Nettlecombe Court lies in a secluded valley at the eastern edge of Exmoor National Park. The house is a striking example of a Tudor and Georgian country mansion set within its own grounds. The Centre has excellent access to the Somerset coast as well as Exmoor National Park and The Quantocks Area of Outstanding Natural Beauty. The centre is half an hour from Taunton and the motorway network. Taunton railway station is less than 2 hours from London.

Our new courses are designed to fit the criteria of the specifications for first teaching in 2015. As such they are designed to:

- Incorporate a number of core practicals, apparatus and technique skills, and mathematical skills that students must complete before taking exams. These also go towards the practical endorsement students must complete. The A-level will examine practical skills and can appear in all three final papers.
- Cover a wide range of topics from the specification and, in particular, topics 3 and 10 of the Edexcel B specification.
- Support students in the transfer of their knowledge of fieldwork and ecology from one habitat to another and from the classroom to their final exam. Synoptic links are integral and will provide a strong foundation for students to tackle extended exam questions.
## Edexcel B A-Level Biology Course – 5 day

The order / timings of sessions may be tide and weather dependent

<table>
<thead>
<tr>
<th>Day</th>
<th>AM</th>
<th>PM</th>
<th>EVE (see additional details below)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Students will be greeted by their Tutor, with a welcome talk followed by a brief tour of the Centre. Allocation of wellies and waterproofs.</td>
<td><strong>BIODIVERSITY AND ECOSYSTEMS</strong></td>
<td>Classification and natural selection</td>
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<td></td>
<td>Students will explore the varied terrestrial and aquatic habitats of the Nettlecombe Estate, in the form of an ecological orienteering course. They will make qualitative ecological observations and consider how to design quantitative investigations. Using local examples the value of long-term ecological studies will be discussed. This session will provide a deeper understanding of ecology, an excellent foundation for the rest of the course. From the deeper ecological understanding developed in this session objectives are set for the whole course which will: * make links to the Edexcel specification * set personal learning goals * consider wider environmental issues * consider the skills needed by working ecologists.</td>
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<td></td>
<td>Field site(s): Nettlecombe Estate (no transport req.)</td>
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<tr>
<td>2</td>
<td><strong>ECOSYSTEMS AND SAMPLING</strong></td>
<td>Choose from:</td>
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<tr>
<td></td>
<td><strong>Grassland and rocky shore study</strong></td>
<td>Core Practical 11 - Investigate the presence of different pigments using chromatography</td>
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<td></td>
<td>Working in the contrasting ecosystems of grassland and rocky shore, students will use a variety of techniques to assess abundance and distribution of organisms. Data collected will include percentage cover, frequency and evidence of phenotypic plasticity in chosen species e.g. surface area or thickness etc. The data collected can be analysed using statistical tests including Student’s t-test and Spearman’s Rank correlation coefficient.</td>
<td>Core Practical 2 – Use of a light microscope, including simple stage and eyepiece micrometers and drawing small numbers of cells from a specialised tissue</td>
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<td></td>
<td><strong>1. Investigation into the ground cover plants in mown and grazed areas</strong></td>
<td>Core Practical 3 – Make temporary squash preparation of a root tip to show stage of mitosis in the meristem under the light microscope</td>
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<td></td>
<td><strong>2. Investigation into zonation on the rocky shore</strong></td>
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<td></td>
<td><strong>Core Practical 15 – Investigate the effect of different sampling methods on estimates of the size of a population</strong></td>
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<td></td>
<td>Field site(s): Nettlecombe Estate (no transport req.), Helwell Bay (15 min drive)</td>
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<tr>
<td>3</td>
<td><strong>CHANGES IN ECOSYSTEMS: SUCCESSION</strong></td>
<td>Choose from:</td>
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<td></td>
<td>Students will see firsthand how succession progresses, gathering abiotic and biotic data to determine distribution and abundance of plants in a sand dune or moorland ecosystem.</td>
<td>Global warming</td>
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<td></td>
<td><strong>Psammoseral succession</strong></td>
<td>Advanced field surveying</td>
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<tr>
<td></td>
<td>Introduction to succession theory, identification and adaptations of key species, nutrient cycling, management and conflicts</td>
<td>Psammoseral succession follow up: Data presentation and analysis</td>
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</tbody>
</table>
### Investigation into the effect of psammoseral succession on the distribution and abundance of vegetation
Data collected to include % Frequency and abiotic measurements. Conducting transects from pioneer community to climax community. Adaptations of plants including xerophytic adaptations investigated. Simpson’s Diversity Index and Spearman’s Rank correlation coefficient can be applied to the data for further analysis.

Field site(s): Braunton Burrows UNESCO Biosphere Reserve (1.5 hrs drive)

OR

### Management of deflected succession
Introduction to succession theory, identification and adaptations of key species, nutrient cycling, management and conflicts

### Investigation into the management of deflected succession in a moorland ecosystem
Data collected to include percentage frequency and abiotic measurements. Burn plots of varying ages are surveyed. Conservation and management techniques will be discussed.

Field site(s): Quantock Hills, AONB (30 min drive)

### ENERGY TRANSFER THROUGH ECOSYSTEMS

#### Freshwater study
Students collect their own primary data in a freshwater ecosystem to construct pyramids of number, biomass and energy. Students will consider the efficiency of energy transfer and compare their data with secondary data from other ecosystems. There is also the opportunity for students to create light and dark bottles and calculate rate of photosynthesis and productivity. Students will also have an opportunity to create their own investigation into animal behavior and analyse this using chi-squared.

Field site(s): Meanders (no transport req.) or Embercombe, Exmoor NP (40 min drive)

### Course ends at 1230

#### Core practical 16 – Investigate the effect of one abiotic factor on the distribution or morphology of one species (fieldwork):
Students carry out the practical: Investigate the effect of one abiotic factor on the distribution or morphology of one species. A research and presentation exercise in order to gain full practical endorsement (CPAC) accreditation.

Field site(s): Nettlecombe Estate (no transport req.)
Evening Session Options

### Classification and natural selection
Students will conduct a BioBlitz in the Centre grounds to identify and collect representatives from a variety of taxonomic groups. They will consider the biological classification of species and discuss alternative models of classification before creating their own version of a taxonomic tree, using their samples. Winter time classroom based alternative available.

### Core Practical 11 - Investigate the presence of different pigments using chromatography
Using leaves from sun dependent and shade tolerant leaves to understand chromatography

### Advanced Field Surveying
This is a great opportunity for students to experience an additional practical technique outside the scope of the standard course. You can choose from estimating population size using the Lincoln index, moth trapping and identification, small mammal sampling and bat detecting.

### Global warming
By using online and offline research techniques, discussion and presentations students will explore how humans can affect ecosystems. They will have access to big data sets, research materials and ideas relating to conservation and natural resources. They will select an area of interest and report back.

### Core Practical 2 – Use of a light microscope, including simple stage and eyepiece micrometers and drawing small numbers of cells from a specialised tissue
Students will work with the organisms that they have been studying in the afternoon, to ensure that they are confident in handling microscopes at high and low power, including the use of a graticule. They will have the opportunity to produce scientific drawings from their observations and annotate these.

### Psammoseral succession follow up: Data presentation and analysis
Draw kite diagrams to show distribution and abundance of sand dune vegetation. Worked example of statistics using Spearman’s rank correlation coefficient. Discussion of findings.

### Core Practical 3 – Make temporary squash preparation of a root tip to show stage of mitosis in the meristem under the light microscope
Students will use onion or broad bean lateral roots, which have been grown for them. They will remove the root tips and squash these with a stain onto a microscope slide, so that they can observe the stages of mitosis.

### Core practical 16 – Investigate the effect of one abiotic factor on the distribution or morphology of one species (planning):
Students plan a mini investigation in which they complete Core practical 16. This can be used to demonstrate practical competency (CPAC). They will decide on methods, variables and controls etc and discuss this with course tutor.

**The following will be integrated within the course unless a workshop style session is preferred.**

### Exam Skills Workshop
We recognise that students often struggle with exam questions on ecological topics. This is partly because they find it difficult to simply restate the facts they have learnt in class. Often students do not successfully transfer their knowledge of one habitat (e.g. woodland) to a question set in a different habitat. Therefore they do not score highly even though they actually understand ecology well. This workshop will help students to identify the key ecological principles and successfully apply them to questions set in a variety of different contexts.

### Data Analysis and Maths Workshop
Maths skills now make up 10% of the total marks in Biology A-level exams. The standard sessions in the programme will include up to three statistical tests (Spearman’s rank, student’s t-test and chi-squared), standard deviation and some other graphical and mathematical analysis. This session is an opportunity for students to spend more time getting to grips with the basics, using real data sets to practise the techniques they find difficult. The focus can be on one of the following three areas:
a) **Statistics.** Why is statistics important for biologists? How do you choose the right statistical test and design an investigation so that you can collect data, which can be analysed successfully? How do you interpret the results of the statistical test and link this to the hypothesis being tested?

b) **Data handling.** In ecological investigations students can collect a large amount of data. It is important that they feel confident in identifying trends and patterns and in applying graphical and mathematical treatment to this data (e.g. mean, median, mode, standard deviation). Students will have the opportunity to practise handling real data sets relating to the habitats they are studying during the course. This will help them answer exam questions which include data handling.

c) **Mixture of statistics and data handling.** Most suitable for more confident students who are able to work independently or in small groups. This will give practice in a number of skills. You can select in advance the areas you want to focus on.

### Alternative Day/Half-Day Options

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<tr>
<th>Day</th>
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<tbody>
<tr>
<td><strong>ECOSYSTEMS AND SAMPLING</strong></td>
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<tr>
<td><strong>Rocky shore study</strong></td>
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<tr>
<td>Working in a marine environment, students will use a variety of techniques to assess abundance and distribution of organisms. Data collected will include percentage cover, frequency and evidence of habitat preference in chosen species. The data collected can be analysed using statistical tests including <strong>Student’s t-test</strong>.</td>
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<tr>
<td>1. <strong>Investigation into gastropod habitat preference on a rocky shore</strong></td>
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<td>2. <strong>Investigation into topshell age, length and growth rates on a rocky shore</strong></td>
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<tr>
<td>Core Practical 15 – Investigate the effect of different sampling methods on estimates of the size of a population</td>
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<td>Field site(s): Porlock Bay (40 min drive)</td>
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<tr>
<td><strong>ECOSYSTEMS AND SAMPLING</strong></td>
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<tr>
<td><strong>Grassland study</strong></td>
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<tr>
<td>Using a variety of terrestrial environments around the Nettlecombe Estate, students will use a selection of techniques to assess abundance and distribution of organisms. Data collected will include percentage cover, frequency and evidence of phenotypic plasticity in chosen species e.g. surface area or thickness etc. The data collected can be analysed using statistical tests including <strong>Student’s t-test</strong> and <strong>Spearman’s Rank correlation coefficient</strong>.</td>
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<tr>
<td>1. <strong>Investigation into biodiversity of ground flora in mown and grazed areas</strong></td>
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<td>2. <strong>Investigation into how environmental factors affect plant distribution up a slope</strong></td>
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<tr>
<td>Core Practical 15 – Investigate the effect of different sampling methods on estimates of the size of a population</td>
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<td>Field site(s): Nettlecombe Estate (no transport req.)</td>
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<tr>
<td><strong>TREES AND PLANTS (half day)</strong></td>
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<td>Students will review the concepts of translocation and transpiration and go on to consider how the availability of water acts as an important factor influencing the distribution of plants. Wider issues such as the consequences of climate change, affecting the distribution of plant species will also be discussed. Students will carry out <strong>Core Practical 8</strong>: Investigate factors affecting water uptake by plant shoots using a potometer.</td>
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<td>Field site(s): Nettlecombe Estate (no transport req.)</td>
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### Added value options

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<th>Added value options</th>
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| **Conservation Walk - Dunkery Beacon loop (half day) and Hurlstone Point (whole day)**  
Students will visit Exmoor’s highest point, Dunkery Beacon, and experience the wilds of the moors. 75% of moorland that exists globally is in the UK, which makes a great starting point for discussions surrounding conservation, habitat management and traditional rural practices, such as hedge laying and hunting. For a full day experience the stunning Exmoor coastline is a short drive away. Students can walk a portion of the South West Coast Path, the longest national trail in England, and experience the beautiful views from Hurlstone Point. A walk along the beach (time and tide dependent) reveals the breach in the shingle ridge of Porlock Bay and the resulting saltmarsh behind, a relatively new and nationally scarce ecosystem that has formed at the expense of farmland. |
| **Management and Conservation (half day)**  
Students will have the opportunity to visit the local woodland to consider how conservation of habitats is balanced with human needs. Conservation agreements and factors will be discussed and students will see evidence of management practices. |
| **Lundy Island (whole day, available from end of March to mid October)**  
Students will visit the unique and highly protected Lundy Island, a Marine Conservation Zone and Site of Special Scientific Interest, with nationally important populations of seabirds and plants. They will walk around the island exploring the conservation management issues affecting the seabirds, marine life and terrestrial habitats. Sailing from Ilfracombe to the Island takes less than 2 hours aboard a ship that has heated undercover areas, a buffet, shop and information centre. There is also a chance of spotting dolphins from the deck! An additional fee of approx. £30 per student will be charged for this trip to cover boat and landing fees, please enquire for more details. |
# Specification links, Core Practicals, Assessment Skills & Mathematics

## Links to:
- **Topic 3:** Classification and Biodiversity
- **Topic 10:** Ecosystems

## Apparatus & Technique Skills:
- **AT1:** Use appropriate apparatus to record a range of quantitative measurements
- **AT8:** Safely and ethically use organisms to measure plant or animal responses
- **AT11:** Use sampling techniques in fieldwork
- **AT12:** Use ICT such as computer modelling, or data logger to collect data, or use software to process data

## Maths Skills:
- **M0.4** Estimate results
- **M1.1** Use an appropriate number of significant figures
- **M1.2** Find arithmetic means
- **M1.3:** Construct and interpret frequency tables and diagrams and bar charts
- **M1.4:** Understand simple probability
- **M1.5** Understand the principles of sampling as applied to scientific data
- **M1.6:** Understand the terms mean, median and mode
- **M1.7:** Use a scatter diagram to identify a correlation between two variables
- **M1.9:** Select and use a statistical test
- **M1.10** Understand measures of dispersion (standard deviation)
- **M1.11** Identify uncertainties in measurements
- **MS2.3:** Substitute numerical values into algebraic equations using appropriate units for physical quantities
- **MS3.2:** Plot two variables from experimental or other data
**What is included in the fee?**

- Up to 10 hours of tuition a day
- Expert tuition, from fully trained staff
- Full board accommodation. Catering includes cooked breakfast, packed lunch, homemade cakes and evening meal.
- Use of facilities including workrooms, recreational space, ICT and centre grounds
- Waterproofs and welly hire
- Established health and safety procedures and 24 hour emergency cover
- Access to specialist equipment and resources
- Support before and following the course

*Tuition* is delivered by talented teachers, with not only an expert knowledge of their subject and field work locations, but a passion for the subject being taught. Our education team are fully DBS checked, and undergo a regular and rigorous training process. All tutors have received training in first aid, risk assessment and water safety.

*Course options* listed in this booklet can be selected to put together a programme designed to meet the requirements of your specification. However, if you need something that is not catered for in the field work investigations, please contact us to discuss possible alternatives.

**External Recognition of Quality**

Nettlecombe Court has been awarded the Quality Badge by The Council for Learning Outside the Classroom. The badge is awarded to organisations that have demonstrated that they consistently deliver high quality teaching and learning experiences and manage risk effectively.

This means that you will have to complete less paperwork when visiting our centre

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*Email us at: enquiries.nc@field-studies-council.org*