes it difficult for new coral planulae to settle and start a new colony (Davies, 1980). The phenomenon of bleaching is similar to the effect of a crown-of-thorns starfish (*Acanthaster planci*) attack where the polyps are digested by enzymes secreted onto the colony surface (Brown, 1990). As Jones (1972) found, *A. planci* poses a severe threat to corals in the Indo-Pacific. The recent occurrence of high numbers of these starfish on reefs has been correlated to run-off from land which contains high levels of plant nutrients (Jones, 1986). The subsequent increase in the number of algae apparently enhances the survival of the filter-feeding larvae of the starfish.

   **To include this text verbatim in your own work, *without* placing the entire paragraph in quotation marks and acknowledging Smith (1992) (see 3 above) would constitute plagiarism.**

   **9.2 Paraphrased version**

   Paraphrased from Smith (1992):
   Smith (1992) has found that corals respond to high temperatures by expelling their zooxanthellae. This phenomenon, known as "bleaching", causes them to go white. Such

corals quickly become covered in algae and this makes it difficult for new coral planulae to settle and begin developing a new colony (Davies, 1980). Bleaching is similar to the effect of a crown-of-thorns starfish (*Acanthaster planci*) attack. Brown (1990) note that this is where the polyps are digested by enzymes secreted onto the colony surface. Jones (1972) found that *A. planci* may be a severe threat to corals in the Indo-Pacific. Recently high numbers of these starfish on reefs has been correlated to run-off from land with high levels of plant nutrients (Jones, 1986). The increase in the number of algae apparently enhances the survival of the filter-feeding larvae of the starfish.

**To include this text in your own work, even *with* the initial acknowledgment Smith (1992) would constitute plagiarism since it reads as if only the first sentence is taken from Smith, and the rest of the references (Davies, Brown and Jones) have been sourced and read by you and that the development and expression of the text is your own original work.**

### 9.3 Unacknowledged version (i.e. submitting this as if it were your own thoughts or work)

The presence of high numbers of crown-of-thorns starfish (*Acanthaster planci*) on reefs has been connected to run-off from land containing high levels of plant nutrients. This causes an increase in the number of algae which results in better survival of the filter-feeding larvae of the starfish. The starfish kills corals by secreting digestive enzymes onto their surfaces. *A. planci* poses a severe threat to corals in the Indo-Pacific and their effect is similar to that caused by "bleaching", a phenomenon caused by high temperatures which results in zooxanthellae being expelled. Subsequently the dead corals become covered in algae which makes it difficult for a new colony to start.

**To include this text verbatim in your own work, would constitute plagiarism since there is no acknowledgment of Smith (1992).**

### 9.4 Acceptable version (based on information from Smith, reading the cited references yourself and drawing upon other work)

Smith (1992) quoted Jones (1972, 1986) in suggesting that the crown-of-thorns starfish poses a threat to corals in the Indo-Pacific, and that their recent upsurge may be due to an increase in plant food levels caused by an input of nutrients from land. Brown (1990) found that these multi-armed starfish killed corals by everting their stomachs onto the coral colony surface and secreting an enzyme to digest the tissues externally. The resulting "bleaching" effect is similar to that which occurs when corals are exposed to high temperatures and the zooxanthellae are expelled (Smith, 1992). Davies (1980) found that the settlement of algae on the colony surface made it difficult for new coral larvae to settle and, although fish often grazed the algae continually, he found they could not keep these under control. Recent studies have shown that plagues of crown-of-thorns starfish may be a natural phenomenon, as the fossilised remains of previous outbreaks have been found in rocks millions of years old (Cromer, 1994).
**To present your work like this would not constitute plagiarism.**

Note that all the references and authors used in this document with the exception of Gordon *et al*. are fictitious.

**PLEASE CONSULT YOUR TUTOR IF YOU ARE STILL IN DOUBT ABOUT PLAGIARISM**

# 17 Personal Academic Development

This table sets out the goals that you should strive for as you progress through your degree. If you can achieve these you will be well prepared for the diverse opportunities that lie ahead

| | **Qualifying year**<br>**Year 1** | **Part I**<br>**Year 2** | **Part II**<br>**Year 3** |
|---|---|---|---|
| Learning experience | • Establish a strong factual base<br>• Learn the basics of the scientific method and develop a questioning approach | • Link knowledge from diverse sources and develop an ability to relate information<br>• Develop a critical and analytical approach to information | • Develop the ability to handle complex information<br>• Evaluate information and synthesise ideas<br>• Develop a creative approach to problem solving |
| Skills acquired | • Cope with varying lecture styles<br>• Make effective use of library and IT facilities<br>• Acquire basic laboratory skills | • Consolidate information skills with extensive use of library and IT<br>• Enhance practical skills<br>• Enhance presentation skills<br>• Organise study and manage time to meet deadlines<br>• Appreciate the importance and value of team work | • Develop a mature approach to study<br>• Exhibit strong self-discipline and commitment<br>• Clearly articulate knowledge and understanding<br>• Respect the views of others and engage in reasoned argument |
| Developing independence | • Learn to combine teacher-driven study with work based on individual initiative | • Make independent use of library and other information resources<br>• Acquire experience in a range of learning styles | • Take responsibility for self-learning<br>• Demonstrate individual style and flair<br>• Exhibit professionalism and ownership of subject |

# 18 Academic Tutoring

Academic tutoring is the support which the school provides to students in addition to formal teaching. It is complementary to the University's central support services and pastoral care provision.

The objectives of Academic Tutoring are to:

- Help you acquire the necessary study skills to pursue your studies successfully.
- Address problems of lack of knowledge and understanding of the subject.
- Address any problems with aspects of a module or your studies in general.
- Provide you with an overview of your academic progress at module and programme level.
- Assist you in making academic choices e.g. module enrolments, programme pathways.
- Provide assessment feedback to help you improve your future performance.
- Contribute to the acquisition of key employability skills.
- Assist and encourage you to gain employment or continue your education after you graduate.

The School takes its responsibility for academic tutoring very seriously and provides the following to ensure that you are properly supported:

- One-to-one meetings with your personal tutor for personal development, pastoral support and guidance (e.g. on module choices).
- Meetings with course directors for module guidance, either informally or at module enrolment days.
- Tutorials/seminars within modules comprising your degree programme.
- Provision of specific credit-bearing academic tutoring and study skills modules D21BG1: Biosciences Tutorials (Academic Development) and Foundation and, C11BE1 Dissertation in Environmental Science and also through skills embedded in other academic modules including project and dissertation modules.
- Drop-in support sessions for mathematics and statistics.
- Written feedback on assessments including;
  - individual written or verbal feedback on coursework and mark allocation based on a transparent marking scheme
  - generic feedback one week after exam results
  - constructive comments provided by markers through individual appointments with module conveners
  - students' evaluation forms collated from students' comments, available through Moodle.
- Student led-seminars.
- Peer support groups, including mentoring.
- 'Office hours' system for appointments with module coordinators/tutors.
- A flexible and comprehensive virtual learning environment (Moodle).
- Links to central support services e.g. Academic Support, the Counselling Service and the Student Services Centre.
- Assistance and guidance on academic administrative matters through the school office.
- Encouragement to make use of central on-line study skills resources e.g. 'Study Skills' www.nottingham.ac.uk/studyingeffectively
- Assistance with personal support or guidance from the School Senior Tutors.

**School of Biosciences Tutoring Statement**

The full Biosciences tutoring statement can be found in appendix 8 and at http://goo.gl/dPpFjU Students are encouraged to read the statement.

# 19 Attendance Monitoring

Students must attend all teaching activities necessary for the pursuit of their studies, undertake all associated assessments and attend meetings and other activities as required by their School or the University. Where students face difficulty in attending sessions or undertaking assessments and examinations, it is their responsibility to inform their School of this fact and to provide a satisfactory explanation. Please see http://www.nottingham.ac.uk/academicservices/qualitymanual/registrationattendanceandstudy/regulations-governing-attendance-and-engagement.aspx for further details on attendance regulations at the University.

Two weeks is considered a significant period of absence and students are encouraged to consider interrupting their studies if they will miss this length of time. See for further details on voluntary interruption of studies.

The School will consider all extenuating circumstances relevant to attendance and engagement with a student's studies. Students should make the School aware of any extenuating circumstances as soon as possible to ensure full support can be provided and any alternative arrangements such as coursework extensions can be applied within the approved timescales. See the Quality Manual http://goo.gl/yX4aTC or further details on extenuating circumstances.

Individual Schools and Departments have systems in place to monitor attendance during the academic year. Example includes taking registers in lectures, monitoring coursework submission and tutorial attendance, etc. Unauthorised absences are reported to Academic Services and recorded as appropriate. Where students are absent without authorisation, to the point that it is not possible to continue with the course, Academic Services will write to the student stating that they will be deemed to have withdrawn from the University and their student record will be amended to show that they have withdrawn.

Students who are identified to be poorly engaging with their studies or poorly attending teaching activities will be asked to meet with the Student Experience and Support Officer or their Personal Tutor.

Where required the University will report non-attendance and poor attendance to appropriate authorities including the UK Border Agency and Student Finance.

# 20 Complaints and Appeals Procedures

Details of the University's Complaints and Appeals Procedure can be found at: http://www.nottingham.ac.uk/academicservices/qualitymanual/assessmentandawards/academic-appeals-policy-and-procedure.aspx

The procedure regarding a complaint concerning your course is that in the first instance you should contact the lecturer concerned. If the matter cannot be resolved, the next points of contact would be:

- Module Convener
- Course Director
- Teaching Manager
- Head of Division
- Head of School
- Student Year Representative (names are on the Learning Community Forum notice board together with the Module Convener)

Students are encouraged to involve their Personal Tutors at any stage, whether the matter of concern is of an academic or personal nature. Students also have the right to bring matters of concern before Learning Community Forum.

# 21 Industry Placements

As an undergraduate student in the School of Biosciences, the vast majority of you can undertake an optional industry placement, between years two and three of your degree, extending your degree to a four year programme.

The year-long placement is open to you if you are studying one of the following degree programmes:

- BSc Agriculture
- BSc Integrated Agricultural Business Management with Industrial Placement Award [1]
- BSc Agricultural and Crop Science
- BSc Agricultural and Livestock Science
- BSc International Agricultural Science [2]
- BSc Animal Science
- BSc Biotechnology
- BSc Environmental Science
- MSci Environmental Science [3]
- BSc International Environmental Science [2]
- MSci International Environmental Science [2 3]
- BSc Environmental Biology
- BSc Food Science
- BSc Microbiology
- BSc Nutrition
- BSc Nutrition and Food Science
- BSc Plant Science

You apply for placements during your second year. The School Placement Team help and support you by organising a range of employer presentations on campus, sending email alerts of placement opportunities, running drop-in sessions and one-to-one meetings, and providing online resources.

Further information, profiles of student experiences and useful links can be found here: www.nottingham.ac.uk/biosciences/placements

If you have any questions or want to find out more, contact the School of Biosciences Placement Team, Dr Judith Wayte and Mrs Rachel Jessop, on biosciplacements@nottingham.ac.uk

[1] If you are studying BSc Integrated Agricultural Business Management with Industrial Placement award, then a year-long industrial placement during year 3 is built into the 4 year degree programme.

[2] If you are studying a degree with an international pathway where you study abroad at the University of Sydney for your second year, you can still undertake an industrial placement. You will need to apply for your placement whilst studying in Sydney. You should be aware that some companies will require you to attend an interview/assessment centre in person, whereas

others will be more flexible and will be able to interview you remotely. You can work together with the School Placement Team by email from Sydney.

[3] If you are studying for an MSci degree course, adding a year in industry will mean that the total length of your degree course is 5 years. If you are an international student on an MSci degree course studying in the UK on a Tier 4 visa, and you wish to undertake a year in industry, you need to be aware of the following:

- Once you have secured an industrial placement, you will need to change degree course and apply for a visa extension.
- You may need to make your application for a visa extension from overseas.

The maximum length of time you can study in the UK on a Tier 4 visa at undergraduate level is 5 years. An MSci course with a year in industry is therefore at the maximum length, so if you were to fail one or more modules, you would not have the opportunity of resitting a year in the UK.

If you have any questions or want to find out more, contact the School of Biosciences Placement Team, Dr Judith Wayte and Mrs Rachel Jessop, on biosciplacements@nottingham.ac.uk

## 21.1 Year Out and Erasmus

The School of Biosciences has established an ERASMUS programme of Student Exchange with a number of European Institutions in France, Germany and Spain.

All students taking honours degrees in the School (except MNutr) are able to take an additional Certificate in European Studies (normal entry requirement is at least a grade B in the second language that the student intend to improve at GCSE level). The Certificate consists of an additional year over and above your 3-year BSc degree programme and commences after the second year in September of Semester 5 and concludes at the end of Semester 6. You will then re-join the normal 3-year programme at the beginning of Semester 7.

Students entering the School need to apply to take the Certificate following a meeting which outlines the principles of the Certificate. Once the application is confirmed, students must submit their application in writing to the School Office.

Students taking the Certificate follow preliminary language training during Year 2 (Part I) by taking 10 credits of French, German or Spanish languages (held in the Language Centre, University Park) and 50 credits of Science modules in each of Semesters 3 and 4. In Semester 5 and 6; students will be on placement in an academic Institution in another European country where they will follow courses, including language modules in both of the Semesters in placement; the courses must be taken in the language of the chosen Country. Students will also need to complete a European Placement module during Semester 5 and 6.

The ERASMUS programme is on an exchange basis. Thus it is suggested that students make contact with ERASMUS students within the School who are from the host University together with those Biosciences students who were at the host University in the previous year. Both these contacts can be invaluable in providing assistance and information.

Further information about the scheme is available from Ms Elena Staves (Student Services Centre, The Barn) or Rachel Jessop (C05, Bioenergy and Brewing Science Bldg, SB).

**SUPPLEMENTARY REGULATIONS FOR THE EUROPEAN CERTIFICATE**

*In addition to the normal progression rules for undergraduate study, the following progression rules apply to the European Certificate element.*

Part I candidates achieving a mark of 50% or more in each of the Autumn and Spring Semester language modules will progress to the language module in the Autumn of the year of the Certificate in European Studies (Biosciences). Part I candidates achieving a mark of 40-49% in the Autumn and/or Spring Semester language module(s) will normally be advised to discontinue with the Certificate in European Studies (Biosciences). Candidates achieving a mark of less than 40%, at first attempt, in the Autumn and/or Spring Semester language module(s) will be advised to discontinue with the Certificate in European Studies (Biosciences). If, after reassessment, candidates do not achieve a mark of at least 50% in the Autumn and/or Spring Semester language module(s), they may not continue with the BSc with a Certificate in European Studies (Biosciences).

The above regulations as specified for candidates obtaining marks at first attempt. Candidates on the year of the Certificate in European Studies (Biosciences) between Part I and Part II who obtain a mark of less than 40% in the language module cannot progress onto placement in the following Semester. Such candidates are offered the opportunity either:

1) to transfer to the equivalent 3-year BSc degree without European Studies at the start of the next academic year and thus do not take any further language modules.

or

2) to be reassessed in the Autumn Semester language module in the August / September reassessment period.

If, after reassessment, a mark of 50% or more is achieved candidates may re-join the Certificate in European Studies (Biosciences) in the following academic year. If a mark of less than 50% is achieved at reassessment candidates will be offered 1) above.

In order to proceed to Part II of the degree BSc with a Certificate in European Studies (Biosciences) candidates must attain pass marks in assessments related to the European Year. Candidates who fail to attain satisfactory marks in the assessment undertaken during the European Year shall be offered the opportunity to transfer to the 3-year equivalent BSc degree without European Studies.

Candidates who fail to achieve the criteria for progression onto the three year equivalent degree without European Studies shall not be permitted to continue on this degree but may be offered the opportunity to transfer to the Ordinary degree.

**MARKING SCHEME FOR THE EUROPEAN YEAR**

**European Placement Module:**

**Fifty percent of the mark correspond to the attendance and assessment of the courses taken abroad. The other fifty percent correspond to one scientific review, one cultural essay and one translation (see below for information).**

**50%: Attendance and assessment of courses taken abroad.**
**50%: Essays and translations.**

| *Activity Type* | *Information* | *Length* | *Weighting* |
|---|---|---|---|
| Attendance and assessment of courses abroad | Students must attend and sit the exams abroad | Not applicable | 50% |
| Essay 1 | Scientific review | 4000 words | 17% |
| Essay 2 | Culture research paper | 4000 words | 16% |
| Translations | Science into English | 10 * 400 words | 17% |

## 21.2 Studying Outside the UK

## Malaysia Campus

Students on the BSc Biotechnology, BSc Agricultural and Crop Science, BSc Nutrition, BSc/MSci Environmental Science, BSc Environmental Biology and BSc Plant Science courses may have the opportunity to study for one Semester or full academic year at our Malaysia Campus as part of their three-year degree programme. All teaching at our Malaysia Campus is in English and the modules and exams are very similar to those in Nottingham. Students from the UK campuses pay a reduced tuition fee during their time abroad and living costs in Malaysia are lower than in the UK.

See link: www.nottingham.edu.my/index.aspx

## Universitas 21

Nottingham is a founder member of Universitas 21 which is a global alliance of key universities. You will be able to apply to spend one Semester (the first of your second year) studying in one of our partner institutions (including Australia, China, Korea, Mexico, North America, New Zealand, Singapore). Competition for these placements is high but the rewards are considerable.

Find out more about study abroad opportunities at
www.nottingham.ac.uk/internationalstudents/exchanges/index.aspx

## Interested? What to do next

Don't miss the Study Abroad Fair, organised by the International Office, which will take place in November 2016. Here, you will learn about all the study abroad options open to you and how to apply. You will also be able to meet with students who have already studied at overseas campuses.

Interested students are advised to find the Study Abroad Team on Facebook to be kept updated with deadlines and events at: www.facebook.com/UoNStudyAbroad and the International Office website:
www.nottingham.ac.uk/internationalstudents/exchanges/index.aspx

# 22 Channels of Communication

Dissemination of information is an on-going process during the academic year; this will come from both the School Office and academic staff. We use several ways to give out information.

- **Email -** Email is the normal means of communication to individuals or class groups; your tutor and module conveners will email regularly and it is also a good way for you to contact academic staff. However, this and other media should not detract from personal meetings, which are necessary for the communication of several matters including the conveyance and discussion of examination.

- **Moodle** - Moodle is the online learning environment across the University. The resource allows you to access lecture notes, find links to external learning resources, access self-test exercises and assessments, participate in online learning activities, submit assignments and collaborate on group projects. You can log in using your University username and password the day after you have completed your registration online: w: moodle.nottingham.ac.uk.

- **The Student Portal -** The Portal is a central part of the University's communication system for staff and students. Make sure you have access to it at: https://goo.gl/dFwTwP

- **Social Media -** The University of Nottingham uses the latest technology to bring Nottingham to life and to ensure that you can experience and interact with the University community at any time, see: www.nottingham.ac.uk/connect/nottinghamconnect.aspx

- **Blue Castle website -** students can view their marks, progression status and final award information electronically at: https://goo.gl/txm85c

# 23 Students/Staff Consultation

The courses you are taking have evolved over a number of years and incorporate many features arising from student feedback and evaluation. Each department has its own procedures for allowing students to participate in the evaluation and future development of courses.

Broadly, two channels exist:

- Feedback evaluations which enable you to comment on the content, style and objectives of modules; we urge you to take the time and effort to complete these so you and future students can play a role in improving our teaching.

- The Learning Community Forum (LCF) consists of course representatives of undergraduate students and teaching staff who discuss a wide range of academic and non-academic matters. Anyone who has comments, criticisms or suggestions that they wish to be discussed should contact one of the representatives, whose names will be notified to you during the first Semester. Minutes of the Learning Community Forum will be made available electronically.

- The Student Guild also elects student representatives to the School Board and other School committees. If you want to influence academic procedures in the School and University on behalf of your fellow students, you must join the Guild first.

# 24 Students' Access to Academic Staff Policy

Appointments for meetings with staff should be requested by students by email or in person (by phone or office notice board). Requests by email can be made at any time. Staff should respond to such requests by email within two working days (both during term and outside term-time). Staff are not obliged to send their responses outside of normal working hours, nor during official University holidays, nor when on vacation. They should put out-of-office messages on their emails during vacations and respond within two working days upon return.

Following a request, appointments should be arranged with the student at a mutually convenient time, normally to be held within three working days of the request.

Once an appointment has been made, both the staff member and the student are expected to honour the appointment. Should either be unable to attend they should email to cancel prior to the meeting.

Staff have the option of restricting their availability to students to particular days or times of day (other than in emergencies). In this case, they will communicate their preferred availability to their tutees and to other students they see on a regular basis.

# 25 Quality Assurance

The primary aim of the University of Nottingham is to sustain and improve the high quality of its provision as one of the leading research-led universities in the United Kingdom. It is also committed to providing a learning environment of the highest quality for students, in which first class teaching is underpinned by excellent research. The School of Biosciences endeavours to maintain these goals in the Biosciences, where relevant in collaboration with other schools, in the following ways:-

- by recruiting motivated students with a proven record of high level of learning;
- by providing a broad education across the discipline;
- enabling the development of an analytical and critical appreciation of scientific ideas and problem solving;
- providing a learning experience enriched by an active research environment;
- enabling the development of independent learning and skills for a wide range of careers within and outside the biological sciences;
- to ensure that students receive appropriate support and guidance in their academic development and career planning;
- to identify and support the academic and pastoral needs of individual students;
- to provide a flexible, effective and adequately resourced learning environment, and
- to maintain and improve teaching and learning through effective management structures in line with the University Quality Manual.

As part of an ongoing process of improving quality, some of our teaching facilities have been recently refurbished and modernised. We look to our students to help us maintain these areas in good condition for the benefit of future generation.

# 26 Coursework and Examination Feedback

Feedback is provided in three main forms on i) assessed coursework, ii) examination performance and iii) general aspects of each module. In addition to individual marks given for assessed coursework in each module, you will receive an overall module mark and the end of each Semester and a full set of module marks will be made available to you through Blue Castle (https://bluecastle.nottingham.ac.uk). Your module marks are confidential and not shown to other students. Individual mark components (e.g. coursework marks) are also confidential; the only exception to this is when you receive a mark for a piece of 'group work' in which all members of your group receive the same mark. The sections below provide further details about feedback.

**Coursework Feedback**

Coursework feedback is normally provided through written comments on your work. For many pieces of coursework, a cover sheet will be returned with your work to explain the mark received and give advice on how your work could be improved. For other pieces of non-examination assessed work, it may not be feasible to provide written comments on your work, for example, a group oral presentation; in such cases, feedback may be provided verbally or by email. Feedback for other assessed work e.g. laboratory practicals, may be provided in other ways as appropriate to the assignment set. Whilst the manner by which you receive coursework may vary depending on the type of coursework set, the purpose of the feedback is to provide a mark for the work together with constructive comments to help improve your performance in future assignments. If you wish to discuss your performance in any assessed work, you should contact the module convenor.

Module convenors will set a deadline by which you must submit coursework and a date when you can expect to receive feedback on your work. This information will be provided when the module convenor sets the piece of work. In normal circumstances, marked coursework and associated feedback should be returned to students within 21 days of the published submission deadline, i.e. students submitting work before the published deadline should not have an expectation that early submission will result in earlier return of work. See details www.nottingham.ac.uk/academicservices/qualitymanual/assessmentandawards/feedback-to-students.aspx

**Examination Feedback**

After each examination period, general examination feedback from each module will be posted on Moodle. This will include: i) feedback on examination questions where students' performance could be improved, ii) suggested strategies for improving performance in those questions and iii) general comments about examination technique. Students wishing to discuss their examination performance should contact the relevant module convenor(s).

**General Feedback**

A copy of the Module Report Form, which is a summary of the discussion/feedback with students at the end of each module, can be found within a folder for the module in Moodle. This feedback sheet is used by module convenors to identify which areas of the module students felt worked well, and others that could be improved; in the latter case, the module convenor will make appropriate academic adjustments to the module for the following academic session. The areas of feedback covered by the module report form follow the headings detailed in the Module Report Form.

The University's Quality Manual provides information on good practice for feedback on assessed work and what you can expect to receive as a student at the University of Nottingham – see http://goo.gl/DI1Gqo.

# 27 Student Services/departments

## 27.1 Student Services Centre

The Student Services Centre can provide you with information and support throughout your student life. They are approachable, knowledgeable and most of all they are there to help. Student Services Centres are based at Sutton Bonington, University Park, QMC and Jubilee Campuses. Further details of support services to be given to you on arrival.

## 27.2 Libraries

The James Cameron-Gifford Library on SB Campus, together with Hallward Library (at UP), George Green Library (UP) and the Medical School Library (QMC and Derby) provide information on all subject areas covered by the School, plus study areas and computing facilities. The on-line catalogue (NUsearch) enables you to search for material held at all branches of The University of Nottingham library. Material from the other campuses can be obtained swiftly for you through the intersite delivery service. During Semester 1 you should attend an introductory lecture provided by the library's Teaching and Learning Support Team. This will be followed up by a tutorial providing an introduction to key resources and discussion on the critical interpretation of published materials as part of the Academic Development and Employability module.

Learning these basic information retrieval and evaluation skills is essential - you will need them for essays and projects throughout your course. As you progress, more specialised studies are undertaken and you must become familiar with the experimental data published in various journals. Acquaintance with published research provides the foundation for most final year research projects. You should not forget to read the more popular scientific press such as *New Scientist* or *Scientific American*, as well as those appropriate to your discipline.

The James Cameron-Gifford Library at Sutton Bonington has over 100 reading places, including quiet areas, bookable/non-bookable study rooms and a number of PCs (see below); it links with several of the Computer Rooms. The Library stock has been developed to support teaching and research in the Schools of Biosciences and Veterinary Medicine, and the library service also provides access to a wide range of databases, electronic journals, and e-books.

Your University Card is also used as a Library borrower's card, and is required for entry to the libraries at University Park campus.

The James Cameron-Gifford Library is open:

Monday to Friday 8.00 am - 9.45 pm
Saturday 9.00 am - 4.45 pm
Sunday 9.30 am - 4.45 pm

The library is open 24/7 during exam periods. More information can be found on our website at: www.nottingham.ac.uk/library

## 27.3 IT Facilities

### Help and advice

Advice and information for new users of the IT facilities can be found on the University web pages – go to www.nottingham.ac.uk and search for 'Student Essentials'. Several on-line guides can be found, and many of them are available as hard copy booklets in the libraries.

### Getting online

Your username and password will get you access to most of the services you will need during your time at the University. Make sure you set a strong password and *never* share your password with someone else. The University will *never* ask you to reveal your password, and you should be suspicious of any request to tell someone your password.
Be sure to check your University email regularly, otherwise you may miss important information.

### Computer rooms

There are a number of Information Services (IS) computer rooms on the Sutton Bonington campus which can be used by students, but some are also used for teaching classes. Please look out for notices stating times when the rooms are unavailable due to teaching bookings

There is a large (120 seat) computer room in the Gateway building (room A07); and smaller rooms in the Main Building (rooms B05, B08, B09, and B10). Further computers are available in the James Cameron Gifford Library, including some with large screens for collaborative or group work.

All IS Computer Room computers are set up in an identical manner, with the same selection of software installed or available (Windows, Microsoft Office, EndNote, PDF Creator; and a range of statistical, graphical and course-related software applications).

### Computer loans

The JCG library counter offers a short-term laptop and tablet loan service, with loans restricted to use within the Library and Learning Hub areas only.
Students may also make use of the Information Services Laptop Loan service, where longer-term loan periods are possible. This service operates from an office at University Park (Pope Building).

### The Portal; and Virtual Learning Environment

The **Portal** (linked from the University's home page) is the main point of access for students, through which you can access most of the services you will need. From the Portal you can connect to your email service, module information, Library services, timetables, and other essential information. You can also connect to **Moodle**, which is the University's Virtual Learning Environment (VLE), and is where you will find course information, module documents, lecture notes, reading lists, assignments, etc.

**Saving your files and backing up your data**

It is the responsibility of each student to save their work safely and securely! Each student has 4GB of personal file storage available on the University's networked servers. This is available as the 'Home Drive' from any IS Computer Room computer, as well as via the web at files.nottingham.ac.uk.

Never save your work onto the hard drive of Computer Room computers – files will be deleted when you log off! Save files to the Home Drive or to an external device.

Any work done on your *own* computer should be backed up – either onto *at least* one external hard drive or onto one of a number of cloud storage options available widely.

**Printing**

Students can print from any IS computer to the University Print Service. Printing is held in a queue and can be printed off and collected at Print Service printers which are situated close to all IS computer rooms and in the libraries.

You can also print from your home computer, laptop or mobile device using the Mobile Print Service. Simply email your document to mobileprint@nottingham.ac.uk

**Wireless**

Good wireless coverage on the **eduroam** service should be available in all of the main teaching and social areas of the campus, and in some outdoor areas. In the halls of residence the wireless service is provided by the Hall management companies.

## 27.4 Accessibility

Teams supporting students with study support, disabilities, specific learning difficulties and long-term health conditions are located in the Student Services Centre (SSC) in The Barn on Sutton Bonington Campus, and in the Portland Building on University Park; and will be available on all of our other teaching sites.

We can assist with queries regarding:

- Support in making the transition to University, admissions and registration
- Liaison with your School or department about any impact your condition may have on the study elements of your course OR: assessments in relation to disability and dyslexia and recommendations to academic staff about reasonable adjustments in the learning, teaching and assessment environments
- access to alternative formats such as Braille and large print
- residential accommodation – adapted study bedrooms
- accessible transport around and between our Nottingham campuses
- applying for Disabled Students' Allowances
- access to alternative formats such as Braille and large print
- access to specialist technology in libraries
- liaison with libraries for enhanced services such as extended loans
- timetabling arrangements

The Accessibility Team also provides support for students who wish to develop their strategies for academic writing and time management.

The Accessibility Team have online study resources which relate to almost all of the areas you cover in the guide, see:
http://www.nottingham.ac.uk/studentservices/supportforyourstudies/academicsupport/studyresources/index.aspx

If you would like to contact us, please telephone the Student Services Centre on:
(0115) 951 3710
e: disability-support@nottingham.ac.uk
dyslexia-support@nottingham.ac.uk

The University of Nottingham ACCESS Centre (UNAC), in the Student Services Centre, provides assessments for students who have applied for Disabled Students' Allowances.

**Student Welfare Manager**
The School also has a dedicated Student Welfare Manager, who provides a point of reference, advice and guidance for members of staff and students in the School about student disability issues and student support. The Welfare Manager is part of a large cross campus team of Student Welfare support managers and officers that meets regularly to share information and good practice. The Welfare Manager in Biosciences works closely with the Accessibility Team in working to ensure that all students are supported and advised appropriately and that there is equality of opportunity for all.

If you have any requirements or concerns talk in the first instance to your Welfare Manager – or contact your personal tutor.

**School Welfare Manager**

The Welfare Manager for the School of Biosciences is located in the Main Building. You will be meet your Welfare Manager during your induction and will be given further details on your arrival at university.

## 27.5 Careers and Employability Service

**Careers and Employability Service**

Many first year students think it is too early for them to start thinking about their future career, but in our experience it is never too early. By making the most of your time at university you can develop skills and build experiences that will be of interest to your future employers.

You could:

- join a **society** or **sports team**
- complete an **Advantage Award** module
- find a **part-time job** through Unitemps

For more information about the Advantage Award, Unitemps or other ways to make the most of university life, you can visit our webpages www.nottingham.ac.uk/careers or speak to a member of the careers team.

Whether you have one or several career ideas or none at all, it is a good idea to start researching possible career options. There are a number of ways the Careers and Employability Service can help you to do this:

- Speak to a Careers Adviser. You can book a one-to-one appointment to discuss your career ideas or questions at Sutton Bonington Campus or at University Park.

- Meet employers on campus. Throughout term time there will be a range of different employers visiting Sutton Bonington Campus and University Park. While you're in your first year you can attend these events to find out about different industries and companies, which will help you with your career planning.

- CV Reviews. Whether applying for work experience, a summer internship or a part-time job, you can have your own CV reviewed at Sutton Bonington Campus or University Park.

To book an appointment or CV review, or to book a place at an employer event or workshop, visit: www.nottingham.ac.uk/careers/login

To find out about the workshops and events, check your university email to find your weekly Biosciences Careers bulletin. You can also follow @UoNCareers and @UoNBioscicareers on twitter.

If you have any questions or if you would like to find out more about The Careers and Employability Service, please do visit one of the careers offices:

- **Sutton Bonington Campus** – Student Services Centre, The Barn, Sutton Bonington Campus
- **Science Faculty team** – B08, Pope Building, University Park

# 28 Health, Safety & Security

- The research buildings are open to students from 08:30am until 18:00pm, Monday to Friday, except public holidays and University holidays. If for any reason you have to be in the building outside if these times, you must be supervised by an academic member of staff.
- There are lifts available in all teaching buildings for use by disabled students. The other use of the lifts is for movement of goods, and should not be used for other purposes.
- The School has its own Safety Handbook which is available on the web at http://goo.gl/UASVap

**Fire**

- Fire alarms in the teaching buildings are tested at a regular time (eg Wednesday at 10 am in the Main Building). In the event of fire in the building, the alarm will sound continuously. In the event of this, the lecturer in charge of your class will organise evacuation of the building to the relevant assembly point. Fire exits are clearly sign-posted. Re-entry into the building after a fire alarm is given by the Fire Monitor.

**Safety**

- Safety in the building, especially in the Laboratories is paramount. See further reference to this matter under 'Practical Classes'.
- Practical classes are continuously supervised by an academic member of staff with the support of demonstrators and occasionally technicians. You should not enter a laboratory until a member of staff arrives.
- Suitable protective clothing must be worn for laboratory classes (see 'Practical Work').
- Defined procedures must be followed for the disposal of certain types of laboratory waste, such as syringes and syringe needles, broken glass, organic solvents and microbial cultures. Instruction on the correct disposal of these and other items will be given in practical classes.
- Safety in Fieldwork. Field Course safety information and the Code of Practice for students can be found at: http://goo.gl/IBS6EF

**Accidents & First Aid**

- For minor injuries, first aid boxes are available in all laboratories and certain offices. In such situations it is likely you can deal with such injury yourself.
- Where an injury is more serious a qualified 'First Aider' should be called. Names of First Aiders are listed on the School's web pages.
- If a 'First Aider' is not available or if further treatment is required, you will be taken to the Cripps Health Centre or A&E at Queens Medical Centre in extreme situations.
- All accidents, whatever their severity, must be reported on an accident report form available from the member of staff taking the class at the time of the accident and will supervise completion of the form.

**Food & Drinks**

- On no account should food and/or drink be taken into a laboratory, lecture theatre or computing rooms.

# 29 Modules

# Year 1 Modules

# C51201 Micro-Organisms and Disease

**Module Convenor:** Dr A Cockayne Alan.Cockayne@nottingham.ac.uk

**School:** Life Sciences, UP

**Module Details**: Level 1 Spring Semester, 10 credits

**Expected Number of Students Taking Module:** 25

**Target Students:** Those studying Microbiology who wish to specifically increase their knowledge of infectious diseases. Students in other areas of Life Sciences where human infectious diseases, pathogenic microorganisms or their products may have an impact.

**Summary of Content:** Students will be introduced to human infections caused by the main groups of bacterial and fungal pathogens and the mechanisms of disease causation. The immune system and its roles in prevention and response to infection and the theory and practical application of vaccination will be described. Laboratory diagnosis of infections and methods for antibiotic sensitivity will be reviewed. A short practical course will introduce students to some of the important laboratory methods used to isolate and identify medically important bacteria and determine their sensitivities to antibiotics.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Assessment details:**
Examination (100%) 2 hours

**Aims:** To introduce students to a range of important human pathogens, their interactions with the immune system, mechanisms of disease causation and the laboratory procedures involved in diagnosis and treatment of infections.

**Learning Outcomes:** At the end of this module you will be able to: • Describe the characteristics of the main groups of bacterial and fungal pathogens of humans, the diseases they cause and the mechanisms involved in disease causation. • Describe the components and functions of the immune system and how it interacts with pathogenic and non-pathogenic microorganisms. • Outline the principles involved in vaccination and the types of vaccine available for prevention of infectious disease. • Describe the practical diagnostic procedures used in isolation of pathogens from different types of clinical specimen, their identification and the methods used for antibiotic sensitivity testing. • Attain practical experience of basic laboratory methods used in handling, identifying and antibiotic sensitivity testing of medically important bacteria.

# C81SOC Social Policy

**Module Convenor:** Dr SM McDonald Stephanie.Mcdonald@nottingham.ac.uk

**School:** Psychology, UP

**Module Details**: Level 1 Autumn Semester, 10 credits

**Expected Number of Students Taking Module:** 400

**Target Students:** (A) Core module for BSc Psychology programmes (i.e., C800, C850 & CV85) (B) International exchange (e.g., U21, Erasmus) and subsidiary (including Natural Science) students.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module introduces students to the core topics in social psychology. Social psychology is concerned with trying to understand the social behaviour of individuals in terms of both internal characteristics of the person (e.g. cognitive mental processes) and external influences (the social environment). Lectures will cover topics on how we define the self, attitudes, attribution, obedience, aggression, pro-social behaviour and formation of friendships. Tutorials BSc Psychology programmes: C800, C850 & CV85: Tutorials with personal tutor. Non-Psychology programmes and international exchange programmes: Two compulsory workshops (see C81SOC Moodle page for details).

**Assessment Details:**

| | | |
|---|---|---|
| Exam 1 | 75% | 1 hour MCQ Exam. 60 Qs. 4 Choices |
| Coursework 1 | 25% | 1500 word essay. See Moodle for deadline information. |

**Aims:** This module aims to introduce core concepts of social psychology and thus introduce the scientific study of the myriad of social behaviour we encounter every day. The module will cover almost every facet of social behaviour, including our sense of self, attitudes, social compliance and conformity, obedience to authority, attribution processes, group performance and conflict, interpersonal attraction, pro-social and anti-social behaviour. Through the study of these topics students will gain an understanding to the ostensibly simple question of why people do the things they do, and how and why that behaviour may change in the presence of others. The module will give an overview of the experimental findings and theoretical positions that seek to explain human behaviour in a social environment. This module introduces a core area of psychology, forming both the academic basis for further studying in the subject area as well as equipping students to gain a deeper understanding of the world around them, as it provides a scientific way of gaining a deeper understanding of the social world.

**Learning Outcomes:** Knowledge and understanding:
Students will have knowledge and understanding of core theories and topics in social psychology • How people form a self-concept • How we can explain the success and shortcomings of folk psychology • How we form attitudes and how they can be changed through persuasion • How the presence of others can influence our performance and behaviour • Why people may engage in behaviour that they know is wrong or harmful • Why people choose to help or not help others in need • How

friendships and relationships are formed Intellectual skills – the ability to: • Evaluate the way in which concepts are defined and measured • Appraise the relative merits of different theoretical frameworks • Relate experimental findings to everyday behaviour • Apply insights from the academic study of social psychology to the way others seek to change our attitudes and behaviour (or how we might affect these changes in others) • Better understand the psychological processes involved in current key issues (e.g. tackling climate change and terrorism) Professional/ Practical skills – the ability to: • Understand how complex social behaviours with many factors can be studied in controlled experiments and field studies • Critically examine evidence in light of different theoretical frameworks • Better understand how people interact in groups striving for a common goal (e.g. work task groups) Transferable (key) skills – the ability to: • Critically evaluate evidence and ideas in relation to competing theories • Develop a critical approach in investigating topics • Communicate accurately and effectively in writing

# D211F3 The Biosciences and Global Food Security

**Module Convenor:** Dr Kevin Pyke Kevin.Pyke@nottingham.ac.uk

**Module Details:** Level 1, Autumn Semester, 10 Credits

**Expected Number of Students Taking Module:** 250

**Target Students** Most first year students studying taking degrees in the School of Biosciences including, Nutrition, Biotechnology, and Food science, Animal Sciences, Plant Sciences,.

**Availability to Exchange Students** Yes - if relevant in the first year

**Pre-requisite(s)**: Normal entry requirements for School of Biosciences.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content** – The module will define global food security as a concept and then examine various aspects thereof, including plant growth, evolution of crop crops, agriculture and crop production, agricultural systems and animal production, the food industry and sustainable nutrition.

**Assessment details** There will be several pieces of assessment including a practical questionnaire to be filled in after the practical session, an online assessment for a self-study session (30 minutes), a multiple choice test in week 8 of the module covering all taught material up till then (one hour, 50 questions) and a final exam which will be performed online using ROGO (one hour)

- Practical questionnaire (3 pages) – 500 words 10%
- An online assessment for a self-study session (30 minutes) – 10%
- MCQ test –one hour – 50 questions - 10%
- ROGO exam - one hour (70%)

**Aims:** To provide first year students with an overview of the issues of global food security and show them the level of complexity that exist in different parts of the food generation system, from plant and crop growth, agricultural systems, generating food stuffs and the environmental effects this process entails and sustainable nutrition.

**Learning outcomes:** On successful completion of the module, students will be able to:
- Review new technologies used to combat global food security.
- Describe the impact agriculture and food production has on the environment.
- Describe the challenges being faced in global food production in relation to your subject area.
- Develop professional skills to work safely in a laboratory situation.

# D211P1 Genes and Cells: 1

**Module Convenor:** Dr Nicola Chapman Nicola.Chapman@nottingham.ac.uk

**Module Details:** Level 1, Autumn Semester, 10 Credits

**Expected Number of Students taking module -** 300

**Target Students** – all year 1 students enrolled on a School of Biosciences degree

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Lecture Programme:** Lecture programme is provisional and more detailed information will be given to you in the first session.

**Timetable Autumn 2016**

| ednesday | Lecture 9 a.m. | Lecture 10 a.m. | Practical 11 a.m. |
|---|---|---|---|
| September 28th | Genetics | Animal Cell | Genetics Practical |
| October 5th | Genetics | Animal Cell | Genetics Practical |
| 12th | Genetics | Plant Cell Lecture | |
| 19th | Genetics | Plant Cell Lecture | Genetics Practical |

**Summary of Content:** The module will start will examining the ultrastructure of the main cell types; eukaryotic (animal and plant) and prokaryotic; and viruses, along with the structure and function of the main organelles within cell type. An overview of cell growth and development will be outlined including the control of the cell cycle, mitosis and meiosis and cell differentiation. The module will then move into more molecular biology and genetic investigations, examining Mendelian laws of inheritance and gene expression.

**Assessment details:**

| | | |
|---|---|---|
| Exam 1 | 75 | 1.5hr hour Rogo based examination |
| Coursework 1 | 25 | Online portfolio of practical work |

**Aims:** This module is designed to give students a broad foundation in the basic functional units of life: cells. The first half of the module will cover the general cell ultrastructure of animal, plant and bacteria cells and also viruses as well as the major organelles essential for their function. A solid foundation in the growth and development of cells will be delivered focusing on mitosis, meiosis, cell division and differentiation. Basic genetic principles will be examined in the second half of the module looking at the Mendelian laws of inheritance and gene expression processes. Application of the basic theories will also be enhanced using practical sessions and workshops

**Learning outcomes:**

1. Describe the ultrastructure of eukaryotic (animal and plant), prokaryotic cells and viruses outlining the structure and function of the main organelles.
2. Explain the growth and development of cells in relation to the cell cycle and cell differentiation.

3. Explain the regulation of gene expression in eukaryotic and prokaryotic cells highlighting the processes from DNA to protein and the sub-cellular units involved that each stage of the process.
4. Online Mendelian Law of Inheritance (using the correct terminology) and the factors that result in changes in populations
5. Report on several key molecular cell biology techniques examining the principles and functions of cell biology

# D212P3 Applied Genetics

**Module Convenor:** Dr Zinnia Gonzalez-Carranza Zinnia.Gonzalez-Carranza@nottingham.ac.uk

**Module Details:** Level 1, Spring Semester, 10 Credits

**Pre-requisite(s):** D211P1 Genes and Cells: 1

**Co-requisite(s)**: None

**Expected Number of Students taking module:** 150

**Target Students:** D420 Agricultural and Livestock Science, D320 Animal Science, J700 Biotechnology, C501 Microbiology, C200 Plant Science

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module builds upon the material delivered in Semester 1 in which within the core section running throughout the module students will further examine the gene structure, function and regulation and investigate how this knowledge can be applied in recombinant DNA technology through DNA sequencing and genetic engineering. Dependent on the enrolled course there are options on plant, animal and microbial genetics which will deliver specific lectures and practicals essential to that discipline, which will feed into modules delivered in the second and third years.

**Core Lecture Programme:** Lecture programme is provisional and more detailed information will be given to you in the first session and in each of the specialist options.

1 Module introduction, Gene structure (ZHGC)
2 Introns (ZHGC)
3 Regulatory regions (ZHGC)
4 Genetic Variation (ZHGC)
5 Mutations (ZHGC)
6 DNA and Genome Sequencing (ZHGC)
7 Restriction Endonucleases (ZHGC)
8 Cloning of DNA (ZHGC)
9 Modern Vectors (ZHGC)
10 PCR (ZHGC)
11 in vitro mutagenesis (ZHGC)

**Assessment details:**

| | | |
|---|---|---|
| Exam 1 | 75 | 1.5hr hour Rogo exam |
| Coursework 1 | 25 | Specialist option exercise |

**Aims:** This module aims to build upon the basics of fundamental biological processes and examine areas of nucleic acid structure; DNA replication; mutation and repair; transcription and translation; control of gene expression. It will then apply the knowledge and explain how this is exploited in recombinant DNA technology; gene cloning, DNA sequencing and genetic engineering.

Specialist options within animal, plant and microbial spheres will allow for subject specific applications of genetic techniques and theories which form an underpinning knowledge base for subsequent modules.

**Learning outcomes:**

- describe the structures and functions of DNA and RNA and how they relate to the mechanisms of DNA replication and repair
- describe the modes of gene expression in prokaryotic and eukaryotic cells
- describe the basic methods of gene cloning and recombinant DNA technology
- explain the polymerase chain reaction and DNA sequencing

**Recommended background reading:**

[1] Beebee, Trevor J. C. and Burke, Julian 1992. Gene structure and transcription. IRL Press.
[2] Cassimeris, Lynne et al. 2011. Lewin's Cells. Jones and Bartlett Publishers.
[3] Hartl, Daniel L. 2014. *Essential genetics: a genomics perspective*. Jones & Bartlett Learning.
[4] Hartl, Daniel L. et al. 2012. *Genetics: analysis of genes and genomes*. Jones & Bartlett.
[5] Watson, James D. 2007. Recombinant DNA: genes and genomes : a short course. Cold Spring Harbor Laboratory Press.

# D21BF3 Microbes and You

**Module Convenor:** Dr Jon Hobman Jon.Hobman@nottingham.ac.uk

**Module Details:** Level 1, Autumn and Spring Semesters, 20 Credits

**Pre-requisite(s):** None

**Co-requisite(s)**: D211P1 Genes and Cells: 1**,** D21BN2 Biochemistry–The Building Blocks of Life

**Expected Number of Students Taking Module:** 65

**Target Students:** Compulsory for Year 1 Microbiology degree students. Available to Biotechnology and Applied Biology students and Students from other Schools.

**Available to Exchange Students:** Not applicable for year 1.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** A historical and contemporary perspective on how microbes interact with humans, animals, plants and other organisms; how microbes influence environmental processes, and how microbial products contribute to healthcare, food production, and manufacturing. The module will examine the current challenges facing the world human population, and potential microbial solutions to these problems. It will address the influence of technological developments, and scientific understanding of microbes and the public perception of them.

**Key themes:** 1) The module will examine human interactions with microbes, beneficial interactions, virulence and pathogenesis, probiotics, host factors in infection, bacteriophages and the flora of the human gut. 2) Commercial products produced from microbes and the use of biotechnology, and genetically modified foods. 3) Nutrient cycles, biodegradation and bioremediation. 4) Microbial systematics and symbiosis in other organisms. 5) Eukaryotic microbiology, 6) Yeasts and fungi

**Assessment details:**

| | | |
|---|---|---|
| Coursework 1 | 40 | 1500 word essay. |
| Coursework 2 | 20 | 15 minute student PowerPoint presentation |
| Exam 1 | 40 | 1.5 hour exam. Students to answer 6/9 questions in spring. |

**Aims:** The aim of this module is to introduce students to the core concepts and understanding of, the relationship between Microbes and humans. It aims to encourage within a taught framework of knowledge and understanding of these relationships, the development of core transferrable skills in oral, presentational and written communication. The coursework is aimed to encourage reflective and self-motivated learning, through the acquisition of information, and construction of a balanced reasoned argument towards answering a question. The tutorial aspect will encourage active participation and self-directed learning.

**Learning outcomes:** On successful completion of this module students will be able to:

(1) Comprehend the terminology and nomenclature used in microbiology to appreciate and express their knowledge of the subject area.

(2) Explain the diverse range of essential information, major concepts, principles and theories associated with specialist disciplines within Microbiology.

(3) Collect and integrate several lines of evidence and apply them in a balanced manner to support an argument.
(4) Apply subject knowledge and understanding to address problems, and effectively communicate these in written and verbal forms.

# D21BF7 The Physiology of Microbes

**Module Convenor:** Dr C Rees Cath.Rees@nottingham.ac.uk

**Lecturers:** Dr P Hill, Dr C Powell

**Module Detail:** Level 1, Full Year new module, 20 credits

**Co-requisite(s):** D211P1 Genes and Cells: 1 and D212P3 Genes and Cells: 2 (or equivalents)

**Note:** This module is a pre-requisite for the modules C52304 Medical Microbiology, D223F6 Bacterial Biological Diversity, D223F7 Virology, D224F9 Analysis of Bacterial Gene Expression, D224FA Microbial Mechanisms of Food Borne Disease and the Microbiology option within D224G1 Professional Skills for Bioscientists. **This module cannot be used as a pre-requisite unless students attend 75% of the practicals and achieve a pass mark in the practical element of the course (45 % of the module mark based on 4 short laboratory reports).**

**Number of places:** 60

**Target Students:** BSc Microbiology, BSc Biotechnology and other related biological sciences and Exchange Students.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** The module will introduce students to the principles of bacterial and yeast cell structure and nutrition, covering the diverse ways by which these microbes obtain energy. The module will cover both practical and theoretical elements of microbial growth and survival, including the processes of adaption and strategies that they have evolved to allow them to occupy selected environmental niches. Special emphasis is placed on the growth and identification of microbes and analysis data from microbiological experiments. Twenty x one-hour lectures at approximately two per week throughout the Semester; five 3-hour practicals and five 1-hour practicals (results and subculture sessions) held in alternate weeks.

**Lecture Programme**: More detailed information will be given to you in the first session.

| | |
|---|---|
| **Topic 1** | Yeast cell structure and function |
| **Topic 2** | Yeast cell growth and replication |
| **Topic 3** | Bacterial cell structure and function, |
| **Topic 4** | Bacterial growth, DNA replication, cell division and protein synthesis |
| **Topic 5** | Anaerobic & Aerobic metabolism in yeast and bacteria |
| **Topic 6** | Developmental processes and survival: Bacterial spores |
| **Topic 7** | Mechanisms of adaptation:<br>Membranes & transport systems; pH homeostasis & Osmoregulation<br>Stationary phase & stress adaptation including temperature stress |

| | |
|---|---|
| | Different mechanisms of bacterial motility and control of movement (Chemotaxis) |
| **Topic 8** | Inactivation of microbes using biocides for cleaning and disinfection and inactivation of microbes using antibiotics |
| **Topic 9** | Control of microbial growth in food |
| **Topic 10** | Culture methods, Selective & diagnostic agar and identification of microbes |
| **Topic 11** | Data analysis & presentation of microbial growth data |
| **Topic 12** | Microscopy including fixed and live samples |
| **Topic 13** | Sterile technique and determining viable count by serial dilution |

**Non-Lecture Programme:** Three x 2.5 hr practicals, five x 1hr practicals; 1hr open book test.

**Coursework:** 4 practical reports; one graph plotting exercise; one open book test/exam practice session.

**Assessment:** Examination (40%) MCQ paper – 1.5 hour, 4 short laboratory reports (45%), one graph plotting exercise (10%) and one open book Test (5%) -1 hour.

**Aims:** To provide students with knowledge of yeast and bacterial cell structures and growth which will form a foundation upon which much of the higher level microbiology courses are based. In addition students will be introduced to the concepts of homeostasis in single cells and the adaptations required to achieve this when the external environment changes. This underpin this students will be introduced to the adaptations that single cells can undertake, such as motility and chemotaxis, sporulation and other responses to environments through changes in patterns of gene expression. Students will be taught how culture and identify microbes and how to process data commonly used in microbiological experimentation. Students will be trained in the basic practical methods required for all microbiological laboratory work.

**Learning Outcomes:** On successful completion of this module, students will have knowledge of:

- Principles of microbial nutrition covering the diverse processes by which yeast and bacteria obtain energy.
- Practical and theoretical elements of microbial growth and knowledge of yeast and bacterial cells structures.
- Strategies microorganisms have evolved to allow them to occupy selected environmental niches, including motility, sporulation and adaptive gene regulation.

In addition students will gain experience of:

- Experimental approaches to investigating microbial populations.
- Processing and presenting data from microbiological experiments
- Basic sterile technique, cell culture and methods used to identify microbes.

**Recommended background reading:** Brock, Biology of Microorganisms**,** Instant Notes in Microbiology, Nicklin etal. Practical Skills in Biomolecular Sciences, Reed et al

# D21BG1 Biosciences Tutorials (Academic Development) and Foundation Science

**Module Convenors:** Prof Matt Dickinson Matthew.Dickinson@nottingham.ac.uk and Dr Dov Stekel Dov.Stekel@nottingham.ac.uk

**Module Detail:** Level 1, Full Year new module, 20 credits

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** The content is as follows: The tutorials component is intended to enhance the transition into university and guide students through the academic expectations of their degrees. This part of the module is spread throughout the year and will include three generic sessions on 'study skills and plagiarism', 'study opportunities' and 'career and personal development', and a series of small group tutorials with the academic tutor to develop generic skills such as finding crucial information, oral presentation, data handling and presentation of results, preparation for examinations, and essay writing skills relevant to the Biosciences. The Foundation Science content has three elements: Chemistry, Maths & statistics and Physics. The Chemistry element will include: elements and periodic table; atomic structure and bonding; intermolecular attractions, chemical equilibrium; acids and bases, oxidation and reduction; rates of reaction; basic organic chemistry, isomerism, and rings. The Maths and Stats element will include: calculations, algebra, functions and relationships, powers, logarithms, descriptive statistics, significance, regression and presenting data. The Physics element will include: - units and dimensions; power, energy and heat; light and the electromagnetic spectrum; attenuation/absorption; and radioactivity. There is also an IT element, which interfaces with generic IT training for undergraduates provided within the University.

**Assessment Details:**

| | | |
|---|---|---|
| Coursework 1 | 25% | 1500 word essay completed in the Autumn Semester |
| Coursework 2 | 12% | 200 word quantitative exercise completed in the Spring Semester |
| Coursework 3 | 13% | 300 word abstract of a scientific paper to be completed in the Spring Semester |
| Inclass Exam 1 (Written) | 25% | Chemistry tests (45 minutes) |
| Inclass Exam 2 (Written) | 25% | Mathematics and Statistics tests (45 minutes) |

**Aims:** The aims of this module are twofold: The Tutorial elements are to enhance the academic and professional development of students via small group work within tutor groups. Working in small groups will encourage active participation and knowledge transfer. This part of the module should equip students with essay-writing, presentational skills (oral and written), critical interpretation of published materials, and other generic skills that should benefit them in modules throughout their degree. It will also provide an opportunity to learn and reflect on opportunities available to enhance their transition from University into the workplace. The Foundation Science element will complement this by providing foundation level knowledge of mathematics, physics and chemistry for undergraduate students entering the School of Biosciences.

The module aims to compensate for gaps in knowledge caused by differences in individual prior education and to ensure that all students have the basic knowledge of these key disciplines required to underpin their future studies in the School of Biosciences. The syllabus has been developed in conjunction with degree programme leaders across the School.

**Learning Outcomes:** • Recognise the significance of the core topics in foundation level physics, chemistry and mathematics to their future degree study in the Biosciences. • Understand a range of fundamental concepts in physics, maths and chemistry which form core knowledge for scientists of all disciplines. • Understand the importance of using the correct scientific units and be able to convert between different units of measurement (e.g. SI and non-SI units). • Manipulate mathematical equations and perform calculations designed to improve confidence in dealing with logarithms, exponentials, powers, scientific notation…..etc. • Recognise the basis of fundamental scientific equations, their interpretation and meaning. • Use Microsoft Excel at a basic level to analyse scientific data, enter formulae and plot graphs • Summarise key relevant information succinctly in an abstract. • Give examples of appropriate referencing styles for scientific reporting. • Identify an appropriate approach for solving a quantitative problem through background and collaborative research. • Review a given scientific topic in a written report.

# D21BN2 Biochemistry–The Building Blocks of Life

**Module Convenor:** Dr Matt Elmes Matthew.Elmes@nottingham.ac.uk

**Lecturers:** Dr Matt Elmes (ME), Dr Marcos Alcocer (MA), Prof Andy Salter (AS), Dr Andy Murton (AM), Dr Simon Welham (SM), Dr Ranjan Swarup (RS), Dr Kevin Pyke (KP)

**Module Details**: Level 1 Autumn and Spring Semesters, 20 credits

**Expected Number of Students Taking Module:** 250

**Target Students:** All School of Biosciences students in year 1

**Availability to Exchange Students** Yes - if relevant in the first year

**Note: This module is a pre-requisite for D224N0 Nutrition, Metabolism and Disease, D223F0 Manufacture of Food (40 credit), D223N8 Principles of Animal Nutrition, D224A6 Endocrine Control Systems & D224G1 Professional Skills for Bioscientists**

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module introduces - proteins, carbohydrates, lipids and nucleic acids. The structure and properties of these will be examined in relation to their function. Topics covered include proteins as structural elements and enzymes, lipids as components of cell membranes, carbohydrates as energy stores and nucleic acids as genetic information and genetic engineering. The process of protein synthesis in prokaryotes will be outlined. The nutritional roles of amino acids, carbohydrates and fats will also be considered briefly. The major metabolic pathways in the cell responsible for energy production (respiration) and biosynthesis of cellular components, including the major pathways of carbohydrate and lipid metabolism along with some aspects of thermodynamics will be covered. Photosynthesis and pathways responsible for the assimilation of nitrogen in plants and eventually animals, will be covered along with general nucleic acid metabolism. In addition general mechanisms for the control of cellular metabolism will also be discussed. The practical sessions are designed to introduce students to several key biochemical techniques. In the first Semester this will introduce students to the use of spectroscopy and demonstrate two major separation techniques - chromatography and electrophoresis. The practical sessions in the second Semester are designed to introduce the concept of sub-cellular fractionation, enzyme assays and metabolite quantification.

**Lecture Programme (provisional):**

| Week | Subject | Lecturers |
|---|---|---|
| 2 | Nucleic acids - structure | ME |
| 3 | Nucleic acids – Properties and Applications | AM |
| 4 | Amino acids and protein structure | MA |
| 5 | Practical | ME, MA, |
| 6 | Practical | AM, ME |
| 7 | Practical | MA, AM |
| 8 | Protein synthesis | SW |
| 9 | Amino acid metabolism | MA |
| 10 | Nucleotide synthesis and metabolism | MA |
| 11 | Nucleotide synthesis and metabolism | MA |
| 12 | Enzymes | SW |

| | | |
|---|---|---|
| 19 | Bioenergetics and Respiration | ME, RS |
| 20 | Bioenergetics and photosynthesis | ME, KP |
| 21 | Bioenergetics | ME |
| 22 | Practical | ME, MA, |
| 23 | Practical | AM, ME |
| 24 | Practical | MA, AM |
| 25 | Carbohydrates and lipids-structure | ME, AS, |
| 26 | Carbohydrates and lipids-structure | ME, AS |
| 31 | Carbohydrates and lipids -functions | ME, AS |
| 32 | Metabolic control | ME |

**Teaching Staff:** Dr Matt Elmes (ME), Dr Marcos Alcocer (MA), Prof Andy Salter (AS), Dr Andy Murton (AM), Dr Simon Welham (SM), Dr Ranjan Swarup (RS), Dr Kevin Pyke (KP).

**Coursework:** One MCQ based online test and a practical report.

**Assessment details:**

| | | |
|---|---|---|
| Exam 1 | 40% | 1.5 hour MCQ exam |
| Coursework 1 | 20% | MCQ moodle assessment |
| Coursework 2 | 40% | Practical Write up in Spring |

**Aims:** The aim of this module is to introduce students to the basic structure, properties and functions of the four key biological macromolecules namely- nucleic acids, proteins, carbohydrates and lipids. It also aims to introduce the basic metabolic pathways occurring in cells, such as respiration, photosynthesis and the biosynthetic pathways for the key macromolecules. In particular:

1. To provide a basis for the understanding of biochemical processes in living organisms.
2. To provide students with a basic understanding of the structure and key properties of all four major macromolecules.
3. To demonstrate to students how these properties are essential for the biological functions of the macromolecules.
4. To provide students with a basic understanding of the major biochemical pathways in cells and their control.
5. To demonstrate to students how these pathways are essential for the cell.
6. To demonstrate several key biochemical techniques for the separation and analysis of macromolecules and measurement of metabolic processes.

**Learning Outcomes: Knowledge and Understanding – to learn of:**
The structure, properties and functions of proteins, nucleic acids, lipids and carbohydrates.
Handle kinetic data and understand molarity
Understand the basic principles of key techniques such as electrophoresis and spectrophotometry.
he major metabolic pathways such as respiration, photosynthesis, lipid and protein biosynthesis.
Bioenergetics and the role of energy in metabolism.
Understand the basic principles of key techniques used to study metabolism such as enzyme assays.

**Intellectual Skills – the ability to:**
Analyse simple experimental data.
Handle simple mathematical concepts relevant to the biological sciences, such as molarity, calibration curves and kinetics.

**Practical Skills – the ability to:**
Accurately operate simple laboratory equipment, such as pipettes.
Collect and record data.
Work safely in the laboratory.

**Transferable/key skills – the ability to:**
Communicate experimental results clearly and concisely in a written form.
Work productively as an individual and as part of a team.
Manage time efficiently.

# F11MCW Molecules that Changed the World

**Module Convenor: TBC**

**Lecturers:** Prof CJ Hayes, Dr S Woodward, Dr J Dowdon, Dr RA Stockman, Dr R Denton

**School:** Chemistry, UP

**Module Details**: Level 1 Autumn Semesters, 10 credits

**Expected Number of Students Taking Module:** 140

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Target Students:** F100, F101, F103, F105, FC17, FC1R, CF71

**Summary of Content:** The aim of the course is to introduce the students to selected molecules that have had significant impact on humankind, including medicines, drugs, poisons and materials. This will be taught in historical context, placing significant importance on how and why these molecules made such an impact on society. We will discuss how unique chemical names came about, the people/cultures involved and the key discoveries/events leading to the current (or past) significance of these molecules in the world.

**Assessment Details:**

Exam 1 100% 1 hour Written Exam

**Aims:** To emphasize the key importance of chemistry and molecules in society. Explain how and why particular molecules became important. To show how discoveries can lead to world changing events, and the importance of realizing potential applications. To emphasize that chemistry is of central importance to society using examples. To emphasize that chemistry/molecules are central to solving the problems facing the modern world.

**Learning Outcomes:** A1 Appreciate how molecules are central to everyday life. A2 Understand that molecular is fundamentally related to its function A3 Learn about the history of some key molecules. How/why they became important. A4 Understand how we can learn from Nature. B Intellectual skills B1 Basic chemical principles. B2 Recognise molecular structure & functional groups. B3 Recognise how structure relates to function. B4 Problem solving. C Professional/practical skills C1 Essay writing C2 Investigative C3 Problem solving C4 Scientific skills D Transferable (key) skills D1 Investigative literature searching D2 Communication skills D3 Presentation skills D4 Written communication – science journalism skills.

# Year 2 Modules

# C52304 Medical Microbiology

**Module Convenor:** Dr N Oldfield

**School:** Life Sciences

**Module Details:** Level 2, Autumn Semester, 10 credits

**Pre-requisites:** C51201 Micro-Organisms and Disease

Students who wish to specifically increase their knowledge of Medical Microbiology

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Expected Number of Students Taking Module:** 25

**Target Students:** Students studying Microbiology who wish to increase their knowledge of Medical Microbiology.

**Summary of Content:** This module will introduce students to the properties, mechanisms of resistance and clinical use of antimicrobial agents in the treatment of microbial infections. Options relating to disease prevention will be explained, and students will be provided with an insight into the role of the laboratory and the Public Health Laboratory Service in the diagnosis, management and control of infection in hospital and the community.

**Assessment details:**

| | | |
|---|---|---|
| Exam 1 | 100% | 2 hour exam Essay style (Answer three questions from a choice of six) |

**Aims:** The aim of this module is to introduce students to key concepts regarding how bacterial and viral pathogens cause human disease. Disease prevention and treatment options will be explained, and mechanisms of resistance covered. Students will be provided with an insight into the role of the Diagnostic Microbiology Laboratory in the diagnosis, management and control of infection in the hospital and the community, and how emerging technologies are leading to improvements in these areas.

**Learning Outcomes:** (i) understand the mechanisms used by different bacterial and viral pathogens to cause disease; (ii) understand the principles of vaccine design and how vaccines can be used to successfully combat viral and bacterial infections; (iii) understand key concepts and methodologies used in the diagnosis of microbial infections; (iv) gain awareness of new and emerging technologies for rapid identification of pathogens; (v) understand how bacterial and viral infections are treated and how pathogens become resistant to treatment. In addition, PBL sessions will enable students to work productively with others, communicate effectively, organize and manage their working time, and meet deadlines.

# D223F6 Bacterial Biological Diversity

**Module Convenor:** Prof CER Dodd (Convenor) Christine.Dodd@nottingham.ac.uk

**Lecturer:** Dr D Scott, Dr K Brown

**Module Details:** Level 2, Autumn Semester, 10 credits

**Pre-requisites:** D211P1 Genes and Cells I

**Expected Number of Students Taking Module:** 40

**Target Students:** Compulsory for students taking Honours degree in Microbiology. Optional for students taking Honours degree in Biotechnology.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module is designed to provide an understanding of the extent of prokaryote biological diversity. Following introductory lectures on microbial taxonomy and classification, students will undertake two student-centred exercises. The first will be the production of an essay on a chosen organism covering its taxonomy, biology and ecology. The second will be a group exercise to design a web site including the material collated for the essay. This will be presented to class members in a short group presentation. The web pages will be accessible by other students to aid student centred learning of other topics, which will be an essential element for the final examination. Examination will be by a preset essay topic.

**Indicative Timetable for module**

**Lecture Programme:** Approximately 7h of lectures within the first 3 weeks of the Semester.

**Non-Lecture Programme:** Four hours of tutorials throughout the Semester.

**Indicative Timetable for module**

**Week 1**
**3h formal teaching**

| | |
|---|---|
| Introduction to the module | CERD |
| Classical bacterial taxonomy | CERD |
| Effect of plasmids on bacterial taxonomy | CERD |

**Week 2**
**2h formal teaching**

| | |
|---|---|
| Numerical taxonomy | CERD |
| Chemosystematics: cell walls and membranes | CERD |
| 1h student centred learning – draft essay | |

**Week 3**
**3h formal teaching**

| | |
|---|---|
| Chemosstematics: proteins and metabolic by-products | CERD |
| Chemosystematics: nuclear acids | CERD |
| I h class tutorial - Essay writing skills & Website exercise | CERD |

**Week 6**
Essay submission

**Week 7 Computer rooms**
3 h class tutorial Web-site workshop DS &KB

**Week 8**
3 h student centred work Group web-site meeting

**Week 9**
3 h student centred work Group web-site meeting

**Week 10**
3h Web site presentations CERD & DS & KB

**Week 11**
3 h student-centred learning based on web-sites

**Week 12**
3 h student-centred learning based on web-sites

Exam essay title released.

**Practical assessment:** There is no laboratory element to this module

**Course assignment:** The first exercise will be the production of an essay on a chosen organism covering its taxonomy, biology and ecology. The second exercise will be a group exercise to design a web site including the material collated for the essay which will be presented to other students in a short group presentation. The web pages will be accessible by other students to aid student centred learning of other topics, which will be an essential element for the final examination.

**Assessment:** Exam 1 50% 1 hour essay with a pre-set title; the web sites are a source material for this. Coursework 1 30% Essay - 2000 words. Coursework 2 20% Group web site -group exercise of up to 4 people who use their essay data to construct a web site. No set length.

**Aims:** There are three main aims: to give students a broader knowledge of bacterial biology; to provide training in literature searches on a defined topic and production of written synopses; to provide web design skills.

**Learning outcomes:** On successful completion of this module students will be able to:
1) Comprehend the terminology and nomenclature used in microbial systematics and its underlying basis.
2) Critically analyse microbiological information derived from a variety of sources associated with specialist disciplines including physiology, interaction with the environment, genetics, molecular biology and biotechnology.
3) Synthesise and summarise information drawn from various sources to address a specific question and present this in a new format.
4) Work productively as an individual or as part of a team.

**Recommended background reading:**
Brock, Biology of Microorganisms, 13th Edition

# D223F7 Virology

**Module Convenor:** Dr Ken Mellits ken.mellits@nottingham.ac.uk

**Capped Module at 45 - You will need permission from the module convenor to take this module unless it is compulsory for your course.**

**Module Details:** The module will provide an introduction to viruses and their interactions with their hosts (bacteria, plants and animals including humans). The structure of viruses, their significance including pathogenesis and molecular biology will be discussed. 10 credits

**Pre-requisite module or other requirements:** D211P1 Genetics and Cell biology.

**Note: This module is a pre-requisite for D236M1 Virology & Cellular Microbiology for module in Part 2 (Final Year).**

**Target Students:** Compulsory for students reading degrees in Food Microbiology and Microbiology. Optional for students reading Animal Sciences, Biotechnology, Food Science and Plant Sciences.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** The module will provide an introduction to viruses and their interactions with their hosts (bacteria, plants and animals including humans). The structure of viruses, their significance including pathogenesis and molecular biology will be discussed.

**Lecturers:**

| | |
|---|---|
| Kristelle Brown | Brian Thomson |
| Ken Mellits | Matt Dickinson |
| Will Irving | Jon Ball |
| Cath Rees | |

**Coursework:** 30% of the module mark will be awarded for coursework, which includes a 1000 word essay and a short group presentation.

**Assessment:** Rest of assessment is: 20% based on a laboratory report which amounts to a 300 word essay, and 50% for a 1.5 hour examination.

**Aims:** To provide a basic understanding of viruses, their diversity, interaction with their hosts and pathogenesis.

**Learning outcomes:** On successful completion of the module students will be able to:

- Describe viruses and their diversity, and the mechanism by which they invade cells and cause disease.
- Acquire, practical techniques associated with studying viruses, including but not limited to the ability to acquire, interpret, plot and critically analyse virological data and information
- Acquire basic Presentation skills including the ability to ask and respond to questions, in a group context.

**Recommended reading:**
Fields Virology Third addition pt 1 and 2.

# D223N6 Principles of Immunology

**Module Convenor:** Dr Marcos Alcocer (Convenor) Marcus.Alcocer@nottingham.ac.uk

**Lecturers:** Prof M Luck, Prof D Hannant (Special Professor) and invited external lecturers

**Module Details:** Level 2, Autumn Semester, 10 credits

**Pre-requisite:** D21BN2 Biochemistry–The Building Blocks of Life

**Availability to Exchange Students** Yes

**Expected Number of Students Taking Module:** 180

**Target Students:** All home and international students with an interest in animal an human biology.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** The module will concentrate on: The innate immune system; the adaptive immune system; MHC and antigen presentation; antibodies and antibody responses; immune-techniques; regulation of the immune responses; effector mechanisms of immune responses; immunity to infection; immunology of reproduction; and immune-deficiencies.

**Lecture Programme:** The lecture timetable is provisional. Details will be provided at the beginning of the module. Topics to be covered will include:

1 The innate immune system
2 The adaptive immune system
3 The response to injury
4 MHC and antigen presentation
5 Antibodies and Antibody responses
6 Immunological techniques
7 Regulation of the immune responses
8 Effector mechanisms of immune responses
9 Vaccination and immunity to infection
10 Immunology of reproduction

**Coursework:** Coursework 1: a MCQ on-line exam.

**Assessment:** Exam, 70%, 1.5hour. Coursework 1, 30%

**Aims:** The module aims at introducing the students to: basic concepts of cellular and molecular immunology; current immune-techniques; modern concepts of immune-deficiency and hypersensitivities.

**Learning Outcomes:** On successful completion of the module students will be able to:

- Describe the main characteristics and features of the innate and adaptive immune system, their functions and how they relate to each other.
- Discuss the main events of the immune response when the body is infected by intra and extracellular parasites, essential components of many diseases.
- Analyse results from classical immune techniques that will help the reading and comprehension of scientific publications.

- Integrate the immune mechanisms and discuss current topics of animal and human diseases

**Recommended background reading:** Reading lists are provided by each staff member teaching in the module.

# D223P0 Molecular Biology and the Dynamic Cell

**Joint Module Convenors:** Dr Kevin Pyke (KP) Kevin.Pyke@nottingham.ac.uk and Dr Ranjan Swarup (RS) Ranjan.Swarup@nottingham.ac.uk

**Module Details:** Level 2 Autumn Semester, 20 Credit

**Expected Number of Students Taking Module:** 70

**Target Students:** Biosciences and Life Sciences students. Availability to Exchange Students.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** A detailed study of the core molecular processes that enable cells to function such as DNA biochemistry, gene expression, protein synthesis and degradation. These sessions will complement lectures on basic eukaryotic cell biology covering a range of organelles and cell structures including the nucleus, plastids, mitochondria, endoplasmic reticulum, Golgi bodies and secretion together with a consideration of cell differentiation.

(**Provisional timetable)**

| *Week* | | *SUBJECT* |
|---|---|---|
| 1 | Session 1 | An overview of the Cell and its nucleus (Nucleus) (KP) |
| | Session2 | Chromosome packaging, DNA replication and molecular basis of evolution (RS) |
| 2 | Session 3 | RNA Synthesis, processing and export (RS)<br>Protein synthesis, antibiotics, abnormal protein folding and human diseases (RS) |
| | Session 4 | Regulation of Gene Expression I: Molecular switches, motifs, transcriptional activators, repressors, enhancers and insulators (ZW) |
| 3 | Session 5 | Regulation of Gene Expression II: Targeted Protein Degradation (ZW)<br>Regulation of Gene Expression III: micro RNA, snRNA, siRNA and artificial microRNA (RF) |
| | Session 6 | Methods of investigating Gene Expression including an overview of gene chips and new generation sequencing (RS/ZW) |
| 4 | Session 7 | Practical: Immuno detection (RS) |
| | Session 8 | Practical: in situ Immunolocalisation and Confocal demo (RS+KP) |
| 5 | Session 9 | Regulation of Gene Expression IV: Long non protein coding RNA (RS)<br>Epigenetics: DNA methylation, imprinting and chromatin remodelling (DS) |
| | Session 10 | Mitochondrion, plastids (KP)<br>Extra nuclear genomes: the plastid and mitochondria (KP) |
| 6 | Session 11 | The cytoskeleton I: IFs and MTs (KP)<br>The cytoskeleton II: MFs and motors (KP) |
| | Session 12 | The endo membrane system I: ER and import (KP) The endo membrane system II: Golgi and export (KP) |
| 7 | Session 13 | Mitosis and Chromosome movement (KP)<br>The Cell cycle - CDK's, cyclins and checkpoints (KP) |

| | | |
|---|---|---|
| | Session 14 | Cell Differentiation (KP/RS)<br>Programmed Cell Death (RS) |
| 8 | Session 15 | The endomembrane system-Secretion and uptake (KP+RS) |
| | Session 16 | Practical (Vesicle trafficking and cell differentiation) (KP) |
| 9 | Session 15 | Coursework poster session (ALL) |
| | Session 16 | Coursework poster session (ALL) |
| 10 | Session 19 | 20. Cell in a multicellular context covering cell to cell interactions and mechanisms of long and short distance signalling-Part I (animals) (DS) |
| | Session 20 | 21. Cell in a multicellular context covering cell to cell interactions and mechanisms of long and short distance signalling-Part II (plants) (RS) |
| 11 | Session 21 | Poster Feedback, Examination Guidance and tutorial (KP+RS) |
| | Session 22 | Tutorial (KP+RS) |
| | | |

KP-Kevin Pyke; RS-Ranjan Swarup; ZW-Zoe Wilson; RF-Rupert Fray;
DS-Dylan Sweetman

**Coursework:** Two pieces of coursework: one poster and one Lab report and questionnaire.

**Assessment details**:

Exam 1 (60%) 2 hour examination
Coursework 1 (15%) Poster
Coursework 2 (25%) Practical report and questionnaire (2000 words)

**Aims:** This module aims to teach students about the basic molecular processes that underpin the function of eukaryotic cells and to describe how different organelles within the cell function, with an emphasis on the dynamic nature of cell biology.

**Learning Outcomes:** On successful completion of the module, students will be able to: 1. Explain the mechanisms of key molecular processes taking place within cells associated with DNA, RNA and protein synthesis 2. Distinguish different molecular mechanisms regulating gene expression within cells, 3. Demonstrate knowledge and understanding of the molecular and cellular components of Eukaryotic cells and their function and how cellular components are integrated into cellular function. 4. Appreciate the use of modern imaging technology and marker molecules in elucidating cellular function and recognise the highly dynamic nature of rapidity of cellular function. 5. Demonstrate intellectual skills to evaluate critically molecular and cell biology research papers 6. Develop professional skills in scientific information retrieval and to work safely in a laboratory situation.

# D224E4 Computer Modelling in Science: Introduction (UP)

**Module Convenor:** Dr Dov Stekel Dov.Stekel@nottingham.ac.uk

**Module Details**: Level 2 Spring Semester, 20 credits

**Prerequisites:** Level 3 students who have already taken C135E9 will not be admitted to this module.

**Co-requisites:** None.

**Location:** University Park Campus

**Expected Number of Students Taking Module:** 60

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Target Students:** All School of Biosciences students, Natural Sciences students and Ningbo 2+2 Environmental Sciences students (based in Geography).

**Summary of Content:** Modern biological and environmental science includes the study of complex systems and large data sets, including imaging data. This necessitates the use of computer models and analyses in order to understand these systems. This module contains an introduction to computer programming and modelling techniques that are used in the biological and environmental sciences. Specifically, it contains: (i) An introduction to computer programming and algorithms, using the Python programming language. (ii) An introduction the construction of mathematical models for biological and environmental systems using difference and differential equations, with a particular emphasis on population dynamics, and the use of computing to simulate, analyze these models and fit these models to data. Throughout the module, the focus will be on relevant examples and applications, e.g. environmental pollution, growth of microbial populations, disease epidemics, or computer manipulation of images of plants, animals or the natural environment. The module will be assessed by a patchwork assessment consisting of write-ups of assignments from during the Semester

**Lecture Programme:** All teaching will be mixed mode (lecture/computer practical) in computer rooms. Lecture programme is provisional and more detailed information will be given to you in the first session.

1. Module introduction (Stekel)
2. Introduction to Python (French)
3. Programming in Python (French)
4. Python modules: NumPy and MatPlotLib (French)
5. Modelling: difference equations (Martin)
6. Modelling: simple differential equations (Stekel)
7. Modelling: differential equations and SciPy (Stekel)
8. Modelling: multi-dimensional systems (Stekel)
9. Modelling: steady state analysis (Stekel)
10. Model building and workshop (Martin)

**Teaching Staff:** Dr Sarah Martin (SM), Dr Dov Stekel (DJS), Dr Andrew French (APF)

**On-line material:** Supporting background material on computing and mathematical concepts (e.g. algorithms, calculus) will be posted on-line with on-line exercises to complete.

**Assessment:** Patchwork Assessment (100%) consisting of write-up of related assignments from the whole module.

**Aims:** The aim of this module is to introduce the use of computing programming and modelling in the biological and environmental sciences for model simulation and image processing.

**Learning outcomes:** A student who successfully completes this module should be able to: (i) Transform a series of instructions specified mathematically or textually into a pseudocode algorithm. (ii) Create or modify simple computer program code in order to carry out a set algorithmic task. (iii) Critically evaluate the use and results of suitable computer algorithms or programs in the context of relevant challenges in the biological or environmental sciences. (iv) Construct a simple mathematical model from a set of biological or environmental processes. (v) Simulate and analyse mathematical models using a computer and appropriate software and/or algorithms. (vii) Critically evaluate a mathematical model and its simulation results in the context of relevant challenges in the biological or environmental sciences.

**Recommended Reading:** A full reading list will be provided at the outset of the module.

# D224F9 Analysis of Bacterial Gene Expression

**Module Convenor:** Dr P Hill (module convenor) Phil.Hill@nottingham.ac.uk

**Lecturer:** Dr CED Rees

**Capped module at 30 – You will need permission from the module convenor to take this module unless it is compulsory for your course.**

**Module Details:** Level 2, Spring Semester, 10 credits

**Pre-requisites:** Genetics with Specialist Options (D212P3) or equivalent, D211P1 Genetics and Cell Biology, Microbial Physiology (D212F7; STUDENT MUST HAVE A PASS MARK IN THE PRACTICAL ELEMENT OF THE MODULE) or equivalent

**Note: This module is a pre-requisite for D236M1 Virology and Cellular Microbiology module in Part 2 (Final Year)**

**Target Students:** Microbiology, Biotechnology

**Availability to Exchange Students:** Yes

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** The course will cover the major techniques required for analysis of gene expression including methods for gene sequence and transcriptional analysis. An in depth study of vectors and gene constructs will provide and understanding of the different strategies used in creating mutants and identifying gene function in bacteria. The coursework exercises are designed to illustrate the topics covered in the lecture course and will give students experience of experimental design and critical analysis of research data and an introduction to bioinformatics for the analysis of DNA and protein sequences.

**Lecture Programme:** More detailed information will be issued in the first teaching session.

| Topic | |
|---|---|
| 1 | Introduction to module; review of DNA structure & Gene control |
| 2 | Enzymes in molecular biology: PCR; DNA sequencing; Restriction enzymes and mapping |
| 3 | Proteomics & reverse genetics |
| 4 | Transposons and reporter genes |
| 5 | Screening libraries and preparation of genomic DNA |
| 6 | Plasmid vectors and conjugation |
| 7 | Hybridisation techniques |
| 8 | Use of computers for DNA sequence analysis and bioinformatics |
| 9 | Phage vectors and transduction |
| 10 | mRNA techniques |

**Non-Lecture Programme:**

There is one practical and one computer session usually around weeks 8 &9 of the module respectively.

**Further Activity Detail:** Half a day per week throughout the Semester, to include formal lectures and tutorials (44 hours) and practicals distributed evenly throughout the Semester. Also, For D224F9 there is one practical and one computer session usually around weeks 8 &9 of the module respectively.

**Assessment:**

| | | |
|---|---|---|
| Exam 1 | 60% | 2 hour examination |
| Coursework 1 | 30% | Data analysis exercise |
| Coursework 2 | 10% | Oral Presentation |

**Aims:** To introduce students to the principles molecular methods of analysis of bacterial gene expression and give experience of the interpretation of data used to map genetic constructs. These provide a platform to allow further study of bacterial molecular genetics and their application in biotechnology in later courses. Student-led short seminars give experience of data analysis and presentation of data.

**Learning outcomes:** On successful completion of this module, students will be able to:

- Explain the mechanism of bacterial gene expression and the methods used to identify control points at the DNA, RNA and Protein levels.
- Compare the differences between alternative methods for analysing specific macromolecules (e.g. DNA) and assess their appropriateness for particular applications.
- Analyse raw data generated by a number of techniques used for gene analysis and interpret their meaning in context with given background information
- Apply practical experimental procedures to prepare and analyse DNA from bacterial cultures.

**Recommended background reading:**
Genes (Lewin) or similar texts, Instant Notes in Molecular biology (Turner, McLennab, Bates & White) Additional research papers and reviews provided on Moodle

# D224FA Microbial Mechanisms of Food Borne Disease

**Module Convenor:** Prof Christine Dodd Christine.Dodd@nottingham.ac.uk

**Lecturers:** Dr Kristelle Brown, Professor Ian Connerton, Dr Cath Rees

**Module Details:** Level 2, Spring Semester, 20 credits

**Prerequisites:** D212F7 Microbial Physiology

**Capped module at 50 - You will need permission from the module convenor to take this module unless it is compulsory for your course.**

**Target Students:** Core for students taking Microbiology, Food Science; optional for students taking Biotechnology. Capped module - registration by agreement with the module convener only. Availability to Exchange Students - available where suitable pre-requisite exists.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module will cover the characteristics and sources of microbial food-borne pathogens and the mechanisms by which these cause disease. Practicals will provide training in the routine testing procedures used in microbiology laboratories: culture, isolation, enumeration and identification of a range of ACP2 bacterial genera.

**Further Activity Detail:** Two 1-hour lectures per week for 11 weeks and ten 3-hour practicals. Students must have attended all of the practical sessions for the module to be qualified as competent in safe handling of organisms for level 3 modules for which this module is a prerequisite. The 2h practical test in the laboratory is held in week 11.

**Week 1**
Introduction to module
Lecture 1 The top ten bacterial pathogens
Lecture 2 Food poisoning statistics
Practical session 1 3h

**Week 2**
Lecture 3 *Staphylococcus aureus*
Lecture 4 *Bacillus*
Practical session 2 3h

**Week 3**
Lecture 5 *Salmonella*
Lecture 6 *Salmonella*
Practical session 3 3h

**Week 4**
Lecture 7 *Vibrio*
Lecture 8 *Yersinia*
Practical session 4 3h

**Week 5**
Lecture 9 *Escherichia coli* and *Shigella*

Lecture 10 *E. coli*
Practical session 5 3h

**Week 6**
Lecture *Clostridium*
Lecture *Clostridium*
Practical session 6 3h

**Week 7**
Lecture *Listeria*
Lecture *Campylobacter*
Practical session 7 3h

**Week 8**
Lecture Emerging pathogens: *Mycobacterium paratuberculosis*
Lecture Emerging pathogens: *Aeromonas* and *Cronobacter*
Practical session 8 3h

**Week 9**
Lecture Protozoa in food and water
Lecture Moulds and mycotoxins
Practical session 9 3h

**Week 10**
Lecture Transfer through the food chain 1
Lecture Transfer through the food chain 2
Practical session 10 3h

**Week 11**
Lecture Pathogen transfer in Red Meat Production
Lecture Exam revision and module evaluation
Practical exam 2h

**Assessment:**

| | | |
|---|---|---|
| Coursework 1 | 50% | Short reports based on laboratory reports for 7 practicals |
| Coursework 2 | 10% | Laboratory Examination - 2 hour practical examination carried out and written up in the laboratory (2 sides A4 max) |
| Exam 1 | 40% | 11/2h examination: two essays. NO MCQ |

**Aims:** The major aims are to provide a fundamental understanding of the microorganisms causing food-borne disease and the mechanisms by which they do this and their routes of transmission. A practical training is in a number of core practical methods needed for the safe handling, culture, isolation, enumeration and identification of a range of ACDP2 pathogens.

**Learning Outcomes:** On successful completion of this module students will be able to:
1) Comprehend the characteristics and routes of transmission of the major food-borne pathogens and the mechanisms by which they cause disease.
2) Apply a range of practical skills in the laboratory including safe handling, culturing and characterisation of microorganisms under ACDP2 conditions.
3) Collect, record and analyse data by making accurate observations and measurements and make reasoned deductions from them.

# D224G1 Professional Skills for Bioscientists

**Module Convenor:** Prof M Dickinson Matthew.Dickinson@nottingham.ac.uk

**Module Details:** Level 2, Spring Semester and Summative Assessment all at the end of Semester 4, 20 credits.

**Session availability:** All Biosciences Undergraduates with the exception of students studying the following programmes: Food Sciences, Nutrition and Food Sciences, Environmental Science.

**Pre-requisites:**
1. Successful progression from Qualifying Year of studies of a Biosciences Degree (or equivalent)
2. Submission of draft CV as part of Module D21BP1

**Expected Number of Students taking module:** est 200

**Target Students:** Biosciences Undergraduate Students and available to Exchange Students from other UoN Campuses only.

**Summary of Content:** The module is divided in to 2 sections. One half will be focused on the provision of specific material deemed appropriate for each course programme to prepare their students for their Final Year (in most cases this will be the research project).

The other section is centered on delivery of key core professional skills through timetabled lectures and group activities and self-directed learning.

**Module Web Links:** Moodle

**Module Activities:** Including Lectures, Group Activity Sessions, Self-Directed Learning, Workshops, Group Presentation Session.

**Assessment details:**
Coursework 1: 100% - 2 coursework outputs
Final Year Preparation Section
2000 word essay or equivalent output appropriate to the specific degree programme - Summative
Mark for the module - 100% weighting
Professional Skills Section
Submission of a Portfolio with prescribed items -
Pass/Fail for Section and Overall Module (non compensatable)

**Aims:** The aim of the module is to develop and consolidate students' professional competencies and abilities as a Bioscientist.

**Learning Outcomes:**
LO1 Demonstrate an understanding of the research process within your discipline
LO2 Identify possible future career pathways reflecting on learnings and wider experiences
LO3 Demonstrate a range of professional behaviours and competencies associated with your discipline

# B12303 Basic Molecular Pharmacology

**Module Convenor:** Dr N Holliday

**School:** Life Sciences, University Park

**Module Details:** Level 2, Autumn Semester, 10 credits

**Pre-requisites:**
B11101 Fundamentals of Human Physiology and Pharmacology 1
C11211 Fundamentals of Human Physiology and Pharmacology 2
C41203 Genes and Cellular Control I (P)
C71101 Cell Structure and Metabolism (L)
C71102 Cell Structure and Metabolism (P) or equivalent

**Expected Number of Students taking module:** 140

**Target Students:** All 2nd Year Neuroscience, Biochemistry and Molecular Medicine, Medicinal and Biological Chemistry students.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module will cover the basic mechanisms involved in drug action; receptors, signal transduction, cell mediators, drug distribution and delivery, toxicology and genetic factors and will provide a basic understanding of drug action and receptor mechanisms.

**Assessment Details:**
Exam 1 100% 90 Minute On-Line exam

**Aims:** This module will provide a fundamental understanding of what the discipline of pharmacology represents. This includes a definition of what drugs are, the different ways they can act at the cellular and molecular level, and the principles of drug absorption, distribution, metabolism and elimination. These aims are considered within the framework of how we can quantify drug action and use drugs as fundamental research tools.

**Learning Outcomes:** By the end of the module, students will be able to (i) describe the basic properties of a drug, and review the main cellular protein targets on which drugs act, for example enzymes, ion channels or receptors (ii) use appropriate pharmacological terms in defining drug action, such as affinity, efficacy and selectivity (iii) interpret quantitative experimental data to obtain information about drug mechanisms (iv) describe the molecular signalling pathways of G protein coupled receptors, ion channels and tyrosine kinase receptors (v) review the pharmacokinetic principles underlying drug handling by the body, and describe how these principles inform clinical guidelines – for example in designing dosing regimens, or when considering drug-drug interactions and inter-individual variation.

# C12365 Medical Molecular Genetics

**Module Convenor:** Prof JA Armour

**School:** Life Sciences, University Park

**Module Details:** Level 2, Autumn Semester, 10 credits

**Pre-requisites:**
C11120 Genetics, Ecology and Evolution (Recommended)
C41202 Genes and Cellular Control (L)

**Expected Number of Students taking module:** 140

**Target Students:** No restriction.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module will present information on the most recent aspects of the Human Genome Project and the methods employed in disease gene identification. Case studies will discuss the identification of genes responsible for some of the most common inherited disorders. The module will also cover cytogenetic and molecular genetic diagnoses of inherited disorders and development of strategies for treatment.

**Assessment Details:**
Exam 1 100% 2 hour exam

**Aims:** The module provides basic understanding of the theory and practical application of medical genetics. The module covers general aspects of inheritance patterns and the use of linkage analysis. A number of important generics diseases are used as case studies to explain how positional cloning can identify genes mutated in Mendelian disorders. The underlying pathological mechanisms are discussed. For some of these diseases, possible therapeutic strategies are discussed. The module also covers the impact of recent technological developments in DNA sequencing to the study of genetic disease.

**Learning Outcomes:** Knowledge and Understanding - A student who completes this programme successfully should be expected to understand: A1. The fundamental biological principles on which the discipline of human genetics is based. A2. The principles of molecular experimental techniques, as applied to the study and diagnosis of genetic disease. A3. The relevance of genetics to human disease. A4a. Appropriate terminology, nomenclature and classification. A4b. Current trends and developments within human genetics. A1 1. Ethical issues of medical genetics. Intellectual skills: B3. Understand complex ideas and relate them to specific problems or questions B4 The module involves analysis of sequence data using DNA comparison programmes. Transferable skills: D4. Using and accessing information technology is required to acquire course materials and background reading matter.

# C12460 Immunology

**Module Convenor:** Prof Jan Bradley

**School:** Life Sciences, University Park

**Module Details:** Level 2, Spring Semester, 10 credits

**Expected Number of Students taking module:** 100

**Target Students:** (C100) Biology; (C300) Zoology but not restricted to them.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module provides an introduction to the basis of vertebrate immunity. The immune response to infection and the basis of immunological disorders. This module will focus on humans.

**Assessment Details:**
Exam 1
Coursework 1

**Aims:** This module aims to give an introduction to the basic concepts of immunobiology.

**Learning Outcomes:** Knowledge and understanding A1. the relationship between the life and environmental sciences and other disciplines and forms of knowledge (t,l,p,a) A2. current trends and developments within the life and environmental sciences (t,a) A3. appropriate terminology, nomenclature and classification (t,p,a) Intellectual skills - the ability to: B1. critically analyse and interpret published information and data (l,p,a) B2. think independently while giving due weight to the arguments of others (l,p,a) B3. understand complex ideas and relate them to specific problems or questions (t,l,p,a) B4. acquire substantial quantities of information systematically, process it effectively, and draw appropriate conclusions (t,l,p,a) Practical skills - the ability to: C2. articulate knowledge and understanding of scientific concepts (t,p,a) C3. write and construct scientific documents (e.g. papers, reports, posters etc) using appropriate styles, conventions, and terminology (t,p,a) Transferable/key skills - the ability to: D2. communicate effectively in writing (p,a) D4. organise and manage your working time, schedule tasks, and meet deadlines (t,l,p,a) D5. use and access information and communication technology (t,l,p,a) D6. reflect upon and assess your own progress, strengths and weaknesses (l,p)

# C12461 Microbial Biotechnology

**Module Convenor:** Prof SV Avery

**School:** Life Sciences

**Module Details:** Level 2, Spring Semester, 10 credits

**Pre-requisite(s):**

C41105 Microbiology or equivalent

**Expected Number of Students taking module:** 100

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Target Students:** The course is designed for BSc/MSci Biology and Microbiology students but not restricted to them.

**Summary of Content:** The course will cover the key groups of eukaryotic and prokaryotic microorganisms relevant to microbial biotechnology, principles of GM and strain improvement in pro- and eukaryotes. Microbial biotechnology in the food industry, including dairy and alcohol products, organic acids. Relevance to agriculture, including biological control. The pharmaceutical industry, e.g. microbiological production of therapeutic entities. Microbial production of industrial ethanol and other biofuels. The impact of "omics", systems biology, synthetic biology and effects of stress on industrial microorganisms.

**Assessment Details:**

| | | |
|---|---|---|
| Exam 1 | 70% | one 1.5 hr multiple choice exam |
| Coursework 1 | 30% | Coursework 30% comprising submission of a power-point presentation and accompanying notes. |

**Aims:** The aim of the course is to describe the use of yeasts, filamentous fungi and bacteria in biotechnology as it relates to the food, agriculture, medicine and other industries. The course will demonstrate how an understanding of the biology and genetics of microorganisms allows their use as cell factories for the production, and models for the discovery, of enzymes and metabolites. The course will also explore how microbial activities themselves can be exploited in processes ranging from food production to biocontrol of disease-causing organisms. The course will cover the key types of product, metabolic pathways, their regulation at the gene level, and methods for strain improvement including the use of recombinant DNA technology for ameliorating product yield and the synthesis of new products. The impact of genomics and systems biology on microbial biotechnology will be presented.

**Learning Outcomes:** Knowledge and understanding of
A2 (current trends and developments between Biology and other disciplines)
A3. (the importance of Biology in human health and disease and its relevance to biotechnology)
A4. (appropriate terminology, nomenclature and classification) and A5 (genetics).
Other aspects are also relevant, e.g.A6,A7 and A10.

Intellectual Skills -
the ability to critically analyse and interpret published information and data (B1) and think independently while giving due weight to the arguments of others (B2).
Also, the course will help students to understand complex ideas and relate them to specific problems or questions (B3) and acquire substantial quantities of information systematically, process it effectively, and draw appropriate conclusions (B4).

Transferable Skills
the ability to communicate effectively in writing (D1), organise and manage your working time, schedule tasks, and meet deadlines (D3) an work productively with others (D7).

# C12472 Parasitology

**Module Convenor:** Dr W Wickstead

**School:** Life Sciences, University Park

**Module Details:** Level 2, Spring Semester, 10 credits

**Expected Number of Students taking module:** 80

**Pre-requisite(s):**

C41202, Genes and Cellular Control or equivalent.
C11219, Immunity, Parasites and Control of Parasitic Diseases is also desirable.

**Target Students:** Year 2 Biology, Genetics and Zoology

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module provides an introduction to the biology of parasitic organisms, the evolution of parasitism and the ways in which new molecular and cellular approaches inform disease control.

**Assessment Details:**
Exam 1 100% 2 hour exam

**Aims:** The course provides an introduction to the biology of parasitic organisms, the evolution of parasitism and the ways in which new molecular and cellular approaches inform disease control.

**Learning Outcomes:** By the end of the module students are expected to have: • An understanding of the major differences between important parasitic taxa; • Detailed knowledge of the biology and life cycles of a range of key parasite species of man • Specific knowledge of the mechanisms used by parasites to evade and exploit host immunity • An understanding of mechanisms of transmission, how parasites exploit vectors and how transmission blocking can be achieved • An understanding of the role of genomics and molecular genetics in modern parasitology research • An appreciation of how human evolution and behaviour has been influenced by parasitism; • An appreciation of the role of molecular research in the development of drugs, vaccines and diagnostics.

# C42418 Bacterial Genes and Development

**Module Convenor:** Prof RE Sockett

**School:** Life Sciences, University Park

**Module Details:** Level 2, Spring Semester, 10 credits

**Pre-requisite(s):**
C41202 Genes and Cellular Control I (L)
C41105 Microbiology

**Expected Number of Students taking module:** 90

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Target Students:** Compulsory for students registered for BSc Genetics, Biochemistry and Genetics.

**Summary of Content:** This module aims to describe in some detail the molecular events which occur during the control of gene expression in bacteria. The material covered will begin with simple control circuits, followed by case studies which show how complex developmental programmes can occur in response to environmental stimuli. Examples of gene regulation in pathogenic bacteria are also included.

**Assessment Details:**

Exam 1 100% 2 hour exam

**Aims:** The module describes in detail the molecular events which occur during the control of bacterial genes.

**Learning Outcomes:** The material covered will begin with simple control circuits, followed by case studies that show how complex developmental programmes can occur in response to environmental stimuli. Examples of gene regulation in pathogenic bacteria are also included.

# C72340 Proteins: Structure and Function

**Module Convenor:** Dr R Layfield

**School:** Life Sciences, University Park

**Module Details:** Level 2, Autumn Semester, 10 credits

**Expected Number of Students taking module:** 180

**Pre-requisite(s):** C71101 and C41202

**Target Students:** Available to all students registered for a Single Honours degree in Biochemistry with another subject and other qualified students, approved by the Head of School.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** The module considers the following topics:
General protein structure,
enzyme kinetics and catalysis,
properties and purification of membrane proteins.

**Assessment Details:**

Exam 1 100% 2 hour examination

**Aims:** Students will be able to describe the general structure of soluble proteins; they will learn about methods to analyse the different levels of protein structure; they will gain knowledge about the specific properties of structural and myofibrillar proteins; they will be able to describe the structure of several specific membrane-bound proteins and the challenges associated with their purification; they will know how enzymes operate in mono and bi-substrate reactions and be able to describe the kinetics of such enzyme-catalysed reactions; they will be able to discuss complex enzyme mechanisms and how these enzyme actions are controlled.

**Learning Outcomes:** Students will be able to: - describe the structure and function of soluble proteins; - explain how individual proteins can be studied in molecular detail; - understand the problems associated with studying membrane-bound proteins; and - gain an increased knowledge about enzyme kinetics and catalysis. Transferable skills: Use of the library. Analysis of research data, IT and communication skills.

# Year 3 Modules

# B13505 Molecular Pharmacology

**Module Convenor:** Dr SPH Alexander

**Location:** Life Sciences, Univeristy Park

**Module Details:** A level 3 course taught in the Autumn Semester

**Pre-requisite(s):** B12303 (Basic Molecular Pharmacology)

Level 2 Neuroscience or level 2 Biochemistry modules.

**Expected Number of Students Taking Module:** 20

**Capped module at 20 – You will need permission from the module convenor to take this module unless it is compulsory for your course.**

**Target Students:** BSc Neuroscience and Pharmacology final year students

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** The Molecular Pharmacology module aims to allow the student to develop an understanding of drug discovery and the pharmacology behind some of the most important classes of medicines that are currently in the clinic. The course deals with fundamental concepts and methods in molecular pharmacology and protein structure. Students will study the major classes of drug targets, their role in signalling systems that lead to changes in cell and tissue function, and thus how their modulation can influence patient health. As part of the focus on drug development, students will research in a focused area of early drug discovery to identify how drug candidates may be taken on to become medicines.

**Assessment:**

| | | |
|---|---|---|
| Exam 1 | 60% | 2 hour exam, comprising a section of essays and a section of data interpretation problems; split 70 % and 30 %, respectively |
| Coursework 1 | 40% | A report summarising and critiquing in 1500 words or less a recent publication in the area of drug discovery |

**Aims:** To develop an understanding of the mechanisms by which drugs are discovered and improved. In addition, the mechanisms will be identified by which intracellular second messengers, signalling cascades, and ion channels mediate functional responses to neurotransmitter and hormone receptor activation. The module will also develop problem-solving skills in the quantitative analysis of drug-receptor interactions and the interpretation of experimental and published data.

**Learning outcomes:** Students should be able to: 1 describe the major groups of molecular targets of therapeutic and experimental drugs; 2 describe the four receptor superfamilies, giving specific examples of each and the major routes of signal transduction associated with them; 3 generate quantitiative parameters from data derived from radioligand binding or signal transduction methodologies 4 describe the current processes in drug discovery and medicines development.

# C13597 Pathogens

**Module Convenors:** Dr K Hardie, and Dr S P Diggle

**Location:** Life Sciences, University Park

**Module Details:** A level 3 course taught in the Autumn Semester, 10 credit module

**Pre-requisite(s):** A knowledge of the following is strongly recommended: C42418 Bacterial Genes & Development or C12472 Parasitology; and also C12460 Immunology. Molecular Genetics is discussed in the module

**Expected Number of Students Taking Module:** 80

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This course, taught by 5 lecturers will give students an in depth understanding of the genetics, evolution and biochemistry behind the pathogenic properties of parasites and micro-organisms that cause major human disease in the present day. As time is limited, we will concentrate mainly on microbial aspects with one week on the genetics of human susceptibility. Students will learn about the specialised features of parasites and micro-organisms that make them pathogenic, how the genes encoding these features are regulated, and how biological, genetic and chemical tools can be used to develop preventative and curative treatments (2wks). Model organisms to be studied include the agents of malaria (2 wks), leishmania (1 wk), candidiasis (1 wk), aspergillosis (1 wk), salmonella, escherichia and shigella dysenteries (1 wk), and tuberculosis (1 wk). Students will also take part in a group-learning activity to produce a poster on an emerging or persistent pathogen explaining the molecular biology of its virulence. They will learn to use a questioning approach to gain an understanding of microbiological processes in the literature and how to present a scientific poster at a conference, doing group work on a pathogens poster topic, which they present for peer and staff judging at a poster conference for 35% of the module mark.

**Assessment:**

| | | |
|---|---|---|
| Exam 1 | 65% | 2 hour written examination |
| Coursework 1 | 35% | Group work poster exercise |

**Aims:** To present work on the molecular genetic biochemical and cellular bases of the major infectious diseases of mankind and why they are still such a health problem. To understand the post-genomic progress in determining the molecular mechanisms of transmission, pathogenicity and susceptibility. To understand the progress and prospects for new therapeutics.

**Learning outcomes:** Students completing this course should be familiar with molecular methods for analysis of disease processes in protozoal and bacterial pathogens, including post-genomic studies and for production of new treatments. They should have an in depth understanding of the principles involved in expression of virulence in vivo and in passage from vectors to hosts. They should also appreciate the application of molecular genetic approaches to new therapeutic targets and treatments, and issues of resistance.

# C135P2 Molecular Plant Pathology

**Module Convenor:** Prof Matthew Dickinson Matthew.Dickinson@nottingham.ac.uk

**Module Details:** A level 3 course taught in the Autumn Semester on Tuesday afternoons at University Park. 10 credits

**Pre-requisite(s):** D224P7 (Plant Pests and Diseases)

**Expected Number of Students Taking Module:** 80

**Target Students:** Unrestricted

**Availability to Exchange Students** Yes

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module will cover the molecular techniques being used to develop an understanding of plant/pathogen interactions. It will then cover the molecular biology of plant pathogens, how these cause disease, and the mechanisms used by plants to defend themselves against such pathogens.

**Lecture Programme:** Lecture programme is provisional and more detailed information will be given to you in the first session.

1 Introduction and Bacterial diseases I (MD)
2 Bacterial diseases continued (MD)
3 Plant viruses (MD)
4 Fungal diseases (John Lucas)
5 Fungal genetics (MD) and Fungal sex (Paul Dyer)
6 Resistance genes (MD)
7 Signalling in disease resistance and Systemic resistance
8 Tutorial sessions
9 Tutorial sessions
10 Tutorial sessions
11 Module review and revision session

**Assessment:** Exam 1 100% 2 hour examination.

**Aims:** This module will explore the modern molecular techniques being used to investigate plant/microbe interactions and will examine the way in which pathogens cause disease and the means by which plants defend themselves.

**Learning outcomes:** On successful completion of this module, students will be able to:

- Describe the current models for how plant pathogens cause disease.
- Relate knowledge of pathogens to how plants defend themselves against disease.
- Explain the molecular basis of plant pathogen interactions.
- Evaluate and critically assess recent research in plant pathogen interactions.

**Recommended background reading:** Dickinson M (2003) Molecular Plant Pathology BIOS Scientific Publishers. Lecturers will provide information on the best reviews and primary sources for the information that they cover in their lectures as the module progresses.

# C93IIS Immunity & The Immune System

**Module Convenor:** Dr L Fairclough

**Location:** Life Sciences

**Module Details:** A level 3 course taught in the Autumn Semester, 10 credit module

**Pre-requisite(s):** Must be enrolled on a course within the School of Life Sciences

**Expected Number of Students Taking Module:** 40

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** To define the basic mechanisms and concepts underpinning the science of Immunology and Allergy.

**Assessment:**

| | | |
|---|---|---|
| Inclass Exam 1 (Written) | 50% | Written examination - 1 hour |
| Inclass Exam 2 (Written) | 50% | MCQ examination - 30 mins |

**Aims:** Students should be able to define the basic mechanisms and concepts underpinning the science of Immunology and Allergy.

**Learning outcomes:** To be able to define the basic mechanisms and concepts underpinning the science of Immunology and Allergy.

# D235F1 The Microflora of Foods

**Module Convenor:** Prof CER Dodd Christine.Dodd@nottingham.ac.uk

**Total Credits:** 20

**Level:** 3 Autumn Semester

**Capped module at 50 – You will need permission from the module convenor to take this module unless it is compulsory for your course.**

**Pre-requisite(s):** D224FA Microbial Mechanisms of Food Borne Disease (20 credit) or equivalent

Late registration for this module is not possible as coursework is submitted in the first two weeks.

**Target Students:** Compulsory for Food Science. Required choice option for students reading for degrees in Microbiology; optional for Nutrition, and Biotechnology.

**Availability to Exchange Students:** Yes

**Module details:** The intrinsic and extrinsic factors which affect the growth of micro-organisms in foods will be considered. The impact of food structure and microflora will also be discussed. The limitations of these parameters for predicting the growth of micro-organisms will be considered together with commercially available predictive models and alternative safety assurance approaches HACCP. The micro-organisms associated with spoilage and the physical changes which occur in a food will be outlined. The microbial profiles of particular foods, including dairy products, fish and red meat, will be described and the changes that occur in the microflora during spoilage will be considered in relation to storage parameters. Practicals will cover methods for isolating and identifying micro-organisms from foods and will evaluate the limitations of these procedures.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Lecture and practical contents**
The final timetable will be given out at the first session.

Week 1
10.00-13.00 Introduction to the module
Examining microbial growth in foods 1: factors controlling growth Examining microbial growth in foods 2: predictive modelling
14.00-16.00 Canning practical 1

Week 2
10.00-12.00 Examining microbial growth in foods 3: enrichment procedures

Examining microbial growth in foods 4: *in situ* detection 12.00-13.00*Salmonella* isolation: practical 1 - enrichment procedures 14.00-16.00 Canning practical 2

Week 3
10.00- 12.00 Spoilage The microflora of specific foods: meat and poultry I
12.00-13.00 Canning practical 3
14.00-16.00 *Salmonella* isolation: practical 2 - selection of isolates

*Week 4*
10.00-11.00 Practical

11.00-13.00 *Campylobacter* The microflora of specific foods: meat and poultry II
14.-00-16.00 *Salmonella* isolation: practical 3 - characterisation of isolates

Week 5
10.00-13.00 The microflora of specific foods: fish and shell fish *Clostridium botulinum and* food borne botulism. Prof Mike Peck (Institute of Food Research - Norwich)
14.00-16.00 Discussion group on *Salmonella* isolation Introduction to *Listeria* practical

Week 6
10.00-11.00 The microflora of specific foods: dairy products
11.00-13.00 *Campylobacter*: practical 1
14.00-16.00 Submission of *Listeria* protocol

*Week 7*
*10.00-13.00 Campylobacter*: practical 2
14.00-16.00 *Listeria isolation: practical 1 – isolation from cheeses*

Week 8
10.00-13.00 The microflora of specific foods: bakery products The microflora of specific foods: miscellaneous
14.00-16.00 *Listeria* isolation: practical 2 - selection of presumptives

Week 9
9.00-13.00 Competitive microflora. Dr. Tim Aldsworth (Coventry University) Food structure and microbial growth. Dr Sharon Johnson (DSTL)
14.00-16.00 Listeria isolation: practical 3 – confirmatory tests

Week 10
10.00 -13.00 HACCP: an introduction
Group exercise on HACCP
14.00-16.00 *Listeria* isolation: practical 4 - final identification

Week 11
10.00- 11.00 Bacterial suicide - a new hypothesis.
11.00-13.00 Discussion group on *Campylobacter* and *Listeria* practicals Seminar on past examination papers and module evaluation

**Lecture Programme:** Available on first day of module

**Non Lecture Programme:** Available on first day of module

**Coursework:** Course work constitutes 50% of the marks for the Semester. This is broken down as:

| | |
|---|---|
| Canning practical report | 25% |
| Continuous assessment exercises: | |
| Canning practical summary | 5% |
| *Campylobacter* identification results | 5% |
| *Listeria* isolation protocol (group exercise) | 15% |

**Assessment Details:**

| | | |
|---|---|---|
| Exam 1 | 50% | 3 hour exam - compulsory data evaluation based on practicals; 3 short answer questions: 1 essay |
| Coursework 1 | 25% | Practical report written as report to industry - 2000 words |
| Coursework 2 | 5% | Group (2 people) practical report - summary of findings after 1 week (2 sides A4 max 500 words per student) |
| Coursework 3 | 5% | Group (2 people) practical report - tabulation of results and brief commentary written by pair working together (2 sides A4 max; 500 words per student) |

| | | |
|---|---|---|
| Coursework 4 | 15% | Group (4 people) practical report - summary of protocol developed in practical sessions and of written instructions issued to technician (1000 words per student) |

**Learning Outcomes:** On successful completion of this module students will be able to:

1) Comprehend the underlying principles of the factors which control microbial growth and their relevance in foods
2) Relate the microbial composition of major food materials with the impact of food composition, storage and processing.
3) Apply a range of practical techniques and methodologies for isolation and characterisation of specific bacteria
4) Design, carry out and evaluate appropriate tests or experiments to address fundamental microbiological problems in the food industry
5) Collect, record and analyse data by making accurate observations and measurements and use appropriate methods for presentation.

**Recommended Reading:** M ft Adams and M O Moss (1995) *Food Microbiology* J M Jay *Modern Food Microbiology* Fourth Edition Collins, Lyne and Grange *Collins and Lyne's Microbiological Methods* Seventh

# D235F5 Molecular Microbiology and Biotechnolgy

**Module Convenor:** Dr P Hill (Convenor) Phil.Hill@nottingham.ac.uk

**Lecturers:** Dr C Rees, Prof I Connerton, Prof D Archer, Dr K Mellits

**Module Details:** Level 3, Autumn Semester, 20 credits

**Pre-requisite(s):** D212F7 Microbial Physiology or equivalent.

Students who have not taken this module may be allowed to register if they can demonstrate the essential prerequisite laboratory skills.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Target Students:** Optional for BSc Biotechnology, BSc Microbiology

**Availability to Exchange Students:** Yes

**Summary of Content:** The module begins with a review of DNA structure, gene transcription and protein synthesis and will then review gene cloning, protein expression vectors and protein analysis. Advanced aspects of protein expression, stability and secretion are then introduced followed by the application of gene engineering to the biotechnology industry. Finally the practical classes provide some experience of detailed planning and execution of practical molecular bacteriology and give experience of protein over-expression in bacterial and macromolecular separation/analysis. The coursework exercise gives training in manuscript preparation.

**Lecture Programme:** More detailed information will be given in the first session.
Topics:
1 Bacterial/gene transcription and translation
2 Cloning in expression vectors
3 Protein analysis and macromolecular separation
4 Protein structure and protein folding
5 Protein stability and gene fusions
6 Protein secretion
7 Expression in eukaryotic systems
8 Protein engineering and biotechnology
9 Post-translational modification
10 Regulatory constraints and patents

**Non-Lecture Programme:** 1 day per week throughout the semester to include formal lectures (approx 33h) together with 6 x 4h practical classes during the semester (approx 24h) and 5 x 2h seminars.

**Assessment:**

| | | |
|---|---|---|
| Exam 1 | 65% | 3 hour examination |
| Coursework 1 | 5% | Tutorial presentation |
| Coursework 2 | 30% | Lab planning exercise - 2 page summary of seminar material plus calculations. Lab report - written in style of research manuscript; 4000 word limit but no minimum length |

**Aims:** To enable students to comprehend the opportunities that protein engineering provides in applied microbiology and to appreciate some of the practical limitations associated with technology. Students will gain a detailed understanding of prokaryotic protein expression and

examples of its application to biotechnology. Practical classes and seminars will provide an insight into the necessary constraints and practicalities of experimental design and execution. The major coursework assignment introduces students to the rigour required for writing scientific papers.

**Learning Outcomes:** On successful completion of this module, students will be able to;

- Explain advanced aspects of protein synthesis in bacteria and how bacteria are used to produce recombinant proteins
- Compare the differences between using bacteria or eukaryotic cells for producing recombinant proteins
- Evaluate the most appropriate techniques used for preparation and purification of a particular given protein.
- Design and implement practical experimental procedures for protein expression and purification.
- Prepare scientific manuscripts based on laboratory data appropriate for publication

**RECOMMENDED READING LIST:**

- Instant notes molecular biology / P.C. Turner ... [et al.], 2nd ed. Bios, 2000.
- Lesk, Arthur M. Introduction to protein science : architecture, function, and genomics / Arthur M. Lesk, 2nd ed. Oxford University Press, 2010.
- Price, Nicholas C. Exploring proteins : a student's guide to experimental skills and methods / Nicholas C. Price and Jacqueline Nairn. Oxford University Press, 2009.
- Practical skills in biomolecular sciences / Rob Reed ... [et al.], 3rd ed. Pearson Education, 2007
- Chemistry for the Biosciences: the essential concepts / Jonathan Crowe ... [et al.], Oxford University Press, 2006

**Recommended background reading:** Genes VII (onwards) Lewin Instant Notes in Molecular Biology. Turner et al. Introduction to Protein Architecture, Lesk

# D235F8 Personal and Professional Development for Food Scientists

**Module Convenors:** Dr Judith Wayte Judith.Wayte@nottingham.ac.uk and Emma Weston (Associated Professor) Emma.Weston@nottingham.ac.uk

**Lecturers:** Experts in professional development and speakers from industry

**Module Details**: Level 3 Autumn Semester, 10 credits

**Pre-requisites:** Participation in the tour of food manufacturing sites (end of the first year)

**Co-requisite(s):** Not open to exchange or study abroad students

**Capped module at 35 – You will need permission from the module convenor to take this module unless it is compulsory for your course.**

**Target Students:** Food Science and Nutrition and Food Science Students

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** This module provides specific training and learning opportunities to develop a range of key skills and competencies that improve employability prospects for the students, and their performance once in work.

**Lecture Programme: Example:**

| Week | SUBJECT | LECTURER |
|---|---|---|
| 1 | Introduction to the module Use of Mahara | EW/JW |
| 2 | Personality Assessment | RS Careers Service |
| 3 | Making Job Applications & CVs | External e.g. Pespsico |
| 4 | Building Targeted CVs | Self Directed Learning |
| 5 | You and Your Career – 1 Career Planning | EW/JW<br>Self-Directed Learning |
| 6 | Careers Launch Pad | Field Trip |
| 7 | Drop In 1:1 Appointments | EW/JW |
| 8 | The Interview Process I | External – e.g. recruitment consultant |
| 9 | The Interview Process II – Group Assessments | External – e.g. Tesco |

| | | |
|---|---|---|
| 10 | Understanding the Job Market | External e.g. CFA |
| 11 | Module Review and Coursework Support | EW/JW |

**Module Activities:**

- Visit four food/drink manufacturing sites at the end of year 1 (2-day field trip) attendance compulsory as part of the module
- Participate in a range of workshops, for example: CV and cover letter writing; application forms and interview techniques; career planning; aptitude tests
- Attend a field trip to an employment event
- Attend employer presentations
- Create online personal portfolio/profile

**Assessment:**

| | | |
|---|---|---|
| Coursework 1 | 80% | A collection of 3 reflective logs and 1 Personal Development Plan. Reflections can be audio; video or 1-2 page written reports. Marked as per written assessments. |
| Coursework 2 | 0% | Pass/Fail. Portfolio of 5 items that contains evidence of the acquisition & realisation of skills, and draws on activities scheduled throughout the course and promotes a high degree of reflective practice. Students can align with a range of specific career. |
| Participation | 20% | Attendance at 4 employer events / workshops outside of the module activities. |

**Aims:** To provide specific training and learning opportunities to prepare students for a range of careers on graduation and in successfully securing a job.

**Learning Outcomes:** On successful completion of this module students will be able to:

- Demonstrate a range of professional behaviours
- Synthesise their skills and capabilities into a targeted portfolio
- Evaluate their performance at networking, interviews and assessment centres
- Construct an action plan for Personal and Professional Development to build on strengths and develop areas of weakness.

# D235P2 Plant Cell Signalling

**Module Convenor:** Dr A Bishopp, Anthony.Bishopp@nottingham.ac.uk

**Lecturers:** Prof. JA Roberts, Dr TP Robbins, Dr R Swarup, Prof M. Dickinson, Prof M Holdsworth, Dr Darren Wells

**Module Details:** Level 3, Autumn Semester, 10 credit

**Pre-requisites:** A selection of genetics and plant science modules at levels one and two.

**Expected Number of Students Taking Module:** 25

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** The module deals with the production and perception of plant signaling molecules. The ways in which these signals are integrated to ensure appropriate responses to environmental conditions or plant pathogen attack are discussed.

**Assessment:**

| | | |
|---|---|---|
| Exam | 70% | 2 hour exam. |
| Coursework | 30% | 1500-word essay. Essay is set at this length because of technical detail required at Level 3 and to give student chance to develop a sufficiently cogent argument with detail. |

**General**

1 Introduction to the module; types of signals and receptors, basic concepts of receptors. And signal transduction cascades (RGF).
2 Auxin transport and signalling (RS)
3 ABA, (MH)
4 Ethylene perception and signal transduction (JAR)
5 Gibberellic acid signalling (RGF)
6 Plant defences – signalling to keep pathogens out (MD)
7 Cytokinin (and Brasinosteroids) (RGF)
8 Phytochromes and perception and response to light. (RS)
9 Signalling in pollen tubes (TPR).
Practical (DW)
10 Practical (DW)
11 Hormone crosstalk: Integration of signalling pathways (RS)
Revision and module debriefing (RGF).

**Aims:** The aims are to provide a detailed knowledge of how plants use intercellular and intracellular signaling strategies to provide information about their environment. Particular emphasis will be placed on the way in which molecular genetics is enabling us to determine the nature of the signals, their perception and the cross-talk that takes place between them. The objectives of this module are: - i. To impart an appreciation of the properties of receptors and the transduction chains activated by them. ii. To illustrate the range of genes induced by signals from other cells and external stimuli and how they differ from other plant genes. iii. To develop a range of transferable skills.

**Learning outcomes:** On Successful completion of the module, students will be able to;

- Compare different mechanisms used by plants to convert a hormone or environmental signal into altered gene expression.
- Evaluate research papers in the general area of plant cell signaling.
- Describe the how plants control the synthesis and turnover of growth regulators.
- Explain how key plant hormones interact to co-ordinate plant growth.
- Discuss the agricultural importance of manipulating plant growth habits.

# C13695 Parasite Immunology

**Module Convenor:** Prof MJHC Doenhoff

**Location:** Life Sciences, Universi9ty Park

**Module Details:** A level 3 course taught in the Spring Semester, 10 credit module

**Capped module at 65 – You will need permission from the module convenor to take this module unless it is compulsory for your course.**

**Pre-requisite(s):** C12472 Parasitology; and C12460 Immunology. Molecular Genetics is discussed in the module.

**Expected Number of Students Taking Module:** 65

**Summary of Content:** This module will consider immunological interactions between parasites and their hosts. Initially the mechanisms involved and the consequences of host responses/resistance to infection will be reviewed across diverse taxa of parasitic organisms. Subsequently the strategies evolved by parasites to enable survival in the face of host immunity will be discussed in some depth.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Assessment:**

| | | |
|---|---|---|
| Exam 1 | 75% | 2 hour exam |
| Coursework 1 | 25% | One essay1500 words long on one topic of a choice of three |

**Aims:** This course is concerned with the immunology of parasitic diseases and aims to provide students with an understanding of the diverse nature and consequences of the interactions between parasites and the host immune system.

**Learning Outcomes:** Knowledge and understanding of: A2. current trends and developments with in Biology/Zoology A3. appropriate terminology, nomenclature and classification A4. genetics A6. organism structure and physiology A7. interaction of organisms and their environment A10. Interaction of organisms and their environment Intellectual Skills: Students will be able to: B1. critically analyse and interpret published information and data B2. think independently while giving due weight to the arguments of others B3. understand complex ideas and relate them to specific problems or questions B4. acquire substantial quantities of information systematically, process it effectively, and draw appropriate conclusions Professional/Practical Skills Students will be able to: C1. carry out scientific research and evaluate and make use of the material so acquired C2. articulate knowledge and understanding of scientific concepts Transferable Skills: D1. Communicate effectively in writing D3. Organise and manage their working time, schedule tasks, and meet deadlines D4. Use and access information and communication technology

# C13CDI Chronic Disease and the Immune System

**Module Convenor:** Dr VG Wilson

**Location:** Life Sciences, University Park

**Module Details:** A level 3 course taught in the Spring Semester, 10 credit module

**Pre-requisite(s):** C14710 Project (Science without Borders)

**Expected Number of Students Taking Module:** 20

**Target Students:** Science Without Borders (SWB) students

**Summary of Content:** The module offers an overview of the immune system, a description of the microvascular and cellular changes associated with inflammation, and insights into the use of drugs to ameliorate or abolish the symptoms associated with several chronic diseases involving the immune system. The clinical areas of interest will include inflammatory bowel disease, rheumatoid arthritis, multiple sclerosis and chronic kidney disease as these are recognized as conditions that future health professionals may come in contact with on a weekly basis. However, you will also be introduced to lesser known conditions/diseases/procedures that are either modified or controlled by synthetic drugs, fungi-derived antibiotics and monoclonal antibiotics that influence the immune system. Students will be expected to compare the treatment of chronic conditions in the UK and Brazil.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Assessment:**

| | | |
|---|---|---|
| Exam 1 | 75% | Essay - 1 hour |
| Coursework 1 | 25% | Poster - 15 minutes with Q&A session |

**Aims:** To introduce the students to immunopharmacology and the treatment of chronic disorders.

**Learning Outcomes:** Knowledge and Understanding By the end of this module the student should understand: • The basics of the immune system and its interaction with the cardiovascular and nervous system. • The methods available to investigate inflammatory processes. • The role of cytokines in physiological and pathophysiological processes. • The mechanism of action of synthetic and natural drugs for the treatment of chronic inflammatory responses. • The use of monoclonal antibodies in diagnosing and treating immune-based disorders and cancer. • Factors influencing the design and outcome of clinical trials in evaluating the efficacy of new drugs. • The increasing importance of overall treatment costs in final judgements from NICE on whether new drugs should be available on the NHS. Intellectual Skills • Development of the ability to absorb, arrange and analyse information; • Development of the ability to extend knowledge through private study; Professional Practical Skills • Development of the ability to assimilate information that will be of value for future clinical practice; • Critical analysis of scientific literature. Transferable Skills • Use of IT facilities including web-based searching of the scientific literature; • Use of library; • Ability to critically appraise research publications; • Integration and concise representation of knowledge; . Attitudes and Behaviour • Application to both formal and self-directed learning. • Studying within the context of competing tasks. Time management.

# C136E6 Environmental Biotechnology

**Module Convenor:** Dr H West Helen.West@nottingham.ac.uk

**Module Details:** Level 3, Spring Semester, 10 credits at University Park

**Pre-requisites:** Completed Part 1 year in Environmental Science, Environmental Biology or Biology

**Expected Number of Students Taking Module:** 40

**Target Students:** BSc Environmental Science, BSc Environmental Biology, BSc Biology, BSc Biotechnology Available to JYA/Erasmus students.

**Summary of Content:** This module provides training inenvironmental biotechnology, with particular emphasis on the interaction between microorganisms and the environment. The main topics covered will be wastewater treatment, bioremediation of organic and inorganic pollutants, microbes as indicators of risk factors in the environment, microbes in agriculture (biocontrol and biofertilisers) and the role of microorganisms in bioenergy production. Each topic will be introduced by a formal lecture followed by workshops during which students will study the topics in greater detail through problem-based learning techniques facilitated by the Convenor and by independent research. Knowledge and understanding of the lecture material will be assessed by Rogo examination and students will present the problem based exercises and case studies within an individual portfolio during the final week of the module.

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Further Activity Details:**
Activities may take place every teaching week of the Semester or only in specified weeks. It is usually specified above if an activity only takes place in some weeks of a Semester. 36 hours of lectures and facilitated workshops

**Assessment Details:**

| | | |
|---|---|---|
| Exam 1 | 30% | 1.5 hour examination |
| Coursework1 | 70% | Portfolio presentation of case studies and problem based exercises |

**Aims:** To provide students with a sound understanding of microbial ecology, the role of microbes in natural processes and their application in waste water treatment and bioremediation processes.

**Learning Outcomes:** Knowledge and understanding of: The way microbes interact with the environment - The applied effects of microbes on the environment and on human activity and welfare. Intellectual Skills - the ability to - Critically analyse and interpret published information and data - Understand complex ideas and relate them to specific problems or questions. Professional Skills - the ability to - Work safely in the laboratory and to assess related safety issues Undertake appropriate experimental design and statistical analysis Transferable Skills - the ability to - Work productively with others - Communicate effectively by oral presentation - Manage and manipulate numerical data.

# D236F5 Rapid Methods in Microbial Analysis

**Module Convenor:** Dr Jon Hobman Jon.Hobman@nottingham.ac.uk

**Total Credits:** 10

**Level:** 3, Spring Semester

**Pre-requisite(s):** D212F7 Microbial Physiology, D224FA Microbial Mechanisms of Food Borne Disease (20 credit) or equivalents

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Module Details:** The use of viable counting as a standard for determining bacterial contamination of foods will be evaluated. Alternative methods used industrially (e.g. impedance, DEFT) will be examined. The limitations of sampling methods for quality control will be discussed. Antibody based and ELISA systems will be described and demonstrated. The role of electrical signal monitoring (impedance) will be discussed as will emerging techniques based on gene engineering that include DNA probes, RNA probes, PCR and phage based assays. A particular emphasis will be placed on the problems of technology transfer into the food microbiology laboratory.

**Lecture Programme:**

| Time | Content | Staff |
|---|---|---|
| **Week 1** | | |
| 09.00-09.30 | Introduction, module aims, coursework etc. | CD |
| 09.30-10.45 | Detection and identification of microorganisms; an introductory seminar | TBA |
| 11.05-11.55 | Sampling Plans | TBA |
| 12.05-12.50 | Rapid methods of microbial detection – an introduction | TBA |
| **Week 2** | | |
| 09.00-10.00 | Physical methods of microbial detection, including DEFT and flow cytometry | TBA |
| 10.00-10.45 | DNA probes; the polymerase chain reaction | TBA |
| 11.05-12.00 | Other emerging techniques of detection | TBA |
| 12.00-12.45 | Antibody-linked detection systems, including ELISA | TBA |
| **Week 3** | | |
| 10.00-11.00 | Impedance microbiology | TBA |
| 11.05-13.00 | Impedance Demonstration | TBA |
| **Week 4** | | |
| 09.00-10.00 | Cleaning and disinfection – an introductory seminar | TBA |
| 10.05-10.45 | Cleaning and disinfection I | TBA |
| 11.05-12.00 | Cleaning and disinfection II | TBA |
| **Week 5** | | |
| 09.00-10.00 | Phage and its application | CR |
| 10.05-12.45 | ELISA Demonstration | JW |
| **Week 6** | | |
| 10.05-12.45 | Sterilisation Assurance Test demonstration | 3M to be confirmed |
| **Week 7** | | |
| 09.00-10.00 | Immunomagnetic separation | TBA |
| 10.00-11.00 | Immunomagnetic separation demonstration | TBA |
| 11.05-12.45 | Petri film demonstration | 3M to be confirmed |
| **Week 8** | | |
| 10.00-12.00 | Sub-species typing of bacteria: classical and phenotypic methods | CD |

| | | |
|---|---|---|
| **Week 9**<br>10.00-12.00 | Sub-species typing of bacteria: DNA-based methods | CD |
| **Week 10**<br>10.00-12.00 | Course summary and revision<br>The written examinations<br>Course evaluation and feedback | TBA |

**Assessment:**

| | | |
|---|---|---|
| Exam 1 | 60% | 1 hour 30 mins examination |
| Coursework 1 | 20% | Letter - 300 words |
| Coursework 2 | 20% | Memorandum - 600 words |

**Aims and Objectives:** The purpose of the module is to enable students to understand and evaluate the methods used industrially for microbiological analysis including rapid methods. Students will benefit by being able to put into perspective the different approaches to enumeration and detection of microorganisms. By the end of the module the student will be able to determine appropriate microbiological sampling plans for food quality control and select current microbial analysis regimes with due regard to their advantages and limitations.

**Learning Outcomes:** On successful completion of this module students will be able to:

(1) Comprehend the terminology, nomenclature and fundamental principles used in rapid microbiological methods.
(2) Apply fundamental principles to understand the advantages and limitations of traditional and modern detection and identification methods.
(3) Analyse where novel advances in rapid microbiological methods are likely to occur.
(4) Evaluate rapid pathogen identification methods safely in the laboratory under ACDP2 conditions.
(5) Synthesize subject knowledge in order to solve problems in a logical manner.

# D236F6 Microbial Fermentation

**Module Convenor:** Dr Jon Hobman Jon.Hobman@nottingham.ac.uk

**Lecturers:** Prof C Dodd, Dr L Whitley

**Total Credits:** 10

**Level:** 3 spring Semester

**Pre-requisite(s):** D212F7 Microbial Physiology

**Expected Number of Students Taking Module:** 30

**Target Students:** Optional for students reading for degrees in Food Microbiology, Food Science, Microbiology, Nutrition & Food Science, and Biotechnology

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Module Details:** This module commences with a review of microbial fermentation, including beer, cheese, yoghurt, meat and single-cell protein production, as well as sewage treatment. The underlying principles of microbial fermentation will be discussed, in addition to specific examples which will be examined in depth. From this basic knowledge the problems of microbial contamination and spoilage of the finished product will be analysed. A visit will be an important part of the module.

**Aims and Objectives:** The purpose of the module is to provide an understanding of the activity of microorganisms during fermentation, particularly with regard to food production. On completion of the module students will understand how microorganisms act to preserve food by the production of chemicals which prevent the growth of those microorganisms associated with food spoilage and food borne illness. Students will develop an understanding of microbial growth and associated problem solving skills.

**Learning Outcomes:** On successful completion of this module students will be able to:

(1) Comprehend the terminology and fundamental biochemical pathways involved in microbial fermentations.
(2) Identify the uses of, and processes involved in, fermentations- both in food production and elsewhere.
(3) Collect, record, and analyse data generated during microbial fermentation experiments, and present these data in the form of a scientific paper.
(4) Synthesize subject knowledge in order to address specific problems and questions.

**Assessment:**

| | | |
|---|---|---|
| Exam 1 | 60% | 1 hour 30 min examination. |
| Coursework 1 | 40% | Lab Report - 3000 words |

**Lecture Programme:**

| Time | Content | Staff |
|---|---|---|
| **Week 1** | | |
| 09.00-10.00 | Module introduction: aims; timetable; coursework, exam | TBA |
| 10.00-12.00 | A review of microbial energetics: fermentation, fermentative pathways, energy production, metabolic products. Batch vs. continuous culture | TBA |
| 12.00-13.00 | Overview of fermentation, with particular reference to food, but touching on 'new' biotechnology | TBA |
| **Week 2** | | |
| 09.00-10.00 | The microbiology of brewing, beers, lagers and wines | TBA |
| 10.00-11.00 | Improvement of beer yeast including genetic manipulation | TBA |
| 11.00-12.00 | Introduction to brewing practical | TBA |
| 12.00-13.00 | Fermentation practical – part 1 | TBA |
| Trip to brewery | Need to arrange for a fully detailed description of the process | |
| **Week 3** | | |
| 09.00-10.00 | Microbial spoilage of beer | TBA |
| 10.00-13.00 | Fermentation practical – part 2 | TBA |
| **Week 4** | | |
| 13.00-17.00 | Visit to Coors Brewery, Burton-upon-Trent | |
| **Week 5** | | |
| 09.00-10.00 | General dairy microbiology and the normal microflora of milk | TBA |
| 10.00-11.00 | The microflora of cheese | LW |
| 11.00-13.00 | Problems encountered in cheese production | TBA |
| **Week 6** | | |
| 09.00-10.00 | Yoghurt production: the methods/microbiology/biochemistry | TBA |
| 10.00-11.00 | Fermented meat products: products/methods/microbiology/biochemistry | CERD |
| 11.00-13.00 | Demonstration of novel methods for detecting antimicrobials | CERD |
| **Week 7** | | |
| 9.00-10.00 | Acetic acid production | TBA |
| 10.00-11.30 | 'Traditional' fermentations (eg miso, tempeh and tea) | TBA |
| 11.30-13.00 | Cocoa and casava production | TBA |
| **Week 8** | | |
| 9.00-10.00 | An introduction to 'new' biotechnology | TBA |
| 10.00-11.00 | Mycoprotein production | |
| 11.00-13.00 | Production of industrially useful compounds: historically (eg acetone and butanol); current (eg GMOs for insulin and industrial enzymes) | TBA |
| **Week 9** | | |
| 09.00-10.00 | Normal microflora of water | TBA |
| 10.00-12.00 | Sewage fermentation and bioremediation | TBA |
| 12.00-13.00 | Module feedback and revision session | TBA |
| **Week 10** | | |
| 09.00-13.00 | Trip to sewage farm | |
| **Week 11** | Study week | |
| **Week 12** | Spring Semester exams begin | |

**Lecturers:**
TBA To be agreed; CERD Prof Chris Dodd; LW Dr Liz Whitley
Lectures: 24h. Practicals/demonstrations: 7h. Site visits: 8h. Student-centred learning: 41h.

# D236M1 Virology and Cellular Microbiology

**Module Convenor:** Dr Ken Mellits Ken.Mellits@nottingham.ac.uk

**Module Details:** Level 3, Spring Semester, 10 credits

**Pre-requisites for admission to the module:** D223F7 Virology, D224F9 Analysis of Bacterial Gene Expression or equivalent

**Co-requisites for the module:** None

**Expected Number of Students Taking Module:** 25

**Target Students:** Food Microbiology and Microbiology. Also for students reading Animal Sciences, Applied Biology, Biotechnology, Food Science and Plant Sciences

**Availability to Exchange Students** Yes

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Summary of Content:** The module will provide an in-depth induction into the relationship of bacterial and viral pathogens and their hosts. This will include an understanding the underlying molecular basis of the adaptive response of bacteria to the host environments and the mechanisms by which bacteria and viruses subvert cellular machinery.

**Assessment details:**

| | | | |
|---|---|---|---|
| Exam 1 | 60% | 90 minutes | 1 Hour 30 Mins |
| Coursework 1 | 20% | Lab based practical report length (1000 words) | 2 x A4 |
| Coursework 2 | 10% | Assessed by Group presentation. | |
| Coursework 3 | 10% | Assessed by Group presentation. | |

**Aims:** The module aims to describe the underlying molecular basis of the adaptive response of bacteria to various environments and to describe the mechanisms by which bacteria and viruses invade eukaryotic cells. In addition students are given experience of literature analysis, preparing material for a problem based learning exercise, to investigate host-pathogen interaction. The practical exercise will provide some experience of designing experimental strategies.

**Learning Outcomes:**

- Understand aspects of adaptive and population gene control and sensing in bacteria, in relation to their environment or host cell.
- Understand mechanisms by which bacteria and viruses invade eukaryotic cells, and how they use cellular machinery to their own advantage to infect.
- Acquire basic skill in critical appraisal of data, experimental design strategy, and problem solving for use in group based learning.

# D236P3 Plant Disease Control

**Module Convenor:** Dr R Ray Rumiana.Ray@nottingham.ac.uk

**Total credits:** 10

**Level:** 3 Spring Semester

**Expected number of Students Taking Module:** 60

**Target Students:** Students in the Schools of Biosciences and Life Sciences

**Timetable:** Personal timetables will be available to all students via www.nottingham.ac.uk/studentservices

**Module Details:** This is a course which deals with the applied aspects of plant disease control, comprising transmission, epidemiology, detection and diagnosis and control options. Control strategies based on application of fungicides, biological control, deployment of disease resistant varieties and biotechnological approaches are described. The relative strengths and weaknesses of the different approaches will be considered.

## Lecture Programme 2016-2017

| Week | Topic | Activity |
|---|---|---|
| 1 | Introduction to the module | RR |
| | Cause of disease, symptoms and assessment | RR |
| | The concept of IDM | RR |
| 2 | Plant health risk and policy | NB |
| | Molecular diagnostics | NB |
| | Plant disease epidemiology | RR |
| 3 | Dispersal of plant pathogens | BF |
| | Case study - phoma in OSR | BF |
| | Coursework brief | RR |
| 4 | Cultural control methods | RR |
| | Disease resistance | RR |
| | Tutorial | RR |
| 5 | Durable resistance | GJ |
| | Breeding for disease resistance | GJ |
| | Tutorial | RR |
| 6 | Field walk | RR |
| 7 | Cereal diseases | RR |
| | Management strategies | RR |
| | Chemical control | RR |
| 8 | Fungicide mode of action | RO |
| | Fungicide resistance | RO |
| | Tutorial | RR |
| 9 | Virus transmission and sugar beet diseases | MS |
| | Integrated pest management | TB |

| | | |
|---|---|---|
| 10 | Nematodes and potato diseases<br>Independent studies | MB |
| 11 | Student presentations MSc,<br>Feedback and module overview | RR |

RR= Dr Rumiana Ray, NB= Prof Neil Boonham (Fera), TB= Prof Toby Bruce (Rothamsted Research), MS= Dr Mark Stevens (BBRO), MB= Dr Matt Back (Harper Adams University), GJ= Prof Graham Jellis (formerly HGCA), RO= Prof Richard Oliver (Curtin University), BF= Prof Bruce Fitt (University of Hertfordshire)

**None Lecture Programme:** Practical exercise to support taught material ondiagnosis.

**Assessment:**
Exam 1 100% 2 hour examination

**Aims and Objectives:** The module aims to instruct students in the current practices, which are available for crop protection, and to provide an understanding of how new measures are developed. The objectives of this module are to enable students to: i) appreciate the problems associated with plant disease ii) develop an understanding of the crop protection options available iii) develop laboratory skills associated with disease diagnosis iv) understand the commercial considerations associated with crop protection.

**Learning outcomes:** On successful completion of the module, students will be able to:
- Compare the strategies used by plant pathogens to spread between plants and cause disease epidemics
- Critically analyse methods available for disease diagnosis in different situations
- Explain the range of approaches used in plant disease control
- Evaluate the strengths and weaknesses of these methods when used in crop protection

# D23PRO Undergraduate Research Project

**Module Convenor:** Dr S Lydon Sussie.Lydon@nottingham.ac.uk

**Total Credits:** 40

**Level:** Level 3, Year-long module

**Summary of Content:** The project is a year-long level 3 module. The topic of the project will be chosen from a list of suggestions, and will be finalised after consultation with the student's Course Manager and a member of academic staff who will act as the supervisor. It involves detailed research on the topic chosen after discussion with the supervisor. Each project will involve collection of data by means such as experiment, questionnaire, observation and/or literature search as well as the analysis and interpretation of the data in the context of previous work. Reading and summarising previous research by other scientists working in the area, and writing a clear concise final report are essential components of the project.

**Module details:** This module consists of an extended programme of research under the direction of an individual member of staff. Students are expected to undertake a challenging piece of work, in which emphasis is placed on self-motivation and self-learning. Detailed guidelines will be provided by the Division.

**Expected Number of Students Taking Module:** 250

**Target Students:** All Biosciences students registered for Honours Degrees in the School of Biosciences apart from those studying Microbiology, and Environmental Sciences degrees.

**Non-lecture programme:** Private study using library, Internet, laboratory, or field facilities supported by regular tutorials with the project supervisor.

**Target Students:** All Biosciences students registered for Honours Degrees in the School of Biosciences apart from those studying Microbiology, and Environmental Sciences degrees.

**Assessment:** The module will be assessed by coursework only; this will take the form of a 15 minute oral presentation of the research findings (10%), an objective assessment of project planning and execution (30%) and a 5,000-word written report (60%). Details of the precise format required for the oral presentation and written report will be provided to students by the School Office.

**Module aims:** The module aims to provide a detailed training in research work. At the end of the module, students should be familiar with the relevant published literature in the field, have become familiar with some of the fundamental techniques necessary to do the prescribed research and published their findings as both an oral report and a comprehensive written report.

**Module objectives:** The objectives are to enable students to:

i) Identify and analyse problems
ii) Undertake good experimental design
iii) Search for, analyse and interpret relevant literature
iv) Carry-out competent laboratory, field or survey research
v) Analyse data using appropriate methods
vi) Write and deliver an oral presentation
vii) Prepare and write a detailed report

**Transferable skills:** Transferable skills associated with this module include:

i) Literature searching using a range of databases
ii) Use of relevant laboratory, field or survey research methods
iii) Statistical analysis as appropriate
iv) Computing and word processing skills
v) Problem solving
vi) Oral communication skills
vii) Time management

**Subject specific information**
In some project areas, it is necessary to begin project work in Semester 4 because of factors such as seasonal availability of crops or farm animals. This phase of the project forms a discrete, 10-credit, Part I module

# 30 Appendices

1 Qualitative Assessment Criteria - General Guidelines for Examinations
2 Qualitative Assessment Criteria - General Guidelines for Essays & Reports
3 Qualitative Assessment Criteria - General Guidelines for Posters
4 Qualitative Assessment Criteria - General Guidelines for Oral Presentations
5 Qualitative Assessment Criteria – Research Project Experimental Work
6 Progression and Compensation Charts
7 Marking at Different Levels within Degree Programmes
8 School of Biosciences Tutoring Statement