2023 / 24

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Ollscoil Teicneolaíochta an Oirdheiscirt

South East Technological University

Department *of* Land Sciences

Bachelor of Science *in* Horticulture (Waterford-Kildalton)

Programme Handbook 2023 /24

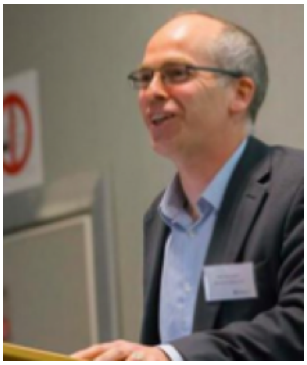
WD_SHORT_D

Award:	Bachelor of Science
Specialisation:	Horticulture (Waterford-Kildalton)
Level:	7
Number of stages:	3
Programme Leader:	Dr Cara Daly

The School of Science and Computing at South East Technical University (Waterford Campus) is delighted to present you the following Programme Handbook. The School is committed to adopting a student centred approach in all of its activities and fundamental to this commitment is to provide all students, both future and existing with the most up to date information on their programme of study. The programme handbook is an important resource for all students in the School as well as our external stakeholders and international partners. Information on key aspects of all programmes, including entry requirements, career opportunities, learning outcomes, and programme content is summarised in the handbook. The structure of the programme across all years of study and detail on the content of each module is also outlined. The information contained in this handbook is updated on an annual basis to ensure that all students are given the tools to make informed decisions about their programme of study.

On behalf of all of the staff in the School of Science and Computing I would like to wish all of you well in your studies.

Prof. Peter McLoughlin,
Head of School of Science and Computing,
South East Technical University (Waterford Campus)



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Contents

The information contained in this handbook is correct at the time of print, but may be subject to change during the course of the academic year.

1 Programme Aim

Programme Aim

The aim of the BSc in Horticulture (Waterford-Kildalton) is to deliver technically skilled and knowledgeable graduates who could enter the work force at skilled technician or lower management levels in the industry.

2 Programme Learning Outcomes (PLO)

On successful completion of this programme, all graduates will have achieved the Programme Learning Outcomes that are set out in Table 2.1. The Programme Learning Outcomes have been devised by the programme team in accordance with the QQI Computing Standards.

Table 2.1: Program level outcomes (PLO) for BSc in Horticulture (Waterford-Kildalton).

On successful completion of the programme the learner should be able to:	
PLO 1	Demonstrate an in depth knowledge of modern horticultural practices and selected business and financial tasks involved in managing a horticultural operation or business.
PLO 2	Demonstrate specialist horticultural knowledge in the theories, concepts and principles relevant to the graduate's chosen specialism and the relevant legal, quality and regulatory frameworks governing that activity.
PLO 3	Operate a wide range of equipment and perform basic and specialist horticultural skills relevant to the graduate's chosen area. Record, analyse and interpret data from both physical activities and business operations, and be able to source additional information when required.
PLO 4	Organise their work efficiently and when problems are encountered in the workplace, select and implement solutions, and where appropriate seek specialist advice.
PLO 5	Make scientifically sound, ethical and responsible decisions in a range of work contexts at skilled technician and lower management levels and carry out any operations with due regard to the Health, Safety and Welfare of all affected parties and the environment.
PLO 6	Work efficiently as an individual and as part of a team to deliver and communicate work outputs and to take on a leadership, supervisory or subordinate role as required for successful completion of the work or learning objective.
PLO 7	Proactively acquire and critically appraise scientific knowledge and research and commit to continuously acquiring knowledge and skills to ensure they remain aware of regulatory and societal changes which impact the horticultural industry.
PLO 8	Confidently discuss relevant horticultural issues in a social, cultural and economic context, promote the scientific method, and ethical horticultural practices.

3 Entry Requirements

School leavers enter year 1 via the CAO (www.cao.ie) using code WD096. The Leaving Certificate requirements for entry are

- 5 subjects: O6 or higher
- English/Irish: O6/H7 or higher
- Mathematics: O6/H7 or higher

Furthermore,

- Students with Level 5 and 6 with merit or distinction in the new Common award in Horticulture and who successfully complete bridging studies, can apply to transfer into Year 2.

- Students who have completed the old National Diploma or Certificate in Horticulture under the aegis of the Department of Agriculture, ACOT or Teagasc can apply to transfer into Year 3.

If you are a mature student (23+), Leaving Certificate points are not required for entry as each applicant is evaluated individually.

4 Overview of Programme

4.1 What is Horticulture?

Horticulture is a diverse industry and career opportunities are wide-ranging from producing plants for garden centres, working on golf courses, or landscaping, right through to fruit and vegetable production and craft gardening. Horticulture plays a central role in creating, maintaining, and enhancing the landscapes we live in. Pretty, pollinator-friendly floral displays are the backdrop in our thriving tourist towns. The pristine golf courses and pitches we compete on, and the beautiful parks, gardens, and urban landscapes we relax in would not be possible without the skills and knowledge of Ireland's trained horticulturists. Equally, a year-round sustainable supply of fruit, vegetables and flowers is only achieved because horticulture scientists and producers make it so. There's a role for our horticultural graduates along every step of the way.

4.2 What is the BSc in Horticulture (Waterford-Kildalton)?

The BSc in Horticulture (Waterford-Kildalton) is a full-time, 3-year course designed to train professional horticulturists. Our students study STEM-rich horticulture modules, undertake work placement, gain business acumen, and graduate from the course having specialised in two major streams of horticulture study. As well as horticultural knowledge, graduates of the course are deemed to have achieved the equivalent of the Green Cert for Stamp Duty exemption for land transfer for young farmers. 'Green Cert' status is incredibly useful when our students realise the potential returns when they have access to a few acres, and the key horticultural and business knowledge required to capitalise on that smallholding. In addition, graduates of the course are eligible to apply for Professional User/Sprayer Operators' Certification (with the DAFM) which is a necessity for use of plant protection products.

We train our horticultural students to ensure they are technically skilled, innovative, and understand the science behind their activities. The importance of maintaining and enhancing biodiversity, gaining transferable skills, all while fostering students' own innate talents and interests, are themes that weave their way through our entire programme. As well as horticultural knowledge, we place great importance on experiencing the industry and making contacts; students learn about their industry throughout the whole three years by taking frequent field trips to the best performing horticulture businesses. We recognise that horticulture students especially enjoy the hands-on work involved in horticulture therefore we ensure that classroom and lab work is balanced with plenty of practical work to practise the skills learned during the course.

This SETU programme is run in conjunction with our colleagues in Teagasc, and students are mostly based in Teagasc's Kildalton College in Piltown, County Kilkenny where you can learn from highly skilled and knowledgeable Horticulturists. Students take science and business modules on SETU's main campus on the Cork Road on the outskirts of Waterford City. SETU provide a free shuttle bus to transport students to and from Waterford City to Kildalton College each day.

4.3 Unique Features of the BSc in Horticulture (Waterford-Kildalton) — Work Placement

One of the unique features of the SETU BSc in Horticulture is that semester 2 of year 2 is spent on a paid work placement with a registered employer in Ireland, or abroad. This 15-week work placement is an opportunity for you to practise the key horticultural skills learned in college and to also work as part of a team in a busy horticultural business. We ensure all our placements are student-focused; we endeavour to place students in thriving and busy work placements where they will grow in confidence, and develop a wide skills base to enhance their employment prospects upon graduation. Teagasc has links with Ohio State Horticulture Internship Programme, and every year some of SETU's horticulture students travel abroad on work placements in the UK, Europe and the USA. Work placement starts in January and lasts for 15 weeks however many students who complete their work placements abroad are employed beyond the 15-week minimum period therefore spend the summer working with their hosts and usually earn the standard industry wage for that position. In recent years, Summerhill Landscapes in New York has been one such employer who kindly sponsored our students to extend their working visas in the USA. In practical terms, this means that year 2 students are in college from September to December, but spent the following January to late August with their work placement hosts.

4.4 What Will I Study During the Course?

Many horticulturists are managers or self-employed therefore need business acumen as well as horticultural skills; we have designed the course with this in mind.

Year 1 introduces you to the diverse world of horticulture where the focus is on learning core horticultural skills and the science which underpins them. Our students are provided with training in plant cultivation and knowledge and they learn about the influence of the many environmental conditions required to grow plants. You will learn how to germinate and grow seedlings, take cuttings and propagate them, and also learn a range of horticultural skills such as pruning, training and planting of trees, shrubs, perennials, bulbs, and bedding plants. Study of soil science ensures a good understanding of the role and importance of growing substrates, and you will also learn about plant pests, diseases, and weeds. In addition, you will receive instruction and get plenty of practise time on many types of horticulture machinery and tools. Learning how to work safely with this machinery, troubleshoot, and carry out preventative maintenance are important work skills. Importantly, you also will learn about laws regulating the use of chemicals in the environment including how to calibrate knapsack equipment, apply sprays correctly, and how to handle, store and dispose of plant protection products to ensure that the environment and operators are protected.

In year 2, along with a semester-long work placement, you will specialise in a specific area of horticulture by selecting one major elective from the following list: Landscape Design, Nursery Stock Production, Sustainable Food Production, Sportsturf Science, and Lab Skills for Plant Micropropagation. You will also learn how to maintain and enhance biodiversity in horticultural settings, and further the plant knowledge gained in year 1 to a stage where you can confidently select the right plant, for the right place.

In Year 3 you will research a horticulture subject of personal interest using our extensive research facilities and expertise, while our horticulture-themed business modules ensure you have the entrepreneurial knowledge to further enhance your employment prospects. You can revisit the major module list from year 2 and choose an additional major stream of study. In the final semester, you complete your research project and an Arboriculture module will teach you to care for amenity trees. In the last semester, you can choose two minor electives from a comprehensive list which includes: Garden Centre Operation and Management, Greenkeeping, Fruit Production, Social and Therapeutic Horticulture, Computer Aided Design, Floristry, and Beekeeping and Pollination Studies.

4.5 What Jobs are Available to Horticulture Graduates?

The Horticulture industry is diverse and vibrant and demands a constant supply of trained, skilled, and knowledgeable Horticulturists. In a 2016 survey of our graduates of the previous 5 years, 88% of respondents secured full-time employment within 3 months of finishing the BSc in Horticulture. Having graduated with more than two major streams of study, many of our graduates have multi-stream businesses. For instance, some of our graduate entrepreneurs run businesses which have a nursery and garden centre on site, while they also provide landscape design and floristry services providing income streams in all seasons, and true variety in their working life.

The following are just a few positions in which our graduates are currently employed:

- Greenkeeper — maintaining and building golf courses, sports fields, and stadia.
- Nursery Stock Producer — producing trees, bedding plants, shrubs, and perennials for the horticulture industry.
- Craft Gardener in public parks, private or heritage gardens.
- Self-Employed Landscape Building Contractor.
- Independent Landscape Designer.
- Garden Maintenance Contractor.
- Food Producers (from small holders producing high value speciality crops to graduates who manage multi-acre glasshouse complexes producing fruit and vegetables for national and international supermarket chains).
- Garden Centre Owner / Manager.
- Florist / Interior Landscaper.
- Horticulture Teacher / Lecturer.
- Horticulture Therapist.
- Mushroom Growers.

- Horticulture Writers and Journalists.
- Horticulture/Plant Science Researcher working on problems in plant science, pathology, or plant/insect interactions.
- Tree Surgeon (after additional training).
- Vegetable Farmer.
- Kitchen Garden Gardener.
- Horticulture Technician.
- Plant Hunter.

Programme Schedule

Stage 1

WD_SHORT_D / Semester 1					Contact Hours					Assessment (%)		
Module Title		Level	Status	Credits	Lect	Prac	Tut	Other	Total	CA	Proj	Final Exam
A06902 COMP-0578	Communication Skills and Computer Applications	Intro	M	5		48			48	100		
A08383 HORT-0035	Horticulture Skills 1	Intro	M	5		48			48	100		
A08741 BIOL-0007	Plant Biology	Intro	M	5	24	24			48	50		50
A08322 HORT-0036	Plant Knowledge 1	Intro	M	5	24	24			48	50		50
A08221 HORT-0002	Plant Protection	Intro	M	5	24	24			48	50		50
A08581 HORT-0037	Soil and Growing Media	Intro	M	5	30	18			48	50		50

1) In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the following module(s). In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

- Plant Biology
- Plant Knowledge 1
- Plant Protection
- Soil and Growing Media

WD_SHORT_D / Semester 2					Contact Hours					Assessment (%)		
	Module Title	Level	Status	Credits	Lect	Prac	Tut	Other	Total	CA	Proj	Final Exam
A10631 CHEM-0005	Chemistry for Land Scientists	Intro	M	5	24	18	6		48	50		50
A11367 CONS-0015	Horticulture Building Construction	Intro	M	5	24	24			48	50		50
A31902 MECH-0038	Horticulture Mechanisation and Safety	Intro	M	5	24	24			48	60		40
A08401 HORT-0039	Horticulture Skills 2	Intro	M	5		48			48	100		
A09802 HORT-0038	Plant Knowledge 2	Intro	M	5	24	24			48	50		50
A09835 HORT-0004	Plant Propagation	Intro	M	5	24	24			48	50		50

1) In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the following module(s). In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

- Chemistry for Land Scientists
- Horticulture Building Construction
- Horticulture Mechanisation and Safety
- Plant Knowledge 2
- Plant Propagation

Stage 2

WD_SHORT_D / Semester 3					Contact Hours					Assessment (%)		
Module Title		Level	Status	Credits	Lect	Prac	Tut	Other	Total	CA	Proj	Final Exam
A08344 HORT-0030	Biodiversity and Horticulture	Inter	M	5	36	12			48	50		50
A07702 HORT-0040	Garden Management and Plant Selection	Inter	M	10	48	48			96	50		50
A34001 BUSS-0063	Managing your Business	Inter	M	5	48				48			100
A01001 HORT-0041	Lab Skills for Plant Micropropagation	Inter	E	10	36	36	24		96	100		
A09821 DESG-0066	Landscape Design	Inter	E	10	24		72		96	50		50
A08541 HORT-0023	Nursery Stock Production	Inter	E	10	48	36		12	96	50		50
A08603 SPOR-0092	Sportsturf Science	Inter	E	10	72	24			96	50		50
A11485 FOOD-0023	Sustainable Food Production	Inter	E	10	48	48			96	50		50

1) Students must select 1 of the 10 credit electives, Lab Skills for Plant Micropropagation is only offered in the Waterford location. All electives are offered subject to adequate class size and resource availability

2) In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the following module(s). In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

- Biodiversity and Horticulture
- Garden Management and Plant Selection
- Landscape Design
- Nursery Stock Production
- Sportsturf Science
- Sustainable Food Production

3) In addition to the normal regulations, a minimum of 35% must be achieved in both the theory and practical components of the following module(s). In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

- Lab Skills for Plant Micropropagation

WD_SHORT_D / Semester 4					Contact Hours					Assessment (%)		
	Module Title	Level	Status	Credits	Lect	Prac	Tut	Other	Total	CA	Proj	Final Exam
A10631 CHEM-0005	Chemistry for Land Scientists	Intro	E	5	24	18	6		48	50		50
A11367 CONS-0015	Horticulture Building Construction	Intro	E	5	24	24			48	50		50
A31902 MECH-0038	Horticulture Mechanisation and Safety	Intro	E	5	24	24			48	60		40
A08401 HORT-0039	Horticulture Skills 2	Intro	E	5		48			48	100		
A11526 PLAC-0150	Placement (Horticulture)	Inter	E	30					0	100		
A08741 BIOL-0007	Plant Biology	Intro	E	5	24	24			48	50		50
A09802 HORT-0038	Plant Knowledge 2	Intro	E	5	24	24			48	50		50
A09835 HORT-0004	Plant Propagation	Intro	E	5	24	24			48	50		50
A32621 SCIE-0085	Science Professional Development	Inter	E	30					0	100		

1) Students who entered the course into Year 1 through the CAO route will be required to complete the Placement module in Semester 4. Students who entered Year 2 of the course through the advanced entry route and who have already undertaken Placement as part of their previously completed qualification, will be required to complete the other 6 modules in Semester 4.

2) In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the following module(s). In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

- Chemistry for Land Scientists
- Horticulture Building Construction
- Horticulture Mechanisation and Safety
- Plant Biology
- Plant Knowledge 2
- Plant Propagation

Stage 3

WD_SHORT_D / Semester 5					Contact Hours					Assessment (%)		
Module	Module Title	Level	Status	Credits	Lect	Prac	Tut	Other	Total	CA	Proj	Final Exam
A33881 FINA-0112	Financial Analysis for Your Business	Inter	M	5	48				48	100		
A31921 HORT-0042	Horticulture Sales and Marketing	Inter	M	5	48				48	100		
A08041 SCIE-0061	Introduction to Scientific Writing and Data Analysis	Inter	M	5			24		24	100		
A07802 MGTS-0023	People Management	Inter	M	5	36				36			100
A01001 HORT-0041	Lab Skills for Plant Micropropagation	Inter	E	10	36	36	24		96	100		
A09821 DESG-0066	Landscape Design	Inter	E	10	24		72		96	50		50
A08541 HORT-0023	Nursery Stock Production	Inter	E	10	48	36		12	96	50		50
A08603 SPOR-0092	Sportsturf Science	Inter	E	10	72	24			96	50		50
A11485 FOOD-0023	Sustainable Food Production	Inter	E	10	48	48			96	50		50

1) Students must select 1 of the 10 credit electives. They must select a different elective to the one they selected in year 2. Lab Skills for Plant Micropropagation is currently only offered in the Waterford location. All electives are offered subject to adequate class size and resource availability.

2) In addition to the normal regulations, a minimum of 35% must be achieved in both the theory and practical components of the following module(s). In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

- Lab Skills for Plant Micropropagation

3) In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the following module(s). In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

- Landscape Design
- Nursery Stock Production
- Sportsturf Science
- Sustainable Food Production

WD_SHORT_D / Semester 6					Contact Hours					Assessment (%)		
	Module Title	Level	Status	Credits	Lect	Prac	Tut	Other	Total	CA	Proj	Final Exam
A08421 HORT-0043	Arboriculture	Inter	M	5	36			12	48	30		70
A14579 HORT-0044	Horticulture Project and Seminar	Inter	M	5	12			12	24	100		
A08361 HORT-0017	Law for Horticulturists	Inter	M	5	36		12		48	100		
A09830 HORT-0045	Tax for Horticulture	Inter	M	5	48				48	100		
A14405 HORT-0046	Beekeeping and Pollination Studies	Inter	E	5	36	12			48	50		50
A09850 CADD-0002	Computer Aided Design	Inter	E	5		48			48	100		
A11494 HORT-0028	Field Crop Production	Inter	E	5	24	24			48	50		50
A06688 HORT-0018	Garden Centre Operations	Inter	E	5	24	12		12	48	50		50
A08582 HORT-0019	Greenkeeping	Inter	E	5	36	12			48	50		50
A08347 HORT-0047	Interior Landscaping and Floristry	Inter	E	5	24	24			48	100		
A09823 DESG-0012	Landscape Design Advanced	Inter	E	5			48		48	100		
A01002 HORT-0034	Plants and Society	Inter	E	5	24			24	48	100		
A08621 HORT-0048	Protected Crop Production	Inter	E	5	36	12			48	50		50
A09746 HORT-0049	Social and Therapeutic Horticulture	Inter	E	5	24	12		12	48	30		70

1) Pre-requisite for Field Crop Production: Sustainable Food Production

2) Pre-requisite for Greenkeeping: Sportsturf science

3) Pre-requisite for Landscape Design Advanced: Landscape Design

4) In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the following module(s). In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

- Arboriculture
- Beekeeping and Pollination Studies
- Field Crop Production
- Garden Centre Operations
- Greenkeeping
- Protected Crop Production
- Social and Therapeutic Horticulture

Module Descriptors

The modules on the BSc in Horticulture (Waterford-Kildalton) are organised into the following clusters.

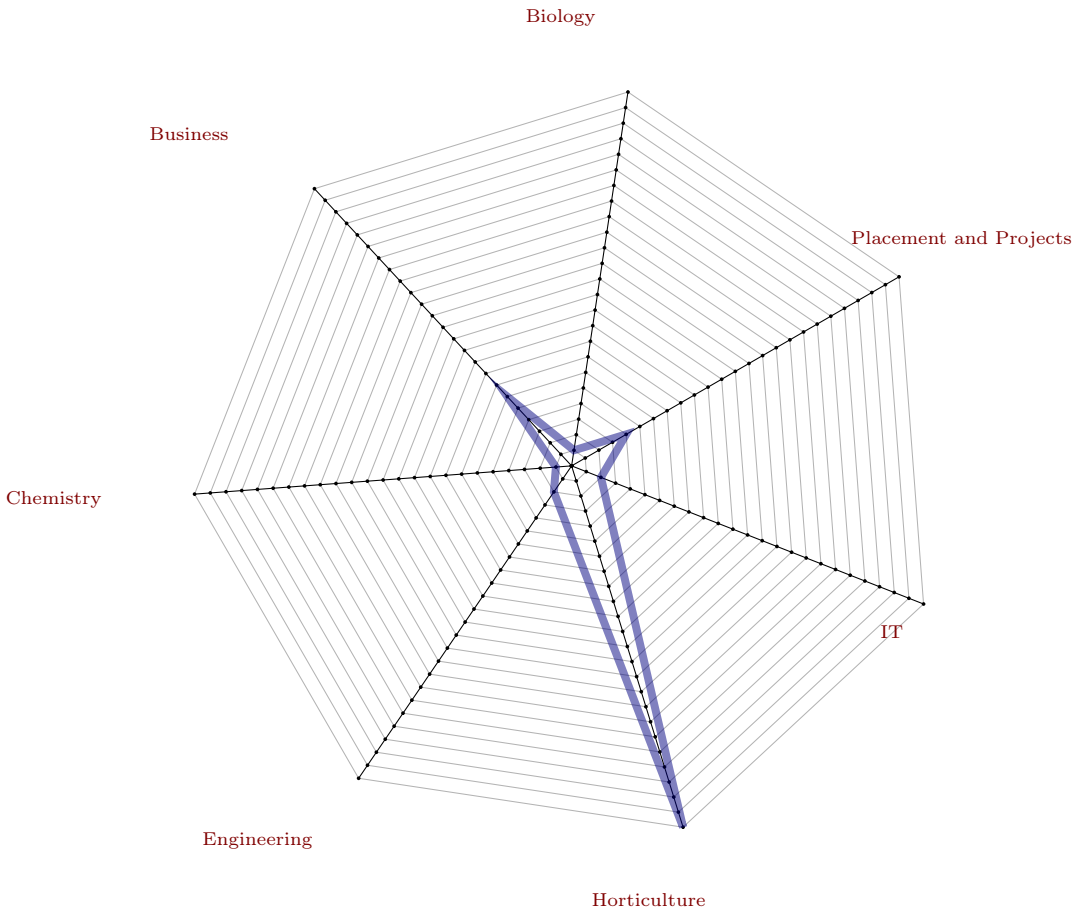
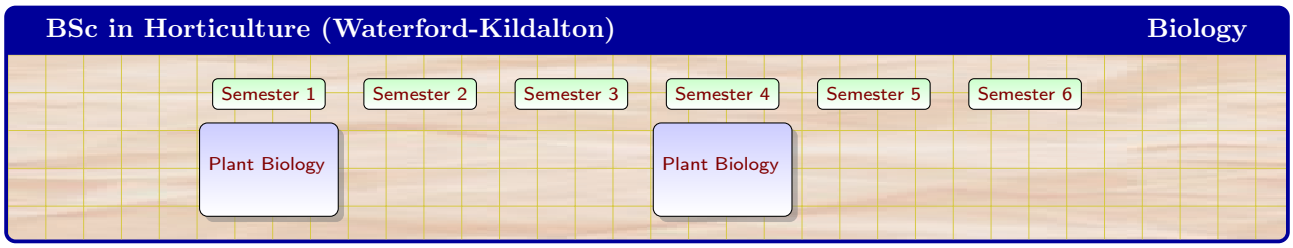


Figure 6.1: Modules organised by cluster.

Biology



Plant Biology (A08741)

Short Title: Plant Biology
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

This module is designed to equip students with a basic knowledge of plant growth and physiology, including the structure and function of various parts of the plant. Students will also learn about the main living processes in the plant, and the responses of plants to environmental conditions. The module also deals with the basics of plant inheritance and biotechnology. The student will learn to operate safely in a laboratory, and perform basic laboratory experiments with plants.

Programmes

		stage/semester/status
BIOL-0007	BSc (Hons) in Physics for Modern Technology (WD_KPHTE_B)	1 / 2 / E
BIOL-0007	BSc (Hons) in Agricultural Science (WD_SAGRI_B)	1 / 2 / M
BIOL-0007	BSc in Agricultural Science (WD_SAGRI_D)	1 / 2 / M
BIOL-0007	BSc in Agriculture (WD_SAGUL_D)	1 / 1 / M
BIOL-0007	BSc in Agriculture (WD_SAGUL_D)	2 / 4 / E
BIOL-0007	BSc in Food Science with Business (WD_SFDSC_D)	1 / 2 / M
BIOL-0007	BSc in Forestry (WD_SFORS_D)	1 / 1 / M
BIOL-0007	BSc (Hons) in Food Science and Innovation (WD_SFSIN_B)	1 / 2 / E
BIOL-0007	BSc in Horticulture (WD_SHORT_D)	1 / 1 / M
BIOL-0007	BSc in Horticulture (Waterford-Kildalton) (WD_SHORT_D)	2 / 4 / E
BIOL-0007	BSc in Horticulture (WD_SHORT_DX)	1 / 1 / M
BIOL-0007	BSc in Horticulture (Botanic Gardens) (WD_SHORT_DX)	2 / 4 / E
BIOL-0007	BSc (Hons) in Molecular Biology with Biopharmaceutical Science (WD_SMBIO_B)	1 / 2 / E
BIOL-0007	BSc in Molecular Biology with Biopharmaceutical Science (WD_SMBIO_D)	1 / 2 / E
BIOL-0007	BSc (Hons) in Pharmaceutical Science (WD_SPHSC_B)	1 / 2 / E
BIOL-0007	BSc (Hons) in Science (Common Entry) (WD_SSCCM_B)	1 / 2 / E
BIOL-0007	BSc (Common Entry) (WD_SSCIE_D)	1 / 2 / E

Indicative Content

- Plant cell structure and function
- Plant evolution, classification and taxonomy
- Plant reproduction, genes and cell division
- Plant physiology: from embryo to establishment including anatomy of seeds, stems, roots, leaves and flowers; function of specialised stems, roots and leaves. Function of mycorrhizae on roots; secondary growth in wood; transport within plants
- Biochemical processes of plants: photosynthesis and respiration
- Plant growth and development as a function of plant growth regulators, light, water and nutrient availability
- The carbon cycle and plants' role in mitigating climate change

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Illustrate the structure and function of plant cells and plant organelles.
2. Summarise the structure, function and anatomical variability of plants.
3. Describe the major biochemical processes in plants
4. Identify wild plants using their Latin names.
5. Operate safely in a laboratory and perform basic laboratory experiments with plants.

Learning and Teaching Methods

- Lectures.
- Laboratory practicals.
- Online tutorials.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,2,3
Continuous Assessment	50%	
Lab Report	40%	1,2,3,4,5
Project	10%	4

Assessment Criteria

<40%: Very little knowledge and understanding of the subject matter. Unable to carry out critical thinking or practical skills.

40%–49%: Demonstrates a limited knowledge of the subject matter. May have some problems with critical thinking and problem solving. Adequate practical skills.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Good practical skills.

60%–69%: Demonstrates skilled and sound knowledge of the subject matter. Shows ability to analyse and logically discuss in an effective way. Good critical thinking and a high level of competence and efficiency in theoretical and practical areas of this subject.

70%–100%: All of the above to an excellent level. Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Lack, A. and D. Evans. *BIOS Instant Notes on Plant Biology.* 2nd ed. Oxford, UK. : Taylor & Francis, 2005.

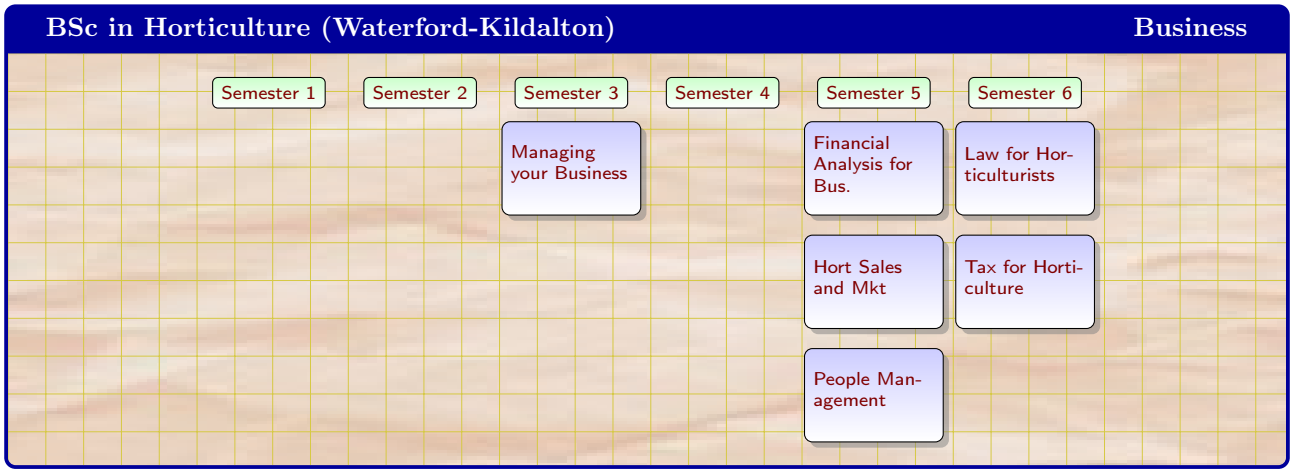
Supplementary Material(s)

- Hudson, M.J. and J.A. Bryant. *Functional Biology of Plants*. 1st ed. Oxford: Wiley-Blackwell, 2011.
- Ingram, D.S., D. Vince-Prue and P. Gregory. *Science and the Garden*. 2nd ed. Oxford: Blackwell Publishing, 2008.

Requested Resources

- Room Type: Biology Lab

Business



Financial Analysis for Your Business (A33881)

Short Title: Financial Analysis for Bus.
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module aims to provide students with a basic knowledge of accounting in the context of establishing the viability of a business (preparing financial statements) and using financial information for planning and control (through financial ratio analysis). Ethical considerations for these areas will also be introduced.

Programmes

		stage/semester/status
FINA-0112	BSc in Horticulture (WD_SHORT_D)	3 / 5 / M
FINA-0112	BSc in Horticulture (WD_SHORT_DX)	3 / 5 / M

Indicative Content

- Statement of Financial Position (Balance Sheet)
- Income Statement (Profit or Loss)
- Analysis of Statement of Cash Flows
- Adjustments to the accounts: Accruals and prepayments, bad debts, fixed assets and depreciation
- Financial ratio analysis (profitability, efficiency, and liquidity)
- Ethical considerations in context: Financial, products, customers and suppliers, staff, and environmental considerations

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Prepare final accounts for a business from a trial balance.
2. Interpret a set of financial statements (final accounts) using financial ratio analysis.
3. Discuss ethical considerations linked to financial reporting, planning, and control.

Learning and Teaching Methods

- Lectures
- Class and group discussions.
- Self study of assigned readings, exercises, and texts.
- Pre-class preparation of readings and exercises for class discussion.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
In-Class Assessment	50%	1,3
Project	50%	2,3

Assessment Criteria

<40%: Very little knowledge and understanding of the subject matter. Unable to carry out critical thinking or practical skills.

40%–49%: Demonstrates a limited knowledge of the subject matter. May have some problems with critical thinking and problem solving. Adequate practical accounting skills.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Good practical accounting skills.

60%–69%: Demonstrates skilled and sound knowledge of the subject matter. Shows ability to analyse and logically organise accounts in an effective way. Good critical thinking and a high level of competence and efficiency in theoretical and practical areas of this subject.

70%–100%: All of the above to an excellent level. Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject.

Essential Material(s)

- Atrill, P. and E. McLaney. *Accounting and Finance for Non-Specialists*. Latest. Harlow, UK: Pearson, 2022.

Supplementary Material(s)

- Dyson, J. and E. Franklin. *Accounting for non-accounting students*. Latest. Harlow, UK: Pearson, 2020.
- Wood, F., A. Sangster and L. Gordon. *Business Accounting*. Latest. Harlow, UK: Pearson, 2021.

Requested Resources

- Room Type: Computer Lab
- Equipment: Blackboard

Horticulture Sales and Marketing (A31921)

Short Title: Hort Sales and Mkt
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

The aim of the module is to introduce the student to the principles and practices of marketing, sales and customer service within the horticulture industry.

Programmes

		stage/semester/status
HORT-0042	BSc in Horticulture (WD_SHORT_D)	3 / 5 / M
HORT-0042	BSc in Horticulture (WD_SHORT_DX)	3 / 5 / M

Indicative Content

- Overview of Marketing Principles and Practices
- Target Marketing, Segmentation and Positioning
- The Four Ps of Marketing, Product, Price, Place and Promotion
- Consumer Buyer Behaviour
- Drivers of Change within Horticulture & Supply Chain Management
- The Selling Process
- Negotiation and Closing the Sale
- Overview of Customer Service and Key Customer Service Behaviours
- Handling Complaints and Difficult Customers
- Designing a Service Blueprint

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Compare the key marketing concepts and practices in business today.
2. Analyse and determine appropriate marketing techniques for successful marketing campaigns.
3. Examine effective selling techniques.
4. Analyse and determine the principles and practices of good customer service management for small businesses.
5. Design a service blueprint for a business and evaluate how it may be measured by staff and customers of the business.

Learning and Teaching Methods

- Lectures
- Case Studies
- Role Plays
- Workshops

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	50%	1,2,3
Assignment	50%	4,5

Assessment Criteria

<40%: Very little knowledge and understanding of the subject matter. Unable to carry out critical thinking or practical skills.

40%–49%: Demonstrates a limited knowledge of the subject matter. May have some problems with critical thinking and problem solving. Adequate practical skills.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Good practical skills.

60%–69%: Demonstrates skilled and sound knowledge of the subject matter. Shows ability to analyse and logically discuss in an effective way. Good critical thinking and a high level of competence and efficiency in theoretical and practical areas of this subject.

70%–100%: All of the above to an excellent level. Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject.

Essential Material(s)

- Rogan, D. *Marketing an introduction for Irish Students.* 4th. Dublin: Gill and Macmillan, 2011.

Law for Horticulturists (A08361)

Short Title: Law for Horticulturists
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

The aims of this module is to give students a knowledge of the laws which frequently impact upon the work of the Horticulturist, to give the Horticulturist an appreciation of the potential legal liabilities which he/she may encounter in the workplace, and the relevant rules and regulations which must be complied with in order to limit their exposure to such liabilities.

Programmes

		stage/semester/status
HORT-0017	BSc in Horticulture (WD_SHORT_D)	3 / 6 / M
HORT-0017	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / M

Indicative Content

- Sources of law - Common Law, Legislation, Judicial Precedent and EU law
- The Structure of the Courts - the Structure and Jurisdiction of the Criminal and Civil Courts including the Jurisdiction of the Small Claims Court process
- Tortious Liability - Negligence, Nuisance, Rylands and Fletcher, Trespass to Land, Occupiers' Liability
- Contract Law - the Formation of the Contract including the tendering process, the Discharge of the Contract and Remedies for Breach of the Contract
- Real and Personal Property Rights, Acquisition and Ownership of Property including Intellectual Property Rights, Property and Boundary Disputes, Easements and Profits a Prendre
- Planning and Environmental Law - Planning Rules and Procedures, Authorised, Unauthorised and Exempted Developments, Environment Regulations impacting on Horticulturalists
- Plants, Hedges and Trees – the law related to the development, cultivation, growth, sale, import and export of plants, hedges and trees

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Debate the impact of current and future Irish and EU sources of law on the day-to-day operation and regulation of the horticulture industry.
2. Show how the court process, including the small claims court procedure, operates in this Jurisdiction.
3. Analyse the various tortious liabilities which the horticulturist may be exposed to in the workplace.
4. Illustrate how contractual agreements are formed and/or terminated and how contractual breaches can be remedied.
5. Explore the law in relation to the development, cultivation, growth, sale, import and export of plants, hedges and trees.
6. Investigate the various ways in which property rights can be acquired and owned and how property disputes can be resolved or avoided.
7. Determine the impact which Planning and Environmental Law has on the provision of horticultural services.

Learning and Teaching Methods

- Lectures
- Seminars
- Self directed learning

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	36	
Tutorial	12	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	20%	1,2
Case Studies	30%	6,7
In-Class Assessment	50%	3,4,5

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out practical/professional tasks. Failure to meet the objectives of projects. Unable to carry out or submit independent study and research.

40%–49%: Demonstrates a limited knowledge of the subject matter.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Satisfactory handling and awareness in carrying out independent study and research.

60%–69%: Demonstrates sound knowledge of the subject matter. Shows ability to analyse and logically argue in an effective and mature style. Demonstrates initiative and the ability to criticise material.

70%–100%: Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject. Provides well focused analysis and convincing argument on the subject.

Essential Material(s)

- Keenan, A. *Essentials of Irish Business Law.* 6th ed. Dublin: Gill & MacMilan, 2012.
- Kelly, T. *Neighbours and the Law.* 1st ed. Dublin : Clarus Press, 2012.

Supplementary Material(s)

- Corbett, V. *Tort.* 2nd ed. Dublin : Roundhall, 2009.
- Grist, B. *An Introduction of Irish Planning Law.* 2nd ed. Dublin : Institute of Public Administration, 2012.
- Pearce, R.A and J Mee. *Land Law.* 3rd ed. Dublin : Roundhall, 2011.

Managing your Business (A34001)

Short Title: Managing your Business
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module will provide students with knowledge and practical skills to prepare a business plan, distinguish between forms of business ownership, and use financial information for managing working capital, budgeting and decision making (cost-volume-profit, pricing decisions, sourcing finance) in a small business context.

Programmes

		stage/semester/status
BUSS-0063	BSc in Horticulture (WD_SHORT_D)	2 / 3 / M
BUSS-0063	BSc in Horticulture (WD_SHORT_DX)	2 / 3 / M

Indicative Content

- Business plans: purpose of business plan, difference between business plan and feasibility study, business plan tests, structure and content
- Forms of business ownership: sole trader, partnership, company
- Working capital: management of the elements of working capital in a small business (inventory, receivables, payables, cash)
- Budgeting: budget process, conflicting roles of budgeting, preparation and monitoring of cash budgets
- Decision making: cost-volume-profit (single and multi-product break-even, target profit, margin of safety)
- Decision making: pricing (price taker/setter, pricing policies)
- Decision making: sourcing finance (sources, factors influencing types and sources of finance)

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Differentiate the required elements of a business plan.
2. Distinguish between forms of business ownership.
3. Manage the elements of the working capital in a small business.
4. Employ the budgetary process and prepare and monitor a cash budget in a small business.
5. Use cost-volume-profit analysis, evaluate pricing options and determine appropriate sources of finance for a small business.

Learning and Teaching Methods

- Lectures.
- Class and group discussions.
- Pre-lecture preparation of readings and exercises for in-class participation.
- Self-study of assigned readings, exercises and texts.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	100%	1,2,3,4,5

Assessment Criteria

<40%: Very little knowledge and understanding of the subject matter. Unable to carry out critical thinking or practical skills.

40%–49%: Demonstrates a limited knowledge of the subject matter. May have some problems with critical thinking and problem solving. Adequate practical skills.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Good practical skills.

60%–69%: Demonstrates skilled and sound knowledge of the subject matter. Shows ability to analyse and logically discuss in an effective way. Good critical thinking and a high level of competence and efficiency in theoretical and practical areas of this subject.

70%–100%: All of the above to an excellent level. Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject.

Essential Material(s)

- Atrill, P. and E. McLaney. *Accounting and Finance for Non-Specialists.* Latest Edition. Harlow: Pearson Education, Latest.

Supplementary Material(s)

- Scarborough, N.M. and J.R. Cornwall. *Essentials of Entrepreneurship and Small Business Management.* Latest Edition. Harlow: Pearson Education, Latest.

Requested Resources

- Lecture Room: Loose Seated
- Room Type: Computer Lab

People Management (A07802)

Short Title: People Management
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module will develop student understanding of the practical and theoretical insights into current people management practices that contribute to business performance. The emphasis on this module is the preparation of science students for management roles in which they will be expected to contribute to the management of human resources.

Programmes

		stage/semester/status
MGTS-0023	BSc in Horticulture (WD_SHORT_D)	3 / 5 / M
MGTS-0023	BSc in Horticulture (WD_SHORT_DX)	3 / 5 / M

Indicative Content

- People management as an exchange relationship, and conflict and cooperation in the exchange relationship
- People as a resource: Theoretical models of matching people management approaches to organisational strategy
- Resourcing the organisation: Focus on the importance of 'fit' in matching the person and the organisation
- Managing Performance: Focus on maximising employee discretionary effort /performance to encourage employees to work beyond contract
- Organisational Justice: Focus on the regulation and resolution of workplace issues to achieve fairness and consistency in the employment relationship

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Appraise the theoretical models that explain different management approaches in managing the employment relationship.
2. Examine resourcing methods and regulatory obligations that enable organisations to fit the person and the organisation.
3. Analyse different forms of employee involvement practices designed to encourage employees to work beyond contract.
4. Examine organisational processes and regulatory obligations for resolving workplace employee relations issues.

Learning and Teaching Methods

- Lectures
- Case studies and class discussion.
- Role play

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	36	
Independent Learning	99	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	100%	1,2,3,4

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out practical/professional tasks.

40%–49%: Demonstrates a limited knowledge of the subject matter. Shows some technical ability/skill in carrying out and reporting on practical/professional tasks.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Logically and competently carries out practical/professional tasks. Satisfactory handling and awareness in carrying out independent study and research. Reporting and projects adequately structured and referenced.

60%–69%: Demonstrates sound knowledge of the subject matter. Shows ability to analyse and logically argue in an effective and mature style. Demonstrate initiative and the ability to criticise methods used and appreciation of experimental design when carrying out practical/professional tasks.

70%–100%: Demonstrates authoritative handling of complex material and has a highly developed and extensive understanding of the subject. Provides well focused analysis and convincing argument on the subject.

Essential Material(s)

- Gunnigle, P., N. Heraty and M. Morley. *Human Resource Management in Ireland.* 4th. Dublin: Gill and MacMillan, 2011.

Supplementary Material(s)

- "Guide to labour Law ." www.entemp.ie
- "People management magazine." http://www.cipd.co.uk
- Armstrong, M. and S. Taylor. *Human Resource Management.* 13th ed. London : Prentice Hall , 2014.
- Carbery, R. and C. Cross. *Human Resource Management.* UK: Palgrave Macmillan, 2013.
- Foot, M. and C. Hook. *Introducing Human Resource Management.* 5th ed. UK : Pearson Ltd, 2008.
- Marchington, M. and A. Wilkinson. *Human Resource Management at Work.* 4th ed. London: CIPD, 2008.

Tax for Horticulture (A09830)

Short Title: Tax for Horticulture
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module will provide students with knowledge and practical skills to comply with obligations relating to the self-assessment and payment of Value Added Tax (VAT), Income Taxes, Universal Social Charge (USC), Pay Related Social Insurance (PRSI) and minimise business exposure to Capital Gains Tax (CGT) and Capital Acquisitions Tax (CAT).

Programmes

		stage/semester/status
HORT-0045	BSc in Horticulture (WD_SHORT_D)	3 / 6 / M
HORT-0045	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / M

Indicative Content

- VAT: how the VAT system operates, registration, records, returns
- Income taxes, USC and PRSI: how to calculate taxable income. Calculation of liability (owner's liability and on behalf of employees); required records; payment and filing obligations
- CGT: how CGT operates; business related exemptions and reliefs
- CAT: how CAT operates; reliefs for the acquisition of a farm or business

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Complete the basic requirements of the VAT system.
2. Calculate taxable income and liability for the purpose of income taxes and determine payment and filing obligations.
3. Prepare income tax, USC and PRSI records required as an employer.
4. Illustrate how CGT and CAT operates, and the exemptions and reliefs available to reduce business exposure to CGT and CAT liability on the transfer of a farm or business.

Learning and Teaching Methods

- Lecturers and practical exercises.
- Class and group discussions.
- Pre-lecture preparation of readings and exercises for in-class discussion.
- Self-study of assigned readings, exercises and texts.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	1,2,3,4

Assessment Criteria

<40%: Very little knowledge and understanding of the subject matter. Unable to carry out critical thinking or practical skills.

40%–49%: Demonstrates a limited knowledge of the subject matter. May have some problems with critical thinking and problem solving. Adequate practical skills.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Good practical skills.

60%–69%: Demonstrates skilled and sound knowledge of the subject matter. Shows ability to analyse and logically discuss in an effective way. Good critical thinking and a high level of competence and efficiency in theoretical and practical areas of this subject.

70%–100%: All of the above to an excellent level. Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject.

Essential Material(s)

- "Revenue (Irish Taxes and Customs)." www.revenue.ie

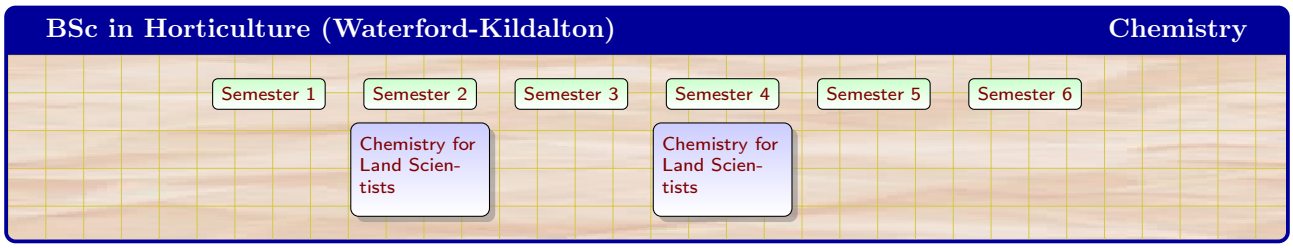
Supplementary Material(s)

- Various, I. T. I. *Taxation Summary*. Dublin: Irish Tax Institute, Annually.

Requested Resources

- Lecture Room: Loose Seated
- Room Type: Computer Lab

Chemistry



Chemistry for Land Scientists (A10631)

Short Title: Chemistry for Land Scientists
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

This is a basic chemistry course dealing with the general principles and practical techniques of chemistry for land scientists (Forestry, Agriculture and Horticulture). No previous knowledge of chemistry is assumed. This is a very applied module with a strong emphasis on laboratory-based teaching.

Programmes

		stage/semester/status
CHEM-0005	BSc in Agriculture (WD_SAGUL_D)	1 / 2 / M
CHEM-0005	BSc in Agriculture (WD_SAGUL_D)	2 / 4 / E
CHEM-0005	BSc in Forestry (WD_SFORS_D)	1 / 2 / M
CHEM-0005	BSc in Forestry (WD_SFORS_D)	2 / 4 / E
CHEM-0005	BSc in Horticulture (WD_SHORT_D)	1 / 2 / M
CHEM-0005	BSc in Horticulture (WD_SHORT_D)	2 / 4 / E
CHEM-0005	BSc in Horticulture (WD_SHORT_DX)	1 / 2 / M
CHEM-0005	BSc in Horticulture (WD_SHORT_DX)	2 / 4 / E

Indicative Content

- Matter, atomic structure and the periodic table
- Chemical reactions, the mole concept and stoichiometry
- Electronic structure of an atom and bonding
- Chemistry of water including H bonding solvent ability, surface tension, osmosis and conductivity
- Acid and bases including definitions of acids and bases, neutralisation reactions, pH, buffers and buffering capacity, role of pH and alkalinity on water and soil quality
- Endothermic and exothermic reactions

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Describe the nuclear atom.
2. Calculate reaction yields using balanced chemical reactions.
3. Distinguish between ionic and covalent bonding, and outline intermolecular bonding and relate to solvent properties.
4. Describe the structure and properties of water.
5. Explain the difference between acidity and basicity, calculate theoretical pH and buffering capacity and their role in water and soil quality.
6. Communicate by written and verbal means the results of theory and practical-based exercises.
7. Demonstrate a keen awareness of the safe handling and disposal of chemicals and good laboratory practice (GLP).

Learning and Teaching Methods

- Lectures.
- Laboratory practicals.
- Tutorials.
- Self-directed study.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Tutorial	6	
Practical	18	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,2,3,4,5
Continuous Assessment	50%	
Practical	40%	6,7
Tutorial/Problem Sheets	10%	1,2,3,4,5

Assessment Criteria

<40%: No understanding of the basic principles of chemistry. Inadequate practical skills in the associated laboratories.

40%–49%: Has a superficial knowledge of the concepts outlined in the indicative content. Has a basic level of competency and skills in the associated laboratories..

50%–59%: Able to clearly describe concepts encountered in the indicative content. Displays good practical skills in the associated practicals.

60%–69%: In addition to the above, able to apply problem-solving skills to new similar problems. Has a high level of skill in the associated laboratories.

70%–100%: All the previous to an excellent level. Demonstrates an ability to put a numerical solution into a context and assess whether such solutions are meaningful. Engages in class discussions and has a high level of proficiency in the associated laboratories.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- "Waterford Institute of Technology." Chemistry for Land Scientists. . www.moodle.ie

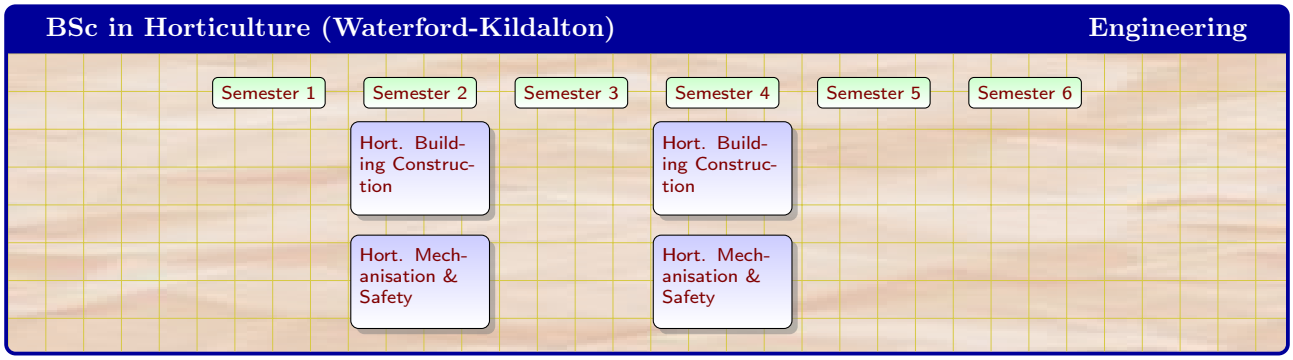
Supplementary Material(s)

- Baird, C. and M. McCann. *Environmental Chemistry.* 5th ed. New York: W.H.Freeman and Co., 2012.

Requested Resources

- Room Type: Chemistry Lab

Engineering



Horticulture Building Construction (A11367)

Short Title: Hort. Building Construction
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

Students will perform basic building and landscape construction tasks. Students will quantify and price small hard landscape elements.

Programmes

		stage/semester/status
CONS-0015	BSc in Horticulture (WD_SHORT_D)	1 / 2 / M
CONS-0015	BSc in Horticulture (WD_SHORT_D)	2 / 4 / E
CONS-0015	BSc in Horticulture (WD_SHORT_DX)	1 / 2 / M
CONS-0015	BSc in Horticulture (WD_SHORT_DX)	2 / 4 / E

Indicative Content

- Planning guidelines, regulations governing buildings and landscape features, steps in building developments, justifying building developments
- Foundations, squaring out a site, transferring levels, pegging out foundations, mixing concrete and mortar
- Timber materials e.g. fencing, and decking
- Construction using concrete blocks, bricks, laying paving units, slabs, setting up gradients, assembling screeds, and building dry stone walls
- Plan, elevation and section drawings
- Quantifying materials for component structures, minimum specifications, estimating quantity of concrete, costings for block walls, brick walls, paving, fences etc..

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Describe planning laws and regulations.
2. Complete safely a range building and maintenance tasks associated with landscape and horticultural building construction.
3. Interpret, read and draft plans and specifications.
4. Describe good environmental practices in constructing buildings.
5. Describe good practices for safety and health in constructing buildings.
6. Estimate quantities and costings for structures such as block walls, brick walls, paving, fences etc.

Learning and Teaching Methods

- Lectures
- Practicals
- Supervised practice

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,3,4,5,6
Continuous Assessment	50%	
Practical	35%	2
Assignment	15%	3

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Unable to carry out practical tasks.

40%–49%: Demonstrates a limited knowledge of the subject matter. Shows some technical ability/skill.

50%–59%: Demonstrates a sound knowledge of the subject matter, and competently carries out practical/professional tasks.

60%–69%: Demonstrates a good knowledge of the subject matter, logically and competently carries out practical/professional tasks.

70%–100%: Demonstrates an excellent knowledge of the subject matter, logically and skilfully carries out practical/professional task.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Requested Resources

- Lecture Room: Loose Seated
- ENGINEERING WORKSHOP: Bricklaying Workshop

Horticulture Mechanisation and Safety (A31902)

Short Title: Hort. Mechanisation & Safety
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

In this module students will learn to operate and maintain horticultural equipment in a safe and efficient way. They will also learn the fundamentals of irrigation from a horticultural perspective.

Programmes

		stage/semester/status
MECH-0038	BSc in Horticulture (WD_SHORT_D)	1 / 2 / M
MECH-0038	BSc in Horticulture (WD_SHORT_D)	2 / 4 / E
MECH-0038	BSc in Horticulture (WD_SHORT_DX)	1 / 2 / M
MECH-0038	BSc in Horticulture (WD_SHORT_DX)	2 / 4 / E

Indicative Content

- Machine shop equipment and practice: hand tools, power tools, wiring 3 pin and 7 pin plugs, crimp connections, junction boxes, and fault finding, Requirements for farm workshop and layout
- Tractor: tractor controls, hitching attachments to three point linkage
- Turf care and grass cutting equipment: principal machines involved in turf care, types of mowers, maintenance and safe use of grass cutting equipment, Aeration equipment for turfgrass
- Irrigation: sources of water, pumps and pipe work, indoor irrigation, outdoor irrigation, calculating irrigation application rates
- Horticulture machinery: operation of horticulture machines, strimmers, hedge cutters, and pedestrian cultivators
- Safe working methods and practices in accordance with associated legislation
- Basic first aid
- Risk assessment and Health and Safety statement for a workplace situation

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Use measuring and workshop hand and power tools safely and effectively.
2. Operate a range of horticultural equipment.
3. Describe the machines involved in horticulture, e.g. grass cutting and turf care.
4. Describe operation and maintenance of horticultural machines.
5. Describe principles of irrigation.
6. Describe safe working methods and practices in accordance with associated legislation.
7. Complete a risk assessment and Health and Safety statement for a workplace situation.

Learning and Teaching Methods

- Classroom instruction with supporting: videos, models, cutaways and samples.
- Practical demonstrations with follow up practice.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	40%	3,4,5,6
Continuous Assessment	60%	
Practical	50%	1,2
Assignment	10%	7

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out practical/professional tasks.

40%–49%: Demonstrates a limited knowledge of the subject matter. Shows some technical ability/skill in carrying out and reporting on practical/professional tasks.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Logically and competently carries out practical/professional tasks.

60%–69%: Demonstrates sound knowledge of the subject matter. Demonstrates initiative and the ability when carrying out practical/professional tasks.

70%–100%: Demonstrates imaginative approach, excellent technical ability, awareness, and aptitude in carrying out practical/professional tasks.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Ryan, M. *Machinery Workshop Skills.* Piltown, Kilkenny: Teagasc, 1995.

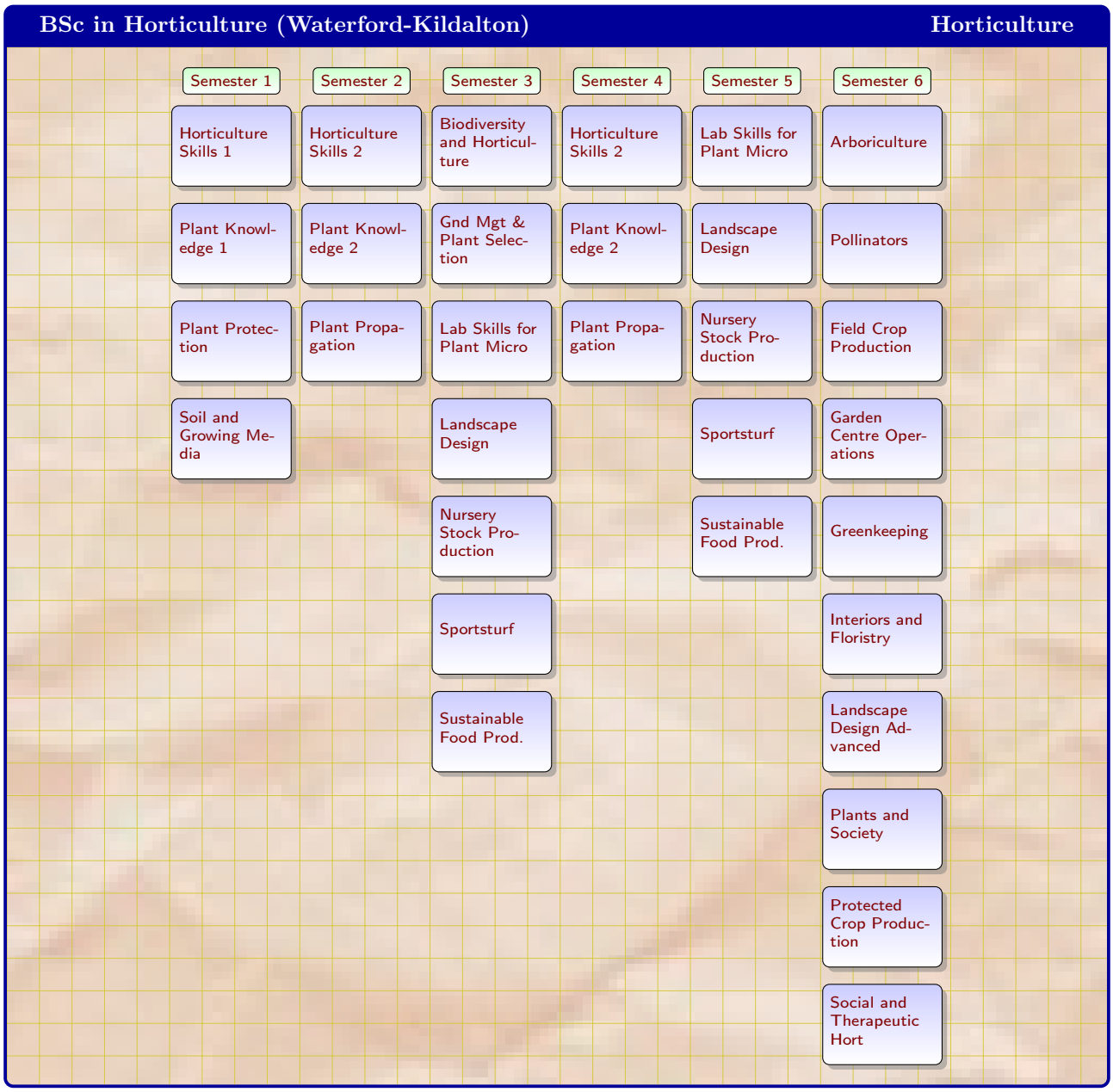
Supplementary Material(s)

- Bell, B. *Farm Machinery.* UK: Farming Press, 1999.
- Bell, B. *Farm Workshop.* UK: Farming Press, 1992.
- Bell, B. and S. Cousins. *Machinery for Horticulture.* UK: Farming Press, 1997.

Requested Resources

- Lecture Room: Loose Seated

Horticulture



Arboriculture (A08421)

Short Title: Arboriculture
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

Arboriculture aims to provide the student with an understanding of the principles and processes involved in the establishment and management of amenity trees.

Programmes

		stage/semester/status
HORT-0043	BSc in Horticulture (WD_SHORT_D)	3 / 6 / M
HORT-0043	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Indicative Content

- Benefits of trees and valuation of trees
- Tree establishment and management; species selection, planting including semi-mature trees, pruning, tree response to wounding
- Decay detection in trees
- Tree hazard assessment and management
- Importance and management of veteran, ancient and heritage trees
- Protection of trees in the development process
- Amenity woodland management

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Debate the benefits of trees and apply a method for valuing amenity trees.
2. Relate the processes involved in tree establishment and maintenance to the development of healthier trees.
3. Compare a range of technologies for detecting decay in trees.
4. Inspect trees for hazards and propose appropriate solutions.
5. Examine the importance and principles of managing veteran, ancient and heritage trees.
6. Associate the potential impacts of the development process on trees with the strategies used to protect trees in this context.
7. Analyse the importance of amenity woodlands and explain the processes involved in managing these woodlands.

Learning and Teaching Methods

- Lectures
- Fieldwork/tree walks

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	36	
Field Trips	12	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	70%	1,2,3,5,6
Continuous Assessment	30%	
Group Project	10%	7
Project	20%	4

Assessment Criteria

<40%: Little or no knowledge and understanding of the subject matter. Fails to meet project objectives.

40%–49%: Demonstrates a basic level of knowledge and understanding. Project objectives achieved to a basic level.

50%–59%: Demonstrates a satisfactory level of knowledge and understanding. Good attempt to achieve project objectives.

60%–69%: Demonstrates a very good level of understanding, analysis and evaluation. Project objectives achieved.

70%–100%: Demonstrates an excellent level of understanding, analysis and evaluation. Project objectives achieved.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Collins, K, ed. *Amenity Trees and Woodlands: A Guide to their Management in Ireland.* Dublin: Tree Council of Ireland, 2010.
- Watson, R. *Trees: Their Use, Management, Cultivation and Biology.* Wiltshire: Crowwood Press, 2006.

Supplementary Material(s)

- British Standards Institution. *BS 3998 Tree Work: Recommendations* London. 2010.
- British Standards Institution. *BS 5837 Trees in Relation to Design, Demolition and Construction: Recommendations* London. 2012.

Beekeeping and Pollination Studies (A14405)

Short Title: Pollinators
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module aims to equip students with the knowledge and skills associated with apiculture, commercial pollination of crops and natural pollination services.

Programmes

		stage/semester/status
HORT-0046	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
HORT-0046	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Indicative Content

- The life cycle of the honey bee, bumble bee, other pollinators and their colonies
- Apiary site selection criteria, annual management programmes.
- Explanation of beekeeping equipment, assembly, and inspection of hives
- Nutrition and food sources for pollinators
- Criteria and methods of breeding
- Pest, disease, poisons and habitats of bees and other pollinators
- Key legislation, directives and action plans to protect pollinating species

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Associate pollinator biology, pollinator health and potential challenges
2. Produce a plan outlining the management of a commercial apiary and protected pollinators.
3. Demonstrate routine skills associated with managing honey bees.
4. Compare the variety of forage crops for pollinators.
5. Compare attributes when selecting and breeding pollinators.
6. Relate the Sustainable Use of Pesticide Directive, and the current National Pollinator Action Plan to improved outcomes for pollinators.

Learning and Teaching Methods

- Lectures
- Demonstration
- Field practical

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	36	
Practical	12	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,4,5,6
Continuous Assessment	50%	
Assignment	20%	2
Practical	30%	3

Assessment Criteria

<40%: Not able to identify 40% of pollinating insect castes and equipment, unable to describe management practices and applications, unable to assemble hive, and unable to describe suitable apiary sites.

40%–49%: Can identify at least 40% of pollinating insect castes and equipment, can describe management practices and application in industry, able to assemble hive, and describe suitable apiary sites.

50%–59%: All of above and can correctly identify at least 60% of pollinating insect castes and equipment, can describe suitable apiary sites and forage requirements.

60%–69%: All of the above with at least 70% of pollinating insect castes and equipment identified correctly.

70%–100%: All of the above and at least 80% of pollinating insect castes and equipment identified correctly.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Hooper, T. *Guide to Bees and Honey.* UK: Northern Bee Books, 2010.

Supplementary Material(s)

- "National Bee Unit." http://www.nationalbeeunit.com/
- "National Biodiversity Data Centre." http://www.biodiversityireland.ie/
- McMullan, J. *Having Healthy Honeybees.* Ireland: The Federation of Irish Beekeepers' Associations, 2012.
- Wilmer, P. *Pollination and Floral Ecology.* America: Princeton University Press, 2011.

Requested Resources

- Lecture Room: Loose Seated

Biodiversity and Horticulture (A08344)

Short Title: Biodiversity and Horticulture
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module introduces the student to the principles of ecology and ethics of biodiversity. Students will gain an understanding of the role that horticulture can play in the conservation and development of biodiversity.

Programmes

		stage/semester/status
HORT-0030	BSc in Horticulture (WD_SHORT_D)	2 / 3 / M
HORT-0030	BSc in Horticulture (WD_SHORT_DX)	2 / 3 / M

Indicative Content

- Ethics of conservation and biodiversity
- Principles of ecology - biodiversity, habitats, niche, species interactions, succession, climax community, energy flow
- Range and extent of Irish Flora and key Irish habitats, horticulture and invasive species, alien species, biosafety
- Legal framework of protection of habitats and biodiversity
- Environmental impact assessment (EIS), environmental monitoring methods
- Horticultural applications to protect, enhance or re-establish biodiversity and reduce negative environmental impacts in a range of sites including commercial horticulture and amenity e.g. brown field, roads, orchards, use of reed beds, flood amelioration techniques, tree and plant selections for urban areas, land stabilization
- Importance and protection of surface water and ground water e.g. sustainable urban drainage, water framework directive
- Urban ecology: Back gardens, urban forestry, green roof, green walls, water courses, parks
- Pollinating insects and the role of horticulture in providing protection

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Propose Horticultural interventions that would benefit Biodiversity.
2. Relate the relevant national and European regulations and laws to their role in protecting biodiversity.
3. Debate the importance of conserving biodiversity and the threats facing it.
4. Distinguish between and identify native and alien species of flora and fauna.
5. Prepare a limited EIS (or a biodiversity survey) for a designated site.

Learning and Teaching Methods

- Lectures
- Practical demonstration
- Practice
- Site visit
- Site survey
- Group work activity to encourage the development of collaborative skills

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	36	
Practical	12	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,2,3
Continuous Assessment	50%	
In-Class Assessment	10%	4
Group Project	40%	5

Assessment Criteria

<40%: Does not perform biodiversity survey or practicals assessments to reasonable standard. Limited knowledge and understanding of the application of horticulture to preserve or develop biodiversity.

40%–49%: Demonstrates a limited knowledge of the subject matter. Is able to complete a biodiversity survey at a basic level. Demonstrates limited understanding in practicals.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Practicals and biodiversity survey; demonstrates a clear understanding and grasp of the subject material.

60%–69%: Demonstrates sound knowledge of the subject matter. Shows ability to analyse and logically argue in an effective and mature style. Demonstrates initiative and the ability to criticise methods used. Practicals and biological survey; demonstrates sound understanding of theory and application.

70%–100%: Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject. Practicals and biological survey demonstrate excellent understanding of theory. Demonstrates reading outside of essential course material.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Fossitt, J. *A guide to Habitats in Ireland.* Dublin: The Heritage Council, 2000.

Supplementary Material(s)

- Douglas, I. and P. James. *Urban ecology.* Devon: Taylor & Francis, 2015.
- Dunnett, N. and N. Kingsbury. *Planting Green Roofs and Living Walls.* Sheffield: Timber Press, 2008.

Field Crop Production (A11494)

Short Title: Field Crop Production
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

The module will enable the student to plan and describe the production of a range of food crops at a large field scale and perform the associated skills to best industry practices.

Programmes

		stage/semester/status
HORT-0028	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
HORT-0028	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Pre-Requisite(s)

- Sustainable Food Production

Indicative Content

- Brassicas: Plan production and management schedules for all year round cabbage, sprouts, cauliflower and broccoli production
- Rootcrops: Plan production and management scheduled for vegetable root crops: carrots such as parsnips and swedes
- Potato production and storage
- Fruit: Apple production and storage. Extended season strawberry production
- Onion production and storage
- Evaluate the economics of mixed vegetables, potatoes and fruit
- Produce a plan for 25 ha of mixed vegetables

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Analyse the production of a range of vegetables including brassicas, rootcrops.
2. Analyse the production of potatoes.
3. Compare different production systems used for fruit crops such as apples, strawberries.
4. Plan a production programme for 25ha of mixed vegetables.
5. Appraise the economics of producing food crops.
6. Demonstrate skills associated with vegetable and fruit production employing proper health and safety practices.
7. Distinguish good environmental practices in food crop production.

Learning and Teaching Methods

- Lecture
- Practical demonstration
- Project
- Practice

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,2,3,5,7
Continuous Assessment	50%	
Practical	25%	6
Project	25%	4

Assessment Criteria

<40%: Very little knowledge and understanding of the subject matter. Unable to carry out critical thinking or practical skills.

40%–49%: Demonstrates a limited knowledge of the subject matter. May have some problems with critical thinking and problem solving. Adequate practical skills.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Good practical skills.

60%–69%: Demonstrates skilled and sound knowledge of the subject matter. Shows ability to analyse and logically discuss in an effective way. Good critical thinking and a high level of competence and efficiency in theoretical and practical areas of this subject.

70%–100%: All of the above to an excellent level. Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Supplementary Material(s)

- Brewster, J.L. *Onions and other Vegetable Alliums, Volume 15 of Crop production science in horticulture.* Wallingford: CABI, 2008.
- Dixon, G.R. *Vegetable Brassicas and Related Crucifers, Volume 14 of Crop production science in horticulture.* Wallingford: CABI, 2007.
- Rubatzky, V., C. Quiros and P. Simon. *Carrots and Related Vegetable Umbelliferae.* Wallingford: CABI, 1999.

Requested Resources

- Lecture Room: Loose Seated

Garden Centre Operations (A06688)

Short Title: Garden Centre Operations
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module is designed to equip students with knowledge of garden centre management and planning. Students will also learn about promotion, sales methods, display and maintenance of garden centre plants. The student will learn how to critique a garden centre.

Programmes

		stage/semester/status
HORT-0018	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
HORT-0018	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Indicative Content

- Market analysis and trends
- Garden centre planning: Types of garden centre, location, site development, creating identity, range of products, security
- Shop layout and customer flow
- Stock control: Planning purchases, making orders, receiving plants, environmental requirements, standing areas for plants
- Promotion and product display, sale promotion, packaging, maintenance of displays, quality assurance schemes
- Display and maintenance of plants, sales techniques

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Explore market and industry trends for garden centres.
2. Propose recommendations on garden centre planning, including the creation of a safe working environment.
3. Plan customer flow and product displays.
4. Examine stock control systems, management and pricing.
5. Explore opportunities for garden centres to balance cash flow.
6. Inspect a garden centre layout.

Learning and Teaching Methods

- Lectures
- Site visits
- Workshop
- Project
- Practicals

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	12	
Field Trips	12	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,3,4,5,
Continuous Assessment	50%	
Practical	25%	6
Assignment	25%	2

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out practical/professional tasks. Failure to meet the objectives of projects. Unable to carry out or submit independent study and research.

40%–49%: Demonstrates a limited knowledge of the subject matter. Shows some technical ability/skill in carrying out and reporting on practical/professional tasks. Attempts made to meet objectives and carry out independent study and research. Final result lacks balance and arguments undeveloped.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Logically and competently carries out practical/professional tasks. Satisfactory handling and awareness in carrying out independent study and research. Reporting and projects adequately structured and referenced.

60%–69%: Demonstrates sound knowledge of the subject matter. Shows ability to analyse and logically argue in an effective and mature style. Demonstrates initiative and the ability to criticise methods used and appreciation of experimental design when carrying out practical/professional tasks. Projects and reporting coherent and soundly structured illustrating wide and in depth reading on subject coupled with the proper use of references.

70%–100%: Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject. Provide well focused analysis and convincing argument on the subject. Demonstrates imaginative approach, excellent technical ability, awareness, and aptitude in carrying out and reporting on practical/professional tasks. Shows initiative, individual thought, and enthusiasm in self-study and independent learning.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Supplementary Material(s)

- "John Stanley Blog." http://www.johnstanley.com.au/johns-blog/
- Snook, C. and K. Carter. *Garden centre manager*. England: Grower books, 1999.
- Stanley, J. *The complete guide to garden centermanagement*. USA: Ball, 2002.

Garden Management and Plant Selection (A07702)

Short Title: Gnd Mgt & Plant Selection
Department: Science
Credits: 10 **Level:** Intermediate

Description of Module / Aims

This module will provide the student with the skills and knowledge required to develop and maintain a garden. Students will be taught to identify a wide range of plants, their cultural requirements, and their suitability for different planting situations.

Programmes

		stage/semester/status
HORT-0040	BSc in Horticulture (WD_SHORT_D)	2 / 3 / M
HORT-0040	BSc in Horticulture (WD_SHORT_DX)	2 / 3 / M

Indicative Content

- Cultivation of a range of fruit top and soft fruit on small garden scale, e.g. apples, raspberries, gooseberries, blackcurrants, strawberries
- Cultivation of a range vegetables on a small garden scale e.g. onions, salads, tomatoes, carrots, cabbage, broccoli, range of herbs, range of cucurbits
- Principles of design, use of plant materials: Colour, form, texture, structure and layout
- Water features, construction methods, and maintenance regimes
- Factors in managing estates and parks. Layout design and history of parks and estates
- Maintenance of parks and mixed borders
- Growing conditions and selection of ornamentals for the following situations: Ponds, seasonal bedding, hedging, screening, shelter, seaside, climbing, walls, ground cover, shade, dry banks, slope stabilisation, and small gardens
- Ornamental plant identification by relevant characteristics such as leaf and twig, bud and twig, flower, berry, stem using the binomial system
- Specialist plants groups e.g. alpines, ferns, grasses, and bamboos
- Care and management of naturalistic plantings e.g. wild flower meadows

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Appraise the growing of fruit and vegetable crops on a small scale.
2. Demonstrate the use of a range of ornamental plants in the landscape.
3. Recommend appropriate plants for specific site situations.
4. Determine the impact of park management on public spaces.
5. Demonstrate appropriate garden maintenance techniques e.g. planting, pruning, weeding, mowing, and edging.
6. Plan a mixed border demonstrating principles of good design.
7. Use scientific names to identify live specimens of ornamental perennials, annuals, bulbs, trees and shrubs.

Learning and Teaching Methods

- Lectures.
- Demonstrations followed by practical work.
- Instruction supported by plant samples.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	48	
Practical	48	
Independent Learning	174	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,2,3,4
Continuous Assessment	50%	
Practical	25%	7
Practical	15%	5
Project	10%	3,6

Assessment Criteria

<40%: Not able to identify 40% of plants. Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out practical/professional tasks.

40%–49%: Able to identify at least 40% of plants. Demonstrates a limited knowledge of the subject matter. Shows some technical ability/skill in carrying out and reporting on practical/professional tasks.

50%–59%: Able to identify at least 50% of plants Demonstrates satisfactory general knowledge of the main issues within the subject. Logically and competently carry out practical/professional tasks.

60%–69%: Able to identify at least 60% of plants. Demonstrates sound knowledge of the subject matter and performs practical/professional tasks efficiently.

70%–100%: Able to identify at least 70% of plants. Demonstrates authoritative and extensive understanding of the subject. Demonstrates imaginative approach, excellent technical ability, awareness, and aptitude in carrying out tasks.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Brickell, C. *RHS A-Z Encyclopedia of Garden Plants.* 3rd ed.. London: DK, 2008.

Greenkeeping (A08582)

Short Title: Greenkeeping
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module aims to enable students to develop an understanding of the maintenance, management and construction of modern golf courses in an environmentally sound manner.

Programmes

		stage/semester/status
HORT-0019	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
HORT-0019	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Pre-Requisite(s)

- Sportsturf science

Indicative Content

- Golf course architecture, design and planning
- Construction of golf course features
- Maintenance of golf course features
- Golf course ecology and habitats
- Impact of the rules of golf on course maintenance
- Golf course nutrition, growth regulation and modification of growing environments

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Explore the principles of planning, construction and maintenance of golf courses.
2. Complete operations in golf course maintenance.
3. Explore the principles of environmentally sound management.
4. Examine the value of ecology and habitats and their impact on the golf course environment.
5. Relate the influence of the rules of golf on management and maintenance.
6. Justify the use of fertilisers and chemicals in golf course management.
7. Determine appropriate maintenance regimes for golf course features
8. Examine current management practices on a golf course.

Learning and Teaching Methods

- Lectures
- Practical assignments.
- Reports

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	36	
Practical	12	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,3,4,5,6,7
Continuous Assessment	50%	
Assignment	25%	8
Practical	25%	2

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out practical/professional tasks. Failure to meet the objectives of projects. Unable to carry out or submit independent study and research.

40%–49%: Demonstrate a limited knowledge of the subject matter. Show some technical ability/skill in carrying out and reporting on practical/professional tasks. Attempt made to meet objectives and carry out independent study and research. Final result lacks balance and arguments undeveloped.

50%–59%: Demonstrate satisfactory general knowledge of the main issues within the subject. Logically and competently carry out practical/professional tasks. Satisfactory handling and awareness in carrying out independent study and research. Reporting and projects adequately structured and referenced.

60%–69%: Demonstrate sound knowledge of the subject matter. Show ability to analyse and logically argue in an effective and mature style. Demonstrate initiative and the ability to criticise methods used and appreciation of experimental design when carrying out practical/professional tasks. Projects and reporting coherent and soundly structured illustrating wide and in depth reading on subject coupled with the proper use of references.

70%–100%: Demonstrate authoritative handling of complex material and a highly developed and extensive understanding of the subject. Provide well focused analysis and convincing argument on the subject. Demonstrate imaginative approach, excellent technical ability, awareness, and aptitude in carrying out and reporting on practical/professional tasks. Show initiative, individual thought, and enthusiasm in self study and independent learning.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Supplementary Material(s)

- Beard, J. *Turf Management for Golf Courses*. 2nd ed. New Jersey: Wiley, 2001.
- Christians, N. and M.L. Agnew. *The Mathematics of Turfgrass Maintenance*. 4th ed. New Jersey: Wiley, 2008.
- Fagerness, M. and R. Johns. *Turfgrass Chemicals and Pesticides. A Practitioner's Guide*. 1st ed. New York: McGraw-Hill, 2003.
- Hayes, P. and R.D.C. Evans. *The Care of the Golf Course*. Bingley, West Yorkshire, England: The Sports Turf Research Institute, 1992.
- Hurdzan, M. *Golf Course Architecture: Evolutions in Design, Construction and Restoration*. 2nd ed. New Jersey: Wiley, 2012.
- Lilly, S. *Golf Course Tree Management*. 1st ed. New Jersey: Wiley, 1999.
- Pira, E. *A guide to golf course irrigation system design and drainage*. 1st ed. New Jersey: Wiley, 1997.
- Vargas, J.M. and A.J. Turgeon. *Poa annua, Physiology, Culture and Control of Annual Bluegrass*. 1st ed. New Jersey: Wiley, 2003.

Requested Resources

- Lecture Room: Loose Seated

Horticulture Skills 1 (A08383)

Short Title: Horticulture Skills 1
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

This module will equip the student with the skill and competence to perform a range of horticultural skills.

Programmes

		stage/semester/status
HORT-0035	BSc in Horticulture (WD_SHORT_D)	1 / 1 / M
HORT-0035	BSc in Horticulture (WD_SHORT_DX)	1 / 1 / M

Indicative Content

- Control weeds using cultural and chemical methods
- Prepare ground by digging, harrowing, rotovating and raking
- Establish a lawn by seeding and sodding
- Plant a range of plants including spring flowering annuals, bulbs, trees and shrubs
- Plant care and maintenance including deadheading, thinning, division, training and support

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Show how to prepare the ground for seed sowing and planting.
2. Control weeds by chemical and cultural means.
3. Show how to prepare the ground and establish a lawn by seeding and sodding.
4. Demonstrate how to plant a range of plants and bulbs.
5. Demonstrate a range of plant maintenance tasks.
6. Complete a record of activities and observations.
7. Operate in a team or individually to complete a series of tasks.

Learning and Teaching Methods

- Practical demonstrations and assignments.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Practical	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Reflective Journal	20%	6
Practical	80%	1,2,3,4,5,7

Assessment Criteria

<40%: Demonstrates an inability to perform most of the skills to an acceptable standard and output.

40%–49%: Demonstrates a limited ability to perform most of the skills to an acceptable standard and output.

50%–59%: Demonstrates a satisfactory ability to perform most of the skills to an acceptable standard and output.

60%–69%: Demonstrates a satisfactory ability to perform all of the skills to an acceptable standard and output.

70%–100%: Demonstrates sound ability to perform all of the skills to an competent standard and output.

Horticulture Skills 2 (A08401)

Short Title: Horticulture Skills 2
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

This module will equip the student with the skill and competence to perform a range of horticulture skills.

Programmes

		stage/semester/status
HORT-0039	BSc in Horticulture (WD_SHORT_D)	1 / 2 / M
HORT-0039	BSc in Horticulture (WD_SHORT_D)	2 / 4 / E
HORT-0039	BSc in Horticulture (WD_SHORT_DX)	1 / 2 / M
HORT-0039	BSc in Horticulture (WD_SHORT_DX)	2 / 4 / E

Indicative Content

- Maintain a lawn (spring), mowing, rolling, edging, nutrition and repairs
- Grow a range of ornamentals and vegetables using techniques such as pricking out, potting up and growing on
- Prepare ground for the planting of ornamentals and vegetables
- Prune and train a range of fruit trees and bushes
- Produce a range of containerised bedding displays
- Plant a range of bedding plant displays
- Plant a range of vegetables and herbs

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Demonstrate a range of spring lawn maintenance tasks.
2. Demonstrate the propagation of flowering annuals and vegetables.
3. Show how the ground is prepared for planting of bedding plants and vegetables.
4. Demonstrate the planting of out bedding plants, vegetables and herbs.
5. Construct a range of containerised bedding displays.
6. Demonstrate the pruning and training of fruit trees and bushes.
7. Complete a record of activities and observations.
8. Operate in a team or individually to complete a series of tasks.

Learning and Teaching Methods

- Practical demonstrations and assignments.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Practical	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Practical	80%	1,2,3,4,5,6,8
Reflective Journal	20%	7

Assessment Criteria

<40%: Demonstrates an inability to perform most of the skills to an acceptable standard and output.

40%–49%: Demonstrates a limited ability to perform most of the skills to an acceptable standard and output.

50%–59%: Demonstrates a satisfactory ability to perform most of the skills to an acceptable standard and output.

60%–69%: Demonstrates a satisfactory ability to perform all of the skills to an acceptable standard and output.

70%–100%: Demonstrates sound ability to perform all of the skills to a competent standard and output.

Interior Landscaping and Floristry (A08347)

Short Title: Interiors and Floristry
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module covers two complimentary areas; floral design and interior plantscaping. The module will enable the student to identify, select and understand the use of a wide range of interior plants. It will also enable the student to identify, use floral materials, and create suitable compositions.

Programmes

		stage/semester/status
HORT-0047	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
HORT-0047	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Indicative Content

- Functional use of interior plants, market potential
- Theory of design, appraise features of good design in interior landscaping, range of products available for the industry e.g.planters and watering systems
- Identify a wide range of interior foliage and flowering plants, their requirements and suitability for different situations
- Site evaluation: Site survey and analysis, measure light temperature and relative humidity of interior landscape
- Maintenance: Acclimatisation, cleaning, pruning, watering, feeding, pest and disease control
- Materials for floristry, identify flower, foliage and materials, and care for and preparation of flowers and foliage material at all stages
- Design in floristry: Principles and elements in floristry design and their application - Colour wheel, depth of colour and harmonies colours for special occasions
- Mechanics: Wire, securing, receptacles, frames, display holders, and accessories
- Floristry assembles: Wired assemblies, presentation bouquets, and corporate arrangements

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Explore potential applications of interior landscaping.
2. Appraise features of good design of interior landscape features
3. Demonstrate and practice care requirements for interior plants, cut flowers, and equipment.
4. Analyse the suitability of a site for an interior display.
5. Plan a maintenance programme for range of interior plant displays.
6. Determine influences of a site on the selection and management of interior displays.
7. Compare and contrast principles of floral design.
8. Create floral assemblies.

Learning and Teaching Methods

- Lectures
- Practical demonstrations
- Site visits

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
In-Class Assessment	30%	1,2,6,7
Project	20%	4,5
Practical	50%	8,3

Assessment Criteria

<40%: Not able to identify 40% of plants using their botanical names, unable to describe maintenance practices, applications and design principles.

40%–49%: Can identify at least 40% of plants using their botanical names, can describe maintenance practices, plant uses, and design principles, and complete floral assembly.

50%–59%: All of the above and can correctly identify at least 50% of plants.

60%–69%: All of the above with at least 60% of plants identified correctly with no spelling errors.

70%–100%: All of the above and at least 70% of plants identified correctly with no spelling errors.

Essential Material(s)

- McHoy, P. *An Illustrated A-Z Guide to Houseplants: Everything You Need to Know to Identify, Choose and Care for 350 of the Most Popular Houseplants.* Erehwon: Lorenz Books, 2013.

Supplementary Material(s)

- DelPrince, J. *Interior Plantscaping: Principles and Practices.* New York: Delmar Cengage Learning, 2013.
- Fediw, K. *The Manual of Interior Plantscaping: A Guide to Design, Installation, and Maintenance.* Portland: Timber Press, 2015.
- Interflora, A. *Practical Floristry - The Interflora Training Manual.* London: Hodder Educational, 1993.

Requested Resources

- Lecture Room: Loose Seated

Lab Skills for Plant Micropropagation (A01001)

Short Title: Lab Skills for Plant Micro
Department: Science
Credits: 10 **Level:** Intermediate

Description of Module / Aims

The module has been designed to enhance the education of science students who will benefit from knowledge of plant culturing techniques, or for students who might require knowledge of establishment and maintenance of environments suitable for sterile culturing of plant, animal or bacterial cultures. Horticultural plant science requires innovation and this module will provide students with the basic requirements to pursue lab-based project work, and eventually level 9 study in plant science.

Programmes

		stage/semester/status
HORT-0041	BSc in Horticulture (WD_SHORT_D)	2 / 3 / E
HORT-0041	BSc in Horticulture (WD_SHORT_D)	3 / 5 / E
HORT-0033	BSc in Horticulture (WD_SHORT_DX)	2 / 3 / E
HORT-0033	BSc in Horticulture (WD_SHORT_DX)	3 / 5 / E

Indicative Content

- Maintaining sterile conditions: practice the principles of maintaining sterile environments and using lab equipment and glassware correctly to maintain sterility and prevent cross contamination
- Commonly used lab calculations: dilutions, molar concentration, commonly used units and measurements and converting between these units
- Lab solutions: preparing and sterilizing nutrient media and other common lab solutions such as phytohormone stock solutions and reagent doses. Budgeting in the lab
- Measuring plant productivity/stress using parameters such as: stomatal frequency, proline content, photosynthetic pigment concentrations and extent of mycorrhizal inoculation
- Lab equipment: calibrate and use of a pH meter and a conductivity meter, and the safe use of centrifuges and autoclaves
- Plant/cyanobacterial cell cultures: components of nutrient media. Establishment and continuous culture of plant callus and liquid cultures. Evaluating the growth rate and viability of cultured plant cells
- Micropropagation of plant clones: propagation of whole plants from sterile ex-plant material
- Cell death in plants: types of cell death in plants including programmed cell death and necrosis and the role of cell death in the plant hypersensitive response. Methods of inducing cell death in plants for scientific study, and enumerating two different types of cell death using staining techniques

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Demonstrate the techniques used to maintain aseptic conditions in a plant lab.
2. Prepare sterile nutrient media and complete an on-going sub-culturing regime for liquid plant and cyanobacterial cell cultures, plant callus and ex-plants.
3. Use and troubleshoot a range of commonplace lab equipment.
4. Calculate the weight of reagents needed to establish solutions of known concentrations and demonstrate proficiency in converting between the units commonly used in the plant science laboratory.
5. Experiment scientifically, interpret the data obtained, appraise observations, and plan further experimentation.
6. Investigate concepts/protocols used in laboratory plant science and evaluate their use.

Learning and Teaching Methods

- Lectures
- Tutorials
- Practical

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	36	
Tutorial	24	
Practical	36	
Independent Learning	174	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Lab Report	25%	5
In-Class Assessment	30%	4
Project	25%	6
Practical	20%	1,2,3

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to work effectively in a plant laboratory.

40%–49%: Demonstrate a limited knowledge of the subject matter. Show some technical ability/skill in carrying out and reporting on practical tasks.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Student can logically and competently carry out practical tasks.

60%–69%: Demonstrates sound knowledge of the subject matter. Practicals and reports completed to high standard.

70%–100%: Demonstrates excellent technical ability, awareness, and aptitude for working with cultured plant cells. Delivers insightful scientific writing. Develops high competency in practical areas.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the theory and practical components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Davey, M.R. and P. Anthony. *Plant Cell Culture: Essential Methods.* Oxford, UK: John Wiley & Son, 2010.

Supplementary Material(s)

- Jones, A., R. Reed and J. Weyers. *Practical Skills in Biology.* 5th ed. Oxford, UK. : Pearson, 2012.
- Lobban, C.S. and M. Schefter. *Successful Laboratory Reports: A Manual for Science Students.* Cambridge, UK. : Cambridge University Press, 1992.

Requested Resources

- Room Type: Biology Lab
- Room Type: Computer Lab

Landscape Design (A09821)

Short Title: Landscape Design
Department: Science
Credits: 10 **Level:** Intermediate

Description of Module / Aims

This module is a know-how and skills based module where students are introduced to the design process working from analysis, concept, through to design solution. It will enable students to design landscapes, carry out the necessary practices associated with landscape design, and the correct use of drawing equipment. Design theory and practice is taught through lectures, individual tuition, group tutorials, field trips and presentations.

Programmes

		stage/semester/status
DESG-0066	BSc in Horticulture (WD_SHORT_D)	2 / 3 / E
DESG-0066	BSc in Horticulture (WD_SHORT_D)	3 / 5 / E
DESG-0066	BSc in Horticulture (WD_SHORT_DX)	2 / 3 / E
DESG-0066	BSc in Horticulture (WD_SHORT_DX)	3 / 5 / E

Indicative Content

- Prepare design plans and specifications for given situations
- Linear surveying, level surveying, transferring information to sketch form
- Principles of design and elements of design
- History of designed landscapes
- Use of drawing equipment and drawing standards
- Draft site survey and site analysis drawings
- Draft masterplan drawings including section/elevation drawings
- Draft planting plans
- Draft axonometric drawing
- Draft construction details
- Costing proposed new designed landscapes

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Practise linear and level surveying safely.
2. Distinguish the principles of design.
3. Design landscape projects.
4. Create designs to the detailed plan and specification stage.
5. Relate how the elements of design, history of design, and different styles influence the design process.
6. Interpret plans and specifications.

Learning and Teaching Methods

- Lecture
- Tutorial
- Studio
- Site Visit
- Seminar/Tutorial

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Tutorial	72	
Independent Learning	174	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	2,5
Continuous Assessment	50%	
Portfolio	50%	1,3,4,6

Assessment Criteria

<40%: Survey and analysis weak or absent and/or design portfolio missing more than 50 % of drawings. Poor knowledge and understanding of the subject matter.

40%–49%: Identifies key site constraints and opportunities of site, portfolio of drawings complete, but design fails to fully exploit site or meet the needs of the client. Demonstrates a limited knowledge of the subject matter.

50%–59%: Identifies key site constraints and opportunities as well as subtle details, portfolio of drawings complete, design meets needs of clients but fails to fully exploit site opportunities. Demonstrates satisfactory general knowledge of the main issues within the subject matter.

60%–69%: Identifies key site constraints and opportunities as well as subtle details, portfolio of drawings complete, design meets needs of clients and exploits site opportunities. Demonstrates sound knowledge of the subject matter.

70%–100%: Identifies key site constraints and opportunities as well as subtle details, portfolio of drawings complete, design meets needs of clients, fully exploits site opportunities and ameliorates site difficulties. Demonstrates a highly developed and extensive understanding of the subject.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Alexander, R. *The Essential Garden Design Workbook*. 1st ed.. England: Timber Press, 2009.
- Reid, G.W. *From Concept to Form in Landscape Design*. 2nd ed.. United States: Wiley, 2007.
- Robinson, N. *The Planting Design Handbook*. England: Ashgate Publishing, Limited, 2004.

Supplementary Material(s)

- Mosser, M. and G. Teyssot. *The History of Garden Design*. London: Thames & Hudson, 2000.

Landscape Design Advanced (A09823)

Short Title: Landscape Design Advanced
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This is a studio based module where students build on knowledge and skills acquired in the 'Landscape Design' major elective. Students will concentrate totally on studio projects for public and semi public schemes and will include knowledge of correct maintenance (short-term) and ongoing management (long-term) procedures.

Programmes

		stage/semester/status
DESG-0012	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
DESG-0012	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Pre-Requisite(s)

- Landscape Design

Indicative Content

- Draft site surveys and site analysis
- Draft masterplans including section/elevation drawings
- Draft axonometric projections and construction details
- Draft planting plans
- Prepare a maintenance plan for proposed planting scheme

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Survey and analyse public and semi-public sites.
2. Design an appropriate landscape design meeting the needs of the client and working within the constraints of the site.
3. Use a variety of drawing types.
4. Propose suitable vegetation for a range of landscape contexts.
5. Compile a management plan and costings for a selected planting scheme.

Learning and Teaching Methods

- Studio
- Site visits

Learning Modes

Learning Type	F/T Hours	P/T Hours
Tutorial	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Portfolio	100%	1,2,3,4,5

Assessment Criteria

<40%: Survey and analysis weak or absent and/or design portfolio missing more than 50 % of drawings.

40%–49%: Identifies key site constraints and opportunities of site, portfolio of drawings complete, but design fails to fully exploit site or meet the needs of the client.

50%–59%: Identifies key site constraints and opportunities as well as subtle details, portfolio of drawings complete, design adequately meets needs of clients but fails to fully exploit site opportunities.

60%–69%: Identifies key site constraints and opportunities as well as subtle details, portfolio of drawings complete, design meets needs of clients well and exploits site opportunities.

70%–100%: Identifies key site constraints and opportunities as well as subtle details, portfolio of drawings complete, design expertly meets needs of clients, fully exploits site opportunities and ameliorates site difficulties.

Requested Resources

- Lecture Room: Loose Seated

Nursery Stock Production (A08541)

Short Title: Nursery Stock Production
Department: Science
Credits: 10 **Level:** Intermediate

Description of Module / Aims

This module is designed to equip students with knowledge of nursery stock production, management and planning. Students will learn nursery stock specific skills of planting, potting, crop protection and will perform cultural techniques for bedding plant, trees and shrub production. Plant health and exporting regulations are also covered.

Programmes

		stage/semester/status
HORT-0023	BSc in Horticulture (WD_SHORT_D)	2 / 3 / E
HORT-0023	BSc in Horticulture (WD_SHORT_D)	3 / 5 / E
HORT-0023	BSc in Horticulture (WD_SHORT_DX)	2 / 3 / E
HORT-0023	BSc in Horticulture (WD_SHORT_DX)	3 / 5 / E

Indicative Content

- Bedding plants: Nutritional programmes, Production of a range of bedding plants, Plan a crop protection programme
- Liner production: Sources of material, Propagation systems, Perform cultural techniques, Nutritional programmes
- Containerised trees, shrubs and herbaceous plants: Compost specification for various production programmes, Demonstrate potting skills, Growing-on systems, Plan a crop protection programme, Perform cultural techniques
- Open ground trees and shrubs: Soil preparation operations before planting, Budding and grafting for field tree production, Planting techniques, Plan a crop protection programme, Perform cultural techniques, Harvesting techniques
- Nursery stock management: Plan the physical layout of a nursery, Schedule production programmes of the above, Nursery irrigation systems, Monitor crop performance
- Quality assurance schemes: Quality standard specification for bedding, liners, trees, shrubs and herbaceous plants
- Sustainable plant production systems and use of contemporary new developments.

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Demonstrate in a safe working environment, a range of cultural tasks associated with nursery stock production including, budding, grafting, potting and planting.
2. Appraise the production of nursery stock crops such as bedding plants, liners, containerised plants and open ground stock.
3. Propose a crop protection programme appropriate to the nursery stock crop grown e.g. bedding plants, liners, containerised plants and open ground production systems.
4. Determine appropriate nutritional programs and compost specifications for a nursery stock crop.
5. Appraise a range of irrigation methods.
6. Investigate the effects of various propagation environments and materials for the production of liners.
7. Relate the requirements of the nursery stock quality assurance schemes and standard specifications to management strategies.

Learning and Teaching Methods

- Lectures
- Projects
- Practicals
- Site visits

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	48	
Practical	36	
Field Trips	12	
Independent Learning	174	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	2,3,5,7
Continuous Assessment	50%	
Practical	30%	1
Assignment	20%	4,6

Assessment Criteria

<40%: Very limited knowledge of plant production methods and cannot demonstrate understanding of plant production. Unable to complete practical skills or exercises.

40%–49%: Demonstrates a limited knowledge of plant production systems and processes. Limited technical ability but demonstrates ability to learn and understand new skills.

50%–59%: Demonstrates satisfactory general knowledge of the main areas of nursery stock production. Competently carries out practical tasks and skills. Reports and projects adequately structured and referenced.

60%–69%: Demonstrates sound knowledge of nursery stock production principles and systems. Demonstrates ability to interpret and analyse technical information logically. Projects, reports and exams coherent and soundly structured illustrating wide and in depth reading on subject coupled with the proper use of references.

70%–100%: Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject. Demonstrate imaginative approach, excellent technical ability, awareness, and aptitude in carrying out and reporting on practical/professional tasks.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Supplementary Material(s)

- Davidson, H., R. Mecklenburg and C. Peterson. *Nursery management: administration and culture.* 4th Edition. UK: Prentice hall, 2000.
- Lamb, K., J. Kelly and P. Bowbrick. *Nursery stock manual.* England: Grower books, 1995.
- Perry, L.P. *Herbaceous perennialsproduction: A guide from propagation to marketing.* Vermont: NARES series, 1998.
- Whitcomb, C. *Plant production in containers.* USA: Lacebark, 2003.

Plant Knowledge 1 (A08322)

Short Title: Plant Knowledge 1
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

This module for horticulturists will introduce the learner to a range of plant material, the use of botanical names, industry specifications for plants and planting techniques, turf grass establishment and maintenance, plant identification and identification of grass genera.

Programmes

		stage/semester/status
HORT-0036	BSc in Horticulture (WD_SHORT_D)	1 / 1 / M
HORT-0036	BSc in Horticulture (WD_SHORT_DX)	1 / 1 / M

Indicative Content

- Classification: Binomial system
- Categorizing trees, shrubs, perennial
- Plant selection and planting specification for the landscape industry
- Plant identification of 60 plants
- Turfgrass establishment
- Identification of Grass Genera

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Identify a range of plants using the correct botanical names.
2. Describe and categorise plant material.
3. Describe the industry specifications for plant material.
4. Describe and select appropriate planting techniques.
5. Describe turfgrass establishment.
6. Identify the main grass genera.

Learning and Teaching Methods

- Using live plant material.
- Lectures
- Practical demonstrations.
- Visit to plant producers and retailers.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	2,3,4,5
Continuous Assessment	50%	
Practical	50%	1,6

Assessment Criteria

<40%: Not able to identify 40% of plants with botanical names, cannot describe key industry plant description, cannot describe seed bed preparation.

40%–49%: Can identify at least 40 % of plants with botanical names, can describe key industry plant descriptions, can select and describe planting techniques, and understands principles of seed bed preparation.

50%–59%: All of the above and achieves 50% of plants identified, can describe seed bed preparation, sowing and sodding.

60%–69%: All the above with 60% of plants identified correctly with no spelling errors.

70%–100%: All of the above and 70% of plants identified correctly with no spelling errors.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Brickell, C. *Royal Horticultural Society A-Z Encyclopediaof Garden Plants [BOX SET].* London: Dorling Kindersley, 2008.
- Fitter, A. *Trees (Collins Gem Series).* London: HarperCollins Publisher, 2004.
- Johnson, A.T. *Plant Names Simplified.* Swadlincote: Landsmans Bookshop Limited, 1972.
- Turgeon, A.J. *Turfgrass Management.* Upper Saddle River N.J.: Pearson Prentice Hall, 2009.

Plant Knowledge 2 (A09802)

Short Title: Plant Knowledge 2
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

This module will introduce the learner to a range of plant materials, describe and categorise plant material to include bulbs and annuals, the principles of pruning of trees, shrubs, climbers, turfgrass maintenance and the identification and use of bedding plants.

Programmes

		stage/semester/status
HORT-0038	BSc in Horticulture (WD_SHORT_D)	1 / 2 / M
HORT-0038	BSc in Horticulture (WD_SHORT_D)	2 / 4 / E
HORT-0038	BSc in Horticulture (WD_SHORT_DX)	1 / 2 / M
HORT-0038	BSc in Horticulture (WD_SHORT_DX)	2 / 4 / E

Indicative Content

- Plant identification of 60 plants to include bedding plants
- Describe and categorise plant material (bulbs and annuals)
- Prepare displays of bedding plants
- Pruning techniques - formative pruning of trees, pruning of a variety of shrubs, climbers and perennials
- Turfgrass maintenance

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Identify a range plants to include bedding plants using their correct botanical name.
2. Describe and categorise plant material (bulbs and annuals).
3. Plan a display of bedding plants.
4. Determine and describe appropriate pruning techniques.
5. Describe turfgrass maintenance techniques.

Learning and Teaching Methods

- Using live plant material
- Lectures
- Practical demonstrations
- Visits to sites

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	2,4,5
Continuous Assessment	50%	
Practical	40%	1
Assignment	10%	3

Assessment Criteria

<40%: Not able to identify 40% of plants with botanical names, cannot describe any pruning techniques, cannot describe turfgrass maintenance, cannot select bedding plants.

40%–49%: Can identify at least 40% of plants with botanical names, basic description of turfgrass maintenance, can describe key pruning techniques but fails to consistently use them correctly, limited selection of bedding plants.

50%–59%: All of the above and achieves 50% of plants identified and selects correct pruning technique, good description of turfgrass maintenance techniques, acceptable selection of bedding plants.

60%–69%: All the above with 60% of plants identified correctly with no spelling errors, and an understanding of more complex pruning techniques, and good bedding plant selection.

70%–100%: All of the above and 70% of plants identified correctly with no spelling errors, consistently applies pruning techniques and has a complete understanding of turfgrass maintenance.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Brickell, C. *Royal Horticultural Society A-Z Encyclopedia of Garden Plants [BOX SET].* London: Dorling Kindersley, 2008.
- Brickell, C. and D. Joyce. *RHS Pruning and Training.* 1st. London: Dorling Kindersley , 1996.
- Fitter, A. *Trees (Collins Gem Series).* London: Collins, 2004.

Plant Propagation (A09835)

Short Title: Plant Propagation
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

A module to enable the student to acquire the principles, knowledge and skills to propagate a range of plants from seed, cuttings, grafting, division and layering. The student will be introduced to a range of techniques useful for the small and large scale production of plants.

Programmes

		stage/semester/status
HORT-0004	BSc in Horticulture (WD_SHORT_D)	1 / 2 / M
HORT-0004	BSc in Horticulture (WD_SHORT_D)	2 / 4 / E
HORT-0004	BSc in Horticulture (WD_SHORT_DX)	1 / 2 / M
HORT-0004	BSc in Horticulture (WD_SHORT_DX)	2 / 4 / E

Indicative Content

- Principles of propagation from seed: Preparing seed for sowing, sowing media, sowing seed, and raising plants
- Types of cuttings, systems, requirements for rooting, and cutting skills
- Principles of grafting and budding: Techniques, equipment required, and grafting skills
- Principles of division and layering: Division operations, and layering operations
- Tissue culture principles and techniques

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Use a range of propagation techniques such as growing plants from seed, cuttings, grafting or budding, division and layering.
2. Describe the production of plants from seed, cuttings, grafting or budding, division and layering.
3. Describe the procedure of plant production by tissue culture.
4. Operate safely in a nursery work environment

Learning and Teaching Methods

- Lectures
- Practical demonstrations
- Site visit

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	2,3
Continuous Assessment	50%	
Practical	50%	1,4

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out practical tasks.

40%–49%: Demonstrates a limited knowledge of the subject matter. Shows some technical ability/skill in carrying out and reporting on practical tasks.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Logically and competently carries out practical tasks.

60%–69%: Demonstrates sound knowledge of the subject matter. Practicals and reports completed to high standard.

70%–100%: Demonstrates excellent technical ability, awareness, and aptitude of the propagation of plants. Delivers insightful reports. Develops high competency in practical areas.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- McDonald, B. *Practical woody plant propagation for nursery growers.* USA: Timber Press, 2006.

Supplementary Material(s)

- MacMillan, B.P. *Plant Propagation.* UK: RHS, 2002.

Plant Protection (A08221)

Short Title: Plant Protection
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

The module will enable the student to describe and apply techniques to control weed, pests and diseases. The student will learn how to calibrate and use a knapsack sprayer correctly.

Programmes

		stage/semester/status
HORT-0002	BSc in Horticulture (WD_SHORT_D)	1 / 1 / M
HORT-0002	BSc in Horticulture (WD_SHORT_DX)	1 / 1 / M

Indicative Content

- Classification of pests, diseases, disorders and weeds
- Identification of pests, diseases, disorders and weeds
- Effect of pests, diseases, disorders and weeds on plant growth
- Control measures and IPM techniques for minimising infestations of pests, diseases, disorders and weeds, sustainably in crops
- Main types, application methods, formulations and modes of action of pesticides, plant pesticide resistance
- Outline the risks and benefits associated with pesticide use including plant pesticide resistance, methods of reducing contamination of the environment, and routes of contamination of the body, and the appropriate use of PPE when working with pesticides
- Current EU and National Legislation including Statutory Instrument 'Good Plant Protection Practice' (GPPP) in relation to pesticides. Maintenance of records, and safe handling, storage, transport, use and disposal of unused pesticides, empty containers, and application equipment (i.e. a 'system of work').
- Carry out risk assessment, and development of strategies for dealing with accidents and incidents involving spillages, contamination and poisoning
- Calibration, mixing and correct use and storage of a knapsack sprayer, slug pellet operator, and weedlick. Interpretation of pesticide labels and Safety Data Sheets (SDS).

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Identify a range of horticultural pests, diseases, disorders and weeds.
2. Describe the effects of infestations of pests, diseases, disorders and weeds on crops.
3. Describe life cycles, monitoring and control methods for pests, diseases, disorders and weeds.
4. Describe the main types, formulations, modes of action, and resistance to pesticides.
5. Describe the current pesticide regulations.
6. Operate a knapsack sprayer, calculate and make up spray mix, correctly apply a pesticide, demonstrate effective cleaning, storage, and calibration of equipment.

Learning and Teaching Methods

- Practical demonstrations
- Lectures

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	2,3,4,5
Continuous Assessment	50%	
Practical	15%	1
Practical	35%	6

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out practical tasks.

40%–49%: Demonstrates a limited knowledge of the subject matter. Shows some technical ability/skill in carrying out and reporting on practical tasks.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Logically and competently carry out practical tasks.

60%–69%: Demonstrates sound knowledge of the subject matter.

70%–100%: Demonstrates imaginative approach, excellent technical ability, awareness, and aptitude in carrying out and reporting on practical tasks.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- O'Dwyer, J. *Plant Protection Workbook.* Ireland: Teagasc, 2013.

Supplementary Material(s)

- "Resistance Management." http://www.agf.gov.bc.ca/pesticides/a_4.htm
- Buczacki, S and K Harris. *Pests, Disease and Disorders of garden plants.* London: Collins, 2000.
- Halstead, A. and P. Greenwood. *RHS Pests and Diseases.* London: Dorling Kindersley, 2009.
- Hessayon, D.G. *The Pest and Weed Expert.* London: Expert Books, 2009.
- Heyler, N., N. Cattlin and K. Brown. *Biological Control in Plant Protection.* 2nd ed. New York: CRC press, 2014.
- Stephens, R.J. *Theory and Practice of Weed Control.* Bath University, UK: Gage Distribution Co., 1982.

Requested Resources

- Lecture Room: Loose Seated

Plants and Society (A01002)

Short Title: Plants and Society
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module examines the importance of plants in modern society and tackles some of the increasingly complex issues that surround the biotechnology of plants. It is necessary for science students to understand these issues and to practice defending their informed opinions, the protocols used and also the plant science research that takes place during the development of new biotechnologies. Society increasingly looks to science graduates to bridge the gap in their understanding of novel biotechnology and this module will help science students to develop skills in evaluating news sources and debating, and ultimately, will produce graduates who will inform society and foster trust in the scientific process. This elective is offered to any science student in WIT who seeks to develop their knowledge of plant biotechnology, the importance of plants in society, and who wants to learn how to generate convincing arguments.

Programmes

		stage/semester/status
HORT-0034	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
HORT-0034	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Indicative Content

- Climate Change: The role of plants in carbon sequestration and carbon release. Early earth environments. Climate change through the eons Plant fossils. Global average temperatures. The greenhouse effect.
- Evolution: Fundamentals of evolution and speciation. Cladistics and the tree of life. Evidence for Evolution. Evolution controversies. Antibiotic use in plant propagation and evolution in the context of antibiotic resistance
- Food security: Fundamentals of GM technology. Terminator technology. Land use change. Rising populations. Intergovernmental policies regarding food security
- Science communication: Distinguishing between reliable sources of information. Responsible use of social media, blogs and message boards. Using evidence based reasoning to participate in constructive and informative arguments
- Nature deficit disorder: Specifically, the reasoning behind why society may not appreciate plant life
- Popular Science: Evaluating the quality of popular science and methods of incorporating popular science in life-long learning.

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Explore reliable scientific information from a variety of print and online resources.
2. Appraise popular science publications from a variety of print and online resources.
3. Investigate the on-going environmental impacts of fertiliser, antibiotic and GM plant use.
4. Analyse the process of inquiry and the assimilation of knowledge.
5. Establish how plants have contributed to and can be used to mitigate global climate change.
6. Research and discuss an appropriate topic.
7. Produce a researched and informative presentation on a given topic.
8. Express opinions logically and persuasively in group discussions.

Learning and Teaching Methods

- Lectures
- Workshops
- Moodle-based Discussion Forums

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Workshop	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Group Project	40%	1,2,3,5,6
Participation	40%	4,8
Presentation	20%	7

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in research ability/skill and understanding to carry out practical tasks. Unwilling to participate in group discussions.

40%–49%: Demonstrates a limited knowledge of the subject matter. Show some research ability/skill when presenting evidence-based arguments.

50%–59%: Demonstrates satisfactory general knowledge of the main issues discussed. Logically and competently carries out research tasks and presents evidence adequately.

60%–69%: Demonstrates sound knowledge of the subject matter. Presentations and reports completed to high standard. Participates adequately in class discussions.

70%–100%: Demonstrates excellent research ability and awareness of the complexities of modern-day plant science and demonstrates an aptitude for delivering convincing arguments using evidences based reasoning. Regularly directs discussions and encourages peer discussion.

Requested Resources

- Lecture Room: Loose Seated

Protected Crop Production (A08621)

Short Title: Protected Crop Production
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

The student will be introduced to a range of protected structures and their environmental control. The module will enable the student to draw up management and production schedules for a range of crops in greenhouses using best industry practice.

Programmes

		stage/semester/status
HORT-0048	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
HORT-0048	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Indicative Content

- Structure, design and site selection of protective structures
- Environmental management and control within protective structures
- Water and nutrient management of protected crops
- Crop production techniques for heated and cold greenhouse crops
- Production and management of a selection of heated and cold greenhouse crops
- Plant protection of protected crops
- Glass House technology and sensor technology, precision technology.

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Determine appropriate protective structures for specific site requirements.
2. Propose appropriate environmental control, irrigation and feeding systems.
3. Develop production and management schedules for protected crops.
4. Integrate good environmental practices into recommendations for heated and cold crops.
5. Demonstrate safely a range of skills involved in protected crop production.
6. Investigate contemporary developments in glass house and sensor technology.

Learning and Teaching Methods

- Lectures
- Practical demonstration
- Practice

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	36	
Practical	12	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,2,4,6
Continuous Assessment	50%	
Practical	25%	5
Project	25%	3

Assessment Criteria

<40%: Very limited knowledge of protected plant production methods and cannot demonstrate understanding of production methods or protected structures. Unable to complete practical skills or exercises.

40%–49%: Demonstrates a limited knowledge of protected plant production systems and processes. Limited technical ability but demonstrates ability to learn and understand new skills.

50%–59%: Demonstrates satisfactory general knowledge of the main areas of protected plant production. Competently carries out practical tasks and skills. Reports and projects adequately structured and referenced.

60%–69%: Demonstrates sound knowledge of protected production principles and systems. Demonstrates ability to logically interpret and analyse technical information. Projects, reports and exams coherent and soundly structured.

70%–100%: Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject. Demonstrates imaginative approach, excellent technical ability, awareness, and aptitude in carrying out and reporting on practical/professional tasks.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Supplementary Material(s)

- Beytes, C. *Ball Redbook Volume 1: Greenhouses and Equipment.* 18th ed. Illinois: Ball Publishing, 2011.
- Boodley, J.W. and S.E. Newman. *The Commercial Greenhouse.* 3rd ed. New York: Delmar Cengage Learning, 2009.
- MacNeidhe, F. *Out of Season Strawberry Production under Polythene.* Dublin, Ireland. : Teagasc, 1999.

Social and Therapeutic Horticulture (A09746)

Short Title: Social and Therapeutic Hort
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module will provide students with an opportunity to review current practices in horticultural therapy and to gain an understanding of the benefits and uses of horticulture for the needs of different groups.

Programmes

		stage/semester/status
HORT-0049	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
HORT-0049	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Indicative Content

- Origins of horticultural therapy, history of use
- Examine range of applications, needs of different groups, prison gardens, care farms, visually impaired, learning difficulties, physical disabilities, and school gardens
- Examine the range of adaptive equipment available for different needs, therapeutic qualities of plants, plant selection for different needs, and design considerations
- Methods used in assessment to modify horticultural activities and assess abilities at horticultural tasks, resources available, and case studies

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Explore the origins of horticulture therapy.
2. Analyse the impact of horticultural therapy on a range of different user groups
3. Recommend a range of tools and suitable plants for a variety of therapeutic situations.
4. Develop appropriate session plans for a group in a horticulture setting.

Learning and Teaching Methods

- Using live plant materials for specialist purposes.
- Lectures
- Practical demonstrations
- Guest speaker/Site visit

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	12	
Field Trips	12	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	70%	1,2,3
Continuous Assessment	30%	
Project	30%	4

Assessment Criteria

<40%: Very little knowledge and understanding of the subject matter. Unable to carry out critical thinking or practical skills.

40%–49%: Demonstrates a limited knowledge of the subject matter. May have some problems with critical thinking and problem solving. Adequate practical skills.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Good practical skills.

60%–69%: Demonstrates skilled and sound knowledge of the subject matter. Shows ability to analyse and logically discuss in an effective way. Good critical thinking and a high level of competence and efficiency in theoretical and practical areas of this subject.

70%–100%: All of the above to an excellent level. Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Adil, J.R. *Accessible gardening: A guide for people with disabilities.* U.S: Woodbine, 1994.
- Simson, S.P. and M.C. Straus. *Horticulture as therapy: Principles and Practices.* NY: Haworth Press, 1998.

Supplementary Material(s)

- Hewson, M.L. *Horticulture as therapy: A practical guide to using horticulture as a therapeutic tool.* Canada: Hewson, 1994.

Requested Resources

- Lecture Room: Loose Seated

Soil and Growing Media (A08581)

Short Title: Soil and Growing Media
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

This module is designed to equip students with a basic knowledge of soils including soil formation, composition and properties. Students will also learn about the macronutrients and micronutrients involved in plant nutrition. The student will learn how to carry out soil sampling and a range of soil analyses. The student will carry out an analysis of a selected soil.

Programmes

		stage/semester/status
HORT-0037	BSc in Horticulture (WD_SHORT_D)	1 / 1 / M
HORT-0037	BSc in Horticulture (WD_SHORT_DX)	1 / 1 / M

Indicative Content

- Soil formation, composition and classification
- Physical, chemical and biological properties of soils and growing media
- Plant nutrition
- Soil sampling and analysis

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Describe the processes involved in the formation of soil.
2. Describe the physical, chemical and biological properties of soils and growing media and the classification of soils.
3. Discuss the role in plants and sources of macronutrients and micronutrients.
4. Discuss a range of alternative growing media.
5. Interpret a soil report and determine fertiliser requirements.
6. Use a range of laboratory techniques to characterise soils and growing media.

Learning and Teaching Methods

- Lectures
- Laboratory practical's
- Fieldwork

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	30	
Practical	18	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,2,3,4
Continuous Assessment	50%	
Practical	40%	2,6
Assignment	10%	5

Assessment Criteria

<40%: Unable to outline key concepts. Cannot perform basic soil analysis.

40%–49%: Basic knowledge of the key learning outcomes including soil formation, composition and properties. Can perform basic soil analysis.

50%–59%: As well as the above, demonstrates an understanding of some of the complexities of soil management.

60%–69%: In addition to the above, the student demonstrates a more detailed knowledge of soil management and a high level of competence in the area.

70%–100%: All of the above to an excellent level. Advanced knowledge of the topic is supported by superior skills.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Ashman, M.R. and G. Puri. *Essential Soil Science: a Clear and Concise Introduction to Soil Science.* 1st ed. Massachusetts: Wiley-Blackwell, 2008.

Supplementary Material(s)

- Adams, C., M. Early, J. Brook and K. Bamford. *Principles of Horticulture.* 6th ed. Oxford: Routledge, 2012.
- Brady, N.C. and R.R. Weil. *The Nature and Properties of Soils.* 14th ed. U.K.: Pearson, 2013.
- Foth, H.D. *Fundamentals of Soil Science.* 8th ed. U.K.: Wiley, 1990.

Requested Resources

- Lecture Room: Loose Seated
- Room Type: Chemistry Lab

Sportsturf Science (A08603)

Short Title: Sportsturf
Department: Science
Credits: 10 **Level:** Intermediate

Description of Module / Aims

This module aims to enable students to develop an understanding of the construction and maintenance of turf and artificial surfaces used for sports.

Programmes

		stage/semester/status
SPOR-0092	BSc in Horticulture (WD_SHORT_D)	2 / 3 / E
SPOR-0092	BSc in Horticulture (WD_SHORT_D)	3 / 5 / E
SPOR-0092	BSc in Horticulture (WD_SHORT_DX)	2 / 3 / E
SPOR-0092	BSc in Horticulture (WD_SHORT_DX)	3 / 5 / E

Indicative Content

- Turfgrass science: Soils for sportsturf, drainage and irrigation for sportsturf, grass morphology and physiology, turfgrass pathology and entomology, sportsturf weeds and control
- Turfgrass maintenance: Turfgrass mowing, management of organic matter, nutrition of turfgrass, aeration and compaction relief of turfgrass, renovation and repair of turfgrass, topdressing and materials, growth regulation, and other maintenance techniques
- Construction and maintenance of a range of sportsturf facilities: Sports pitches, bowling greens, cricket grounds, lawn tennis courts, equestrian sports and artificial surfaces

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Determine and specify appropriate soil types and root zones for specific sportsturf construction.
2. Interpret the principles of drainage and irrigation and describe appropriate methods for sportsturf.
3. Distinguish the main turf grass species and a range of pests, diseases and weeds associated with turfgrass.
4. Explore the factors influencing pests of turfgrass and propose appropriate IPM control methods in response to turfgrass pests, diseases and weeds.
5. Explore maintenance techniques and equipment required for turfgrass maintenance.
6. Demonstrate a range of turfgrass maintenance techniques.
7. Produce a plan of appropriate maintenance techniques for a range of sportsturf constructions

Learning and Teaching Methods

- Lectures
- Practical assignments
- Reports

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	72	
Practical	24	
Independent Learning	174	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,2,4,5,
Continuous Assessment	50%	
Assignment	25%	7
Practical	25%	3,6

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out practical/professional tasks. Failure to meet the objectives of projects. Unable to carry out or submit independent study and research.

40%–49%: Demonstrates a limited knowledge of the subject matter. Show some technical ability/skill in carrying out and reporting on practical/professional tasks. Attempt made to meet objectives and carry out independent study and research. Final result lacks balance and arguments undeveloped.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Logically and competently carries out practical/professional tasks. Satisfactory handling and awareness in carrying out independent study and research. Reporting and projects adequately structured and referenced.

60%–69%: Demonstrates sound knowledge of the subject matter. Show ability to analyse and logically argue in an effective and mature style. Demonstrate initiative and the ability to criticise methods used and appreciation of experimental design when carrying out practical/professional tasks. Projects and reporting coherent and soundly structured illustrating wide and in depth reading on subject coupled with the proper use of references.

70%–100%: Demonstrates authoritative handling of complex material and a highly developed and extensive understanding.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Supplementary Material(s)

- Brown, S. *Sports Turf and Amenity Grassland Management.* Wiltshire: The Crowood Press Ltd, 2005.
- Evans, R.D.C. *Bowling greens: Their history, construction and maintenance.* Bingley, West Yorkshire, England: Sports Turf Research Institute, 1992.
- Evans, R.D.C. *Cricket grounds: The evolution, maintenance construction of natural turf cricket tables and outfields.* Bingley, West Yorkshire, England: The Sports Turf Research Institute, 1991.
- Evans, R.D.C. *Winter games pitches, the construction and maintenance of natural turf pitches.* 1st. Bingley, West Yorkshire, England: Sports Turf Research Institute, 1994.
- Fry, J. and B. Huang. *Applied Turfgrass Science and Physiology.* New Jersey: Wiley, 2004.
- Lodge, R. and S. Shanks. *All Weather Surfaces for Horses.* 3rd ed. London: J. A. Allen Publishing, 2005.
- McCarty, L.B., I.R. Rodriguez, B.R. Bunnell and F.C. Waltz. *Fundamentals of Turfgrass and Agricultural Chemistry.* New Jersey: Wiley, 2003.
- Perris, J. *Grass Tennis Courts. How to construct and maintain them.* 1st ed. Bingley, West Yorkshire, England: The Sports Turf Research Institute, 2000.
- Phulla, J., J. Krans and M. Goatley. *Sports Fields: A manual for design, construction and maintenance.* 2nd ed. New Jersey: Wiley, 2010.

Requested Resources

- Room Type: Biology Lab

Sustainable Food Production (A11485)

Short Title: Sustainable Food Prod.
Department: Science
Credits: 10 **Level:** Intermediate

Description of Module / Aims

The module will enable the student to plan and describe the production of a range of speciality food crops and perform the associated skills to best industry practices.

Programmes

		stage/semester/status
FOOD-0023	BSc in Horticulture (WD_SHORT_D)	2 / 3 / E
FOOD-0023	BSc in Horticulture (WD_SHORT_D)	3 / 5 / E
FOOD-0023	BSc in Horticulture (WD_SHORT_DX)	2 / 3 / E
FOOD-0023	BSc in Horticulture (WD_SHORT_DX)	3 / 5 / E

Indicative Content

- Salad crops, scallions, lettuce and celery: Soil, site and rotation. Cultivars. Sowing/planting and irrigation. Cultivation and nutrition. Weed, pest and disease control including SUD/IPM. Harvesting and grading
- Rhubarbs, asparagus, courgettes and sweetcorn: Site selection and soils. Cultivars. Cultivation and nutrition. Weed, pest and disease control including SUD/IPM. Harvesting and grading
- Leeks, peas and beans: Site selection and soils. Cultivars. Cultivation and nutrition. Weed, pest and disease control including SUD/IPM. Harvesting and grading
- Beetroot, radish and spinach: Site selection and soils. Cultivars. Cultivation and nutrition. Weed, pest and disease control including SUD/IPM. Harvesting and grading
- Herbs (culinary and medicinal): Market size and outlet. Range of herb crops. Site selection and soils. Cultivation and nutrition. Weed, pest and disease control including SUD/IPM. Harvesting and grading
- Blueberries, blackberries and currants: Propagation methods. Choice of varieties. Nutrition Soil preparation and planting. Pest disease and weed control including SUD/IPM. Picking, training and pruning
- Nitrates Directive, FSAI regulations, Bord Bia QA scheme, Origin Green, Pesticide Control/Registration
- Organic Conversion: Time periods, and preparation of application form
- Pest and disease management in an organic system 'v' conventional systems
- Soil fertility and management in an organic system 'v' conventional systems
- Regulation of organic production, grading and marketing of produce

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Analyse the propagation and production of a range of food crops (including vegetables, fruit and herbs) under sustainable systems.
2. Produce a conversion plan for an organic production system.
3. Complete routine tasks associated with specialty crops.
4. Relate the requirements of the quality assurance schemes, EU directives, and other regulations to management strategies in food production systems.

Learning and Teaching Methods

- Lecture
- Practical demonstration
- Project
- Practice

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	48	
Practical	48	
Independent Learning	174	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,4
Continuous Assessment	50%	
Project	25%	2
Practical	25%	3

Assessment Criteria

<40%: Very little knowledge and understanding of the subject matter. Unable to carry out critical thinking or practical skills.

40%–49%: Demonstrates a limited knowledge of the subject matter. May have some problems with critical thinking and problem solving. Adequate practical skills.

50%–59%: Demonstrates satisfactory general knowledge of the main issues within the subject. Good practical tasks.

60%–69%: Demonstrates skilled and sound knowledge of the subject matter. Shows ability to analyse and logically discuss in an effective way. Good critical thinking and a high level of competence and efficiency in theoretical and practical areas of this subject.

70%–100%: All of the above to an excellent level. Demonstrates authoritative handling of complex material and a highly developed and extensive understanding of the subject.

Note: In addition to the normal regulations, a minimum of 35% must be achieved in both the final exam and continuous assessment components of the module. In cases where continuous assessment has a practical component attendance of at least 75% in the practicals is mandatory.

Essential Material(s)

- Pollock, M. *RHS Vegetable & Fruit Gardening.* London: Dorling Kindersley, 2012.

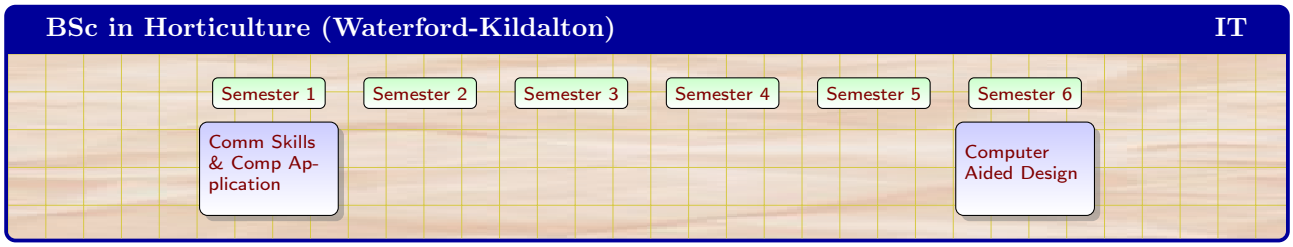
Supplementary Material(s)

- "Protected Crop Growing, A guide for home and Market Gardeners." http://www.teagasc.ie/. http://www.teagasc.ie/pu
- Dixon, G.R. and D.E. Aldous. *Horticulture:Plants for People and Places, Volume 1.* Amsterdam: Springer Netherlands, 2014.
- Larkcom, J. *The Organic Salad Garden.* London: Frances Lincoln, 2006.

Requested Resources

- Lecture Room: Loose Seated

IT



Communication Skills and Computer Applications (A06902)

Short Title: Comm Skills & Comp Application
Department: Science
Credits: 5 **Level:** Introductory

Description of Module / Aims

This module will teach the student how to communicate effectively using written and oral media. Students will be shown how to find and reference reliable information from a variety of sources. The student will gain a competency in the Microsoft Windows operating environment, as well as a proficiency in file and data management. An introduction to the basic principles of word processing, spreadsheets and presentations will be given. Report writing and presentation skills will be acquired, such that the student can competently present material in a format acceptable for reports and presentations.

Programmes

		stage/semester/status
COMP-0578	BSc in Forestry (WD_SFORS_D)	1 / 1 / M
COMP-0578	BSc in Horticulture (WD_SHORT_D)	1 / 1 / M
COMP-0578	BSc in Horticulture (WD_SHORT_DX)	1 / 1 / M

Indicative Content

- Research and referencing: introduction to the sourcing of information, plagiarism and correct referencing
- Writing skills: planning, structuring and executing a piece of written communication, proof-reading skills, editing skills
- Communication in teams: stages in team-building, composition of successful teams
- Structure of formal meetings: role of secretary, role of chairperson, function of agenda, minutes, standing orders, motions
- Oral presentations: identifying the audience, defining objectives, structuring a presentation
- MS Windows environment: effective and efficient file management, privacy and security
- Word processing: creating, editing, formatting, saving and printing documents; creating and editing tables, table of contents and manipulation of images in documents
- Spreadsheets: creating, editing, formatting, saving and printing workbooks and worksheets; sorting data, using formulas, charts, filters and links
- Presentations: creating, editing, formatting, saving and printing presentations; use of images, animations and transitions in presentations

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Identify information from reliable sources and use an appropriate referencing system to generate a bibliography.
2. Reproduce letters, reports, minutes and memoranda using word processing software.
3. Report information orally using presentation software.
4. Explain data using spreadsheet software.

Learning and Teaching Methods

- Lectures.
- IT practicals.
- Group work.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Practical	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
In-Class Assessment	30%	4
Presentation	20%	3
Portfolio	50%	1,2

Assessment Criteria

<40%: Poor presentation and/or poorly communicated and formatted assignments.

40%–49%: Presentation adequate, communication and technology use adequate.

50%–59%: Presentation of material is competent with clear ideas and logical structure, few if any grammatical and spelling errors. Competent display of IT skills.

60%–69%: Presentation of material is logical and persuasive, indicates strong communication and technical skills.

70%–100%: Excellent communication of material supported by use of correct conventions and excellent use of technology.

Essential Material(s)

- McClave, H. *Communications for Business.* . 4th. Dublin: Gill & McMillan Ltd, 2008.

Supplementary Material(s)

- Kennedy, J.A. *Complete ECDL 5.* 2nd ed.. Dublin: Gill & Macmillan, 2011.

Requested Resources

- Room Type: Computer Lab

Computer Aided Design (A09850)

Short Title: Computer Aided Design
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module will enable students to produce simple landscape design plans using computer aided design (CAD), and to print out drawings to scale.

Programmes

		stage/semester/status
CADD-0002	BSc in Horticulture (WD_SHORT_D)	3 / 6 / E
CADD-0002	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / E

Indicative Content

- Identify components of a CAD system
- Use quick setup wizard
- Use menu commands
- Use snap, grid, ortho, object snap
- Use scale grids
- Use drawing tools
- Use layers
- Dimensions and leaders
- Produce a hard copy of a file
- Plot to scale

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Operate CAD software drawing and modifying tools.
2. Complete simple landscape drawing using CAD.
3. Create drawings and plot them.
4. Produce printed drawings to scale.

Learning and Teaching Methods

- Practical sessions using computers, and supervised sessions using CAD.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Practical	48	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Practical	80%	1,3,4
Project	20%	2

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to carry out the task.

40%–49%: Demonstrate a limited knowledge of the subject matter. Shows some technical ability/skill in carrying out the task.

50%–59%: Demonstrate a good knowledge of the subject matter. Shows good technical ability/skill in carrying out the task.

60%–69%: Demonstrate a sound knowledge of the subject matter, logically and competently carries out the practical/professional task.

70%–100%: Demonstrate a very good knowledge of the subject matter. Shows good technical ability/skill in carrying out the task, and can print plan to scale.

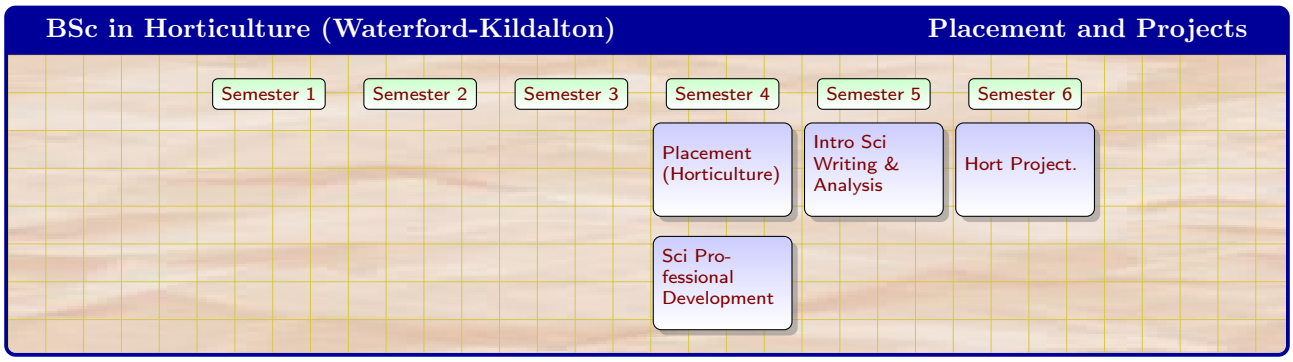
Supplementary Material(s)

- Autodesk Official Press, A. *Mastering AutoCAD 2016 and AutoCAD LT 2016*. London: Autodesk Official Press, 2016.

Requested Resources

- Room Type: Computer Lab

Placement and Projects



Horticulture Project and Seminar (A14579)

Short Title: Hort Project.
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module provides the opportunity to collect, analyse and present horticulture-related data obtained from a group project. Projects and groups will be assigned to students. Projects may involve growth experiments, surveys of societal or consumer attitudes or inclinations, or may be design oriented. Projects will be implemented by the group and written up individually. Groups will then work together at the end of the semester to present their findings in a poster seminar.

Programmes

		stage/semester/status
HORT-0044	BSc in Horticulture (WD_SHORT_D)	3 / 6 / M
HORT-0044	BSc in Horticulture (WD_SHORT_DX)	3 / 6 / M

Indicative Content

- The scientific method(s): generating and using null and alternative hypotheses; examining what is a researchable question
- Working effectively as part of a team: what to expect from your peers, from your supervisor, and methods to overcome motivational challenges within a team
- Structuring a research project: deciding number of replicates, random block design generation, positive and negative controls, working titles, project outline, and timing
- Collecting and interpreting data: designing and administering questionnaires, planning and conducting interviews, using internet-based facilities to share group data, and pitfalls to avoid when interpreting data
- Presenting results: graphical and tabular presentation of data, and explanation of data quality using standard deviation and standard error
- Designing scientific posters: generating impactful, clear and attractive poster presentations
- Presentation skills: examining the effective use of narrative-based presentation of scientific data; methods of overcoming performance anxiety and building resilience
- Writing reports: getting started, structuring, and revising written reports, guarding against plagiarism and evaluating the written report

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Formulate a horticulture-related hypothesis using the scientific method.
2. Set up a horticultural experiment and collect data as part of a team.
3. Prepare a report outlining methods, results and significance of the outcomes of a horticulture-related study.
4. Design, and present a poster presentation as part of a team on a body of research.
5. Appraise the methods used and data collected during the course of a horticulture-related study.
6. Establish the limitations and opportunities for improvement within a horticulture-related study.

Learning and Teaching Methods

- Lectures.
- Group and individual workshops.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	12	
Workshop	12	
Independent Learning	111	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Project	60%	1,3,5,6
Participation	20%	2,4,
Presentation	20%	4

Assessment Criteria

<40%: Very limited knowledge and understanding of the subject matter. Lacking in technical ability/skill and understanding to work effectively as a researcher. Functions poorly as a member of a team.

40%–49%: Demonstrates a limited knowledge of scientific method(s) and experiment design and implementation. Shows some technical ability/skill in carrying out and reporting on practical tasks. Limited function as a member of a team.

50%–59%: Demonstrates satisfactory general knowledge of scientific method(s) and experiment design and implementation. Logically and competently carries out practical tasks. Works well as a member of the team and is often one of the first to show initiative in a group.

60%–69%: Demonstrates sound knowledge of experiment design and implementation of experiments according to scientific methods. Practicals and reports completed to high standard. Works effectively as a team member and shows continued initiative within a working group.

70%–100%: Demonstrates excellent technical ability, awareness, and aptitude for working as a researcher. Delivers insightful scientific writing and presents data with impact. Develops high competency in data analysis and shows leadership qualities during group work.

Essential Material(s)

- Bell, J. and S. Waters. *Doing Your Research Project: A Guide for First-Time Researchers in Education, Health and Social Science.* 6th ed. Berkshire, UK: Open University Press, 2005.

Supplementary Material(s)

- Jones, A., R. Reed and J. Weyers. *Practical Skills in Biology.* Oxford, UK. : Pearson, 2012.
- Pechenik, J.A. *A Short Guide to Writing About Biology.* 9th ed. London, Uk: Pearson, 2016.

Requested Resources

- Lecture Room: Loose Seated
- Room Type: Computer Lab

Introduction to Scientific Writing and Data Analysis (A08041)

Short Title: Intro Sci Writing & Analysis
Department: Science
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module is designed to enable the student to read and interpret academic writing, and to produce a competently written and well-structured literature review. The student will choose a topic from a list, and will construct a literature review based on three to five papers provided by the tutor, and two to three papers sourced by the student.

Programmes

		stage/semester/status
SCIE-0061	BSc in Horticulture (WD_SHORT_D)	3 / 5 / M
SCIE-0061	BSc in Horticulture (WD_SHORT_DX)	3 / 5 / M

Indicative Content

- Critical reading
- Development of academic writing skills and referencing
- Literature searching
- Structuring a literature review
- Basic statistical analysis
- Data presentation: graphical and tabular

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Interpret published academic work to identify themes and trends.
2. Analyse published academic work and comment upon its significance.
3. Construct a literature review on the current state of knowledge in a given topic area which is prepared using appropriate structure, language, grammar, punctuation and referencing.
4. Analyse data using basic statistical techniques.
5. Use appropriate software to present data in graphical and tabular formats
6. Prepare an abstract.

Learning and Teaching Methods

- Tutorials.
- Practical training in library and/or computer laboratory.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Tutorial	24	
Independent Learning	111	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	60%	1,2,3
In-Class Assessment	20%	4,5
Assignment	20%	6

Assessment Criteria

<40%: Little or no evidence of interpretation of the supplied papers. Poorly structured and/or presented literature review. Incorrect or inadequate referencing. Little or no ability to analyse and present data. Poorly written abstract.

40%–49%: Demonstrates a basic level of understanding of the supplied papers. Shows a limited ability to identify themes/trends and to structure a literature review. Makes an attempt to reference but with errors. Some evidence of proofreading. Some ability to analyse and present data. Limited ability to produce an abstract.

50%–59%: Demonstrates a good understanding of the supplied papers. Identifies themes and trends. Attempts to paraphrase and consider opposing ideas. Referencing largely correct. Proofreading generally good. Good attempt at analysing and presenting data. Good attempt at producing an abstract.

60%–69%: Demonstrates a good understanding of the supplied papers. Identifies themes and trends. Paraphrases and presents opposing ideas competently. Few errors in referencing and proofreading. Competent data analysis and presentation. Competently produced abstract.

70%–100%: Demonstrates a high level of understanding of the supplied papers. Identifies themes and trends. Paraphrases and presents opposing arguments to a high standard of competence. Referencing correct throughout. Evidence of excellent proofreading. Excellent standard of data analysis and presentation. Excellent abstract.

Essential Material(s)

- Bell, J. and S. Waters. *Doing Your Research Project: A Guide for First-time Researchers.* 6th ed.. Berkshire: Open University Press, 2014.
- Cargill, M. and P. O'Connor. *Writing Scientific Research Articles: Strategy and Steps.* West Sussex: Wiley-Blackwell, 2009.

Requested Resources

- Room Type: Computer Lab

Placement (Horticulture) (A11526)

Short Title: Placement (Horticulture)
Department: Science
Credits: 30 **Level:** Intermediate

Description of Module / Aims

The module introduces the student to work in their chosen specialism with a 15 week placement in the horticulture industry. The student is supervised by the host on a day-to-day basis, and the placement is monitored by Teagasc staff. The student will keep a written diary and visual portfolio (digital photographs) of the tasks he/she carried out at the workplace. Students are also encouraged to seek placements overseas.

Programmes

		stage/semester/status
PLAC-0150	BSc in Horticulture (WD_SHORT_D)	2 / 4 / E
PLAC-0150	BSc in Horticulture (WD_SHORT_DX)	2 / 4 / E

Indicative Content

- Placement period of 15 weeks when student will: use safe practices, avail of learning opportunities and turn up on time
- Performance of work: work output and quality, dependability, performing tasks in accordance with directions, initiative, adaptability and applying theory to practice
- Develop and maintain excellent working relationships: communicating and working with co-workers, and communicating and working with host
- Record of placement experience: particulars and features of business, enterprise details, weekly diary, photographical evidence, and end of placement summary
- Placement review: knowledge and skills gained, planning ability, and reflective personal conclusion on placement experience

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Construct a professional CV, and prepare for interview to secure a placement.
2. Plan learning objectives for the placement.
3. Operate independently and/or as part of a team towards the set objectives of the horticultural enterprise.
4. Apply competently their horticultural knowledge and skills in a range of settings.
5. Practise safely, horticulture related skills and employ good environmental practices.
6. Examine their personal, professional and technical achievements on the placement.
7. Communicate their activities and assessment of the horticultural enterprise in a professional manner.
8. Complete a portfolio of images documenting work practices and experiences using digital photography.

Learning and Teaching Methods

- Practical demonstrations.
- Supervised practice.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Placement	810	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Reflective Journal	Pass/Fail	6,7
Supervisor's Report	Pass/Fail	3,4,5
Portfolio	Pass/Fail	1,2,8

Assessment Criteria

Fail: Student fails to undertake or complete placement to a satisfactory level and/or fails to submit the assessments and documents related to the learning outcomes

Pass: Minimum period of at least 15 weeks placement completed, satisfactory Supervisor Evaluation Report submitted, and assessments and documents related to the learning outcomes, all to an acceptable standard submitted within deadlines

Supplementary Material(s)

- Harman, D. *The Digital Photography Handbook: An Illustrated Step-by-step Guide*. London, UK. : Quercus, 2014.

Science Professional Development (A32621)

Short Title: Sci Professional Development
Department: Science
Credits: 30 **Level:** Intermediate

Description of Module / Aims

The Science Professional Development module is an elective module designed as an alternative to the Work Placement module in Science programmes, taken by the student with prior agreement with the module supervisor. This module facilitates the student to reflect on their own professional aims and motivation for learning, to identify gaps in their professional knowledge and take the initiative and responsibility for meeting their own learning needs. This mode of learning recognises the student s agency in taking responsibility for their learning with the support of the module supervisor. This module will offer the student a broad range of professional experience. In addition to gaining specialised knowledge and skills, participating students will demonstrate the acquisition of many transferable skills. These will include individual initiative and personal responsibility, learning flexibly, operating and communicating effectively in a multi-disciplinary environment and specialised knowledge transfer

Programmes

		stage/semester/status
SCIE-0085	BSc (Hons) in Physics for Modern Technology (WD_KPHTE_B)	3 / 6 / E
SCIE-0085	BSc (Hons) in Agricultural Science (WD_SAGRI_B)	3 / 6 / E
SCIE-0085	BSc in Agriculture (WD_SAGUL_D)	2 / 4 / E
SCIE-0085	BSc in Food Science with Business (WD_SFDSC_D)	3 / 5 / E
SCIE-0085	BSc in Forestry (WD_SFORS_D)	2 / 4 / E
SCIE-0085	BSc (Hons) in Food Science and Innovation (WD_SFSIN_B)	3 / 5 / E
SCIE-0085	BSc in Horticulture (Waterford-Kildalton) (WD_SHORT_D)	2 / 4 / E
SCIE-0085	BSc in Horticulture (Botanic Gardens) (WD_SHORT_DX)	2 / 4 / E
SCIE-0085	BSc (Hons) in Molecular Biology with Biopharmaceutical Science (WD_SMBIO_B)	3 / 6 / E
SCIE-0085	BSc (Hons) in Pharmaceutical Science (WD_SPHSC_B)	3 / 6 / E

Indicative Content

- Student will fully participate in a minimum of 15 weeks professional development: whereby the student will plan learning objectives with the module supervisor, demonstrate continuous progress towards these objectives, avail of learning opportunities and communicate outcomes in a timely manner.
- The student, with support from the module supervisor, will participate in the WIT Science Industry committee and in a range of: industry/professional bodies' conferences; seminars; professional development activities; and/or certified training.
- The student will identify, assess and analyse, with prior agreement with the module supervisor, a piece of knowledge, technology or skill and its application relevant to the students main study area. The student will carry out a project and communicate the results.
- The student will be provided with opportunities to relate, communicate and work with others and/or work independently to meet the agreed learning objectives.

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Plan learning objectives for the Science Professional Development semester.
2. Apply competently their science knowledge and skills in a range of settings, operating independently and/or as part of a team towards the set learning objectives.
3. Demonstrate the student has started their personal & professional development in acquiring transferable competences that characterise operating as a professional, including self-evaluation, personal responsibility and effectiveness, communication and operating in a multidisciplinary environment.
4. Demonstrate the ability to reflect critically on their personal, professional and technical achievements in this module.
5. Identify, assess and analyse a particular piece of knowledge, technology or skill and its application relevant to the student's main study area.

Learning and Teaching Methods

- A Department of Science workshop on planning and preparing for the Science Professional Development module.
- Scheduled communication between student and supervisor before, during and after the Science Professional Development module, to ensure successful outcomes.
- Student engagement with the WIT Science Industry Board and industry groups relevant to the student's main study area, facilitated by the module supervisor.
- Industry-supervised or self-directed project / training, focused on a specific piece of knowledge, skill or technology and its application to the student's main programme specialisation.
- A portfolio that may include some or all the following: a daily work diary, a reflective journal and/or presentation detailing the student's gain of experience and the development and evaluation of personal and professional understanding, learning and growth.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Placement	810	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Portfolio	100%	1,2,3,4,5

Assessment Criteria

Fail: Student fails to undertake or complete Science Professional Development to a satisfactory level and/or fails to submit the assessments and documents related to the learning outcomes.

Pass: Minimum period of at least 15 weeks Science Professional Development completed to a satisfactory standard with Supervisors Report, assessments and documents related to the learning outcomes, all submitted to an acceptable standard and submitted within deadlines.

Essential Material(s)

- "WIT Moodle: Science Professional Development folder: preparation, support and assessment documentation and resources.." https://www.wit.ie/. https://moodle.wit.ie/

Supplementary Material(s)

- "Knowing Yourself - Guide to Self-Assessment | CareersPortal.ie." https://careersportal.ie/. https://careersportal.ie/ca