



APPROVED

Awards			
Bachelor of Science (Honours)			
Programme Code:	BN_SHTSC_8	Mode of Delivery:	Full Time
		No. of Semesters:	8
NFQ Level:	8		
Institute Code:	TU853		
Department:	Horticulture		
Programme Extra Information:	(Pre TU Dublin Code - BN113) 30 credits to be taken in semesters 5, 6, 7 and 8		

Programme Outcomes

On successful completion of this programme the learner will be able to :

PO1	Knowledge - Breadth	
	(a)	<p>During the course of the programme, the student will be exposed to the working of the horticulture sector. They will see current work done by researchers, designers, analysts and other practitioners in the field, each instance appropriate to their stage of learning. The student will thereby gain a substantial knowledge of the breadth of modern horticulture, and its application and position in wider society. Within the programme structure, the student will acquire a sophisticated understanding of the range of concepts that underpin both the science of horticulture and the practical technologies and skills that underpin its applications in the real world. This will include the following examples. • The graduate will have a full knowledge of the fields of scientific knowledge underpinning horticulture, including the biological, chemical and physical sciences. This will also include a thorough knowledge of experimental design and the mathematical and statistical concepts underpinning this subject. • They will have a comprehensive knowledge of the range of plants in cultivation and the specific factors of soil and climate that is required for their propagation and culture. • The graduate will be able to manage and apply scientific research practices to horticultural questions. In particular, they will define a project and manage a planned implementation of a design, utilising the resources necessary, within a realistic time scale. • They will learn and be able to demonstrate knowledge of the legal and ethical issues around the formulation of problems from industry clients or other sources, the conduct of such scientific research and the impact of possible implementation of such findings or use in new industrial practices on the wider physical environment. • The graduate will develop their knowledge of the environmental impact of horticultural activity, including modern methods of controlling or, where necessary, minimising such impacts. This will include a thorough grounding in sustainability issues, the meaning of organic methods and production and other terms in industry and legal use. • They will learn and be able to demonstrate an ability to use technological systems and comprehend the physical sciences underpinning their use for horticultural purposes.</p>
PO2	Knowledge - Kind	
	(a)	<p>On successful completion of the programme the graduate will demonstrate a depth of comprehension of current scientific knowledge and professional best practice in the specialised areas studied on the course. They will be made aware of the boundaries of their existing knowledge and the need to continuously improve their knowledge, skill and competence in order to be at the forefront of Horticulture as an area of study. Integrating individual and group reflective analysis into each of the programme modules as the programme is delivered will achieve this. The graduate must also be capable of integrating the knowledge gained from the thematic areas, which make up the degree programme, including balancing the sometimes-competing demands of different criteria, in any particular body of work. This skill of integration will be instilled in the project modules envisaged in the programme. The students work in the areas of research, design, construction and analysis will be judged by scientific, technical, professional and ethical criteria, where appropriate, and in the final year of the honours degree they will also be judged on a thesis written in tandem with their project. Further areas of knowledge are noted here: • They will be able to describe and apply knowledge and understanding of a wide range of topics within horticulture ranging from commercial food production to design, development and maintenance of parks, gardens and landscaped areas. • This knowledge can be brought to bear on problems deriving from the graduates work in the Horticulture sector. • The successful graduate will also be able to demonstrate strategic technical knowledge, critical skills, abilities, and attitudes to be effective in a future changing world. • They should be adaptable, flexible, and confident graduates who can deal effectively with change and fit rapidly into the workplace. • They will possess a detailed knowledge on which to build in this era of life-long learning, and demonstrate the critical skills to identify knowledge gaps and fill them through effectively targeted continuing profession development. • The graduate should be able to argue the need for, and apply critical understanding of, the application of ethical environmental principles in horticultural activity in a society increasingly affected by and concerned with environmental issues. They should be able to argue and demonstrate that this is no longer an issue to be addressed 'after the fact' nor the concern of 'environmentalists', but a key scientific principle to be acted on at all stages of work. • The successful graduate will also be able to evaluate mechanical and technical equipment and techniques used in the Horticulture industry for their advantages and limitations and their range of applicability, and to keep abreast of current usages and standards in the industry and relevant new technologies shaping the evolution of the practical application of the field. • The graduate will have a substantial knowledge of legal and intellectual property issues, and be able to argue the applicability of such knowledge to specific real world situations such as laws applying to planning and development as well as contractual matters employment and health and safety.</p>
PO3	Skill - Range	

	(a)	<p>For a student to complete this academic programme successfully, they must clearly master the skills acquired in the themes of the programme outlined previously: • Professional Development • Business Practice • Design and Construction • Science • Production and Management • Techniques The graduates must have acquired the scientific knowledge and analytical skills to perform as scientists in the sector, or have a full comprehension of this process, should they not be among the 'coalface' team. Students will learn the skills to critically evaluate scientific or technical problems arising from sectoral client briefs (meant in the broadest sense) and, where needed, to design and implement solutions to these problems. They must be able to draw up a plan for the development of such products as Gardens, parks and other urban amenities, golf courses and civic amenity schemes, and anticipate the individual and organisational steps that must be taken implementing it. Finally they must be able to assess whether work produced by themselves or a team they are working in has the necessary features and meets the highest professional standards and conforms to known legal and ethical standards. Throughout the course students will be required to complete research tasks. Both through coursework assignments and in the terminal examinations, students must display an ability to conduct critical evaluation in all modules, to formulate opinions and solutions and the academic ability to present such material using formal research methodologies. The teaching and learning methodologies will include emphasis of a holistic, practical problem-based approach where students will be expected to demonstrate an understanding of the significance of self-reflective practice. The skills acquired to make this happen are listed here. The successful graduate will also be able to: • Identify a range of indoor and outdoor plants and be familiar with their cultivation classify and describe horticultural systems. • Source appropriate scientific knowledge to bring to bear on a given scientific problem arising from a client brief, citing sources where necessary in the appropriate manner. • Deploy the relevant mathematical and statistical tools to carry out full data analysis. • Select and use appropriate technologies and scientific principles and analysis to meet a stated need in a customer brief, in particular, answering environmental and developmental concerns in urban and rural areas. • Analyse and present the ethical issues, along with any likely social impact, associated with a particular brief, in their own professional practice and that of others. • Design a programme of investigation to answer the complex scientific questions posed by the client brief. • Operate complex scientific, mechanical and other technical equipment to the highest safety standards as art of such a programme of investigation. • Incorporate business considerations into design solutions where required. • Interpret details of landscape designs and plans and communicate recommendations to both technical and non-technical personnel. • Generate landscape and garden designs of a high aesthetic quality using modern software aids. • Keep detailed and clear records of their activities in analysing and solving problems for their own records and for the use of others in their teams or in the overall structure of the organisation in which they are working. • Be able to harness their own creativity and enhance and develop the creativity of others.</p>
PO4	Skill - Selectivity	
	(a)	<p>Working in the Horticulture Industry will require a graduate of this programme, on occasion, to be able to critically analyse client design requirements, technical specifications and limitations, environmental considerations and the consequential impact on proposed projects. Operating as a scientist in the sector will require the establishment of scientific studies, involving the design of experiments and other analytical work. Therefore, graduates must have a capacity to exercise appropriate judgement in many areas. On successful completion of the programme students will have developed the ability of critical analysis and will exhibit the conceptual and practical ability to tackle cross-functional, multi-functional and specialist decision making in a coherent and logical manner. In so doing the student will be able to apply cognitive skills of critical thinking, synthesis, scientific rigour and professional judgement. This will include the following points. • Graduates of the programme will be able to contribute to and listen to the views of others in the context of dynamic and evolving scientific debates. • They will be able to identify the limits of the knowledge of the working group, and formulate strategies to address this. • The graduate should have the ability to decide between competing technologies, including in situations of limited means. More generally, they will be able to analyse quantitative and qualitative information on a variety of areas pertaining to scientific enquiry and planning and decision-making processes when practical implementation is at hand. Case studies in industry related modules will have shown the students the variety and range of challenges facing the Industry today, and they will have taken from this the need for decision making in contexts of incomplete information. • The candidate should be able to critically assess the evolution and expression of current thinking on environmental impact issues, sustainability and the social contexts of their work. Having done this, they will be able to make sound decisions based on their accumulation of knowledge. They will need to communicate this analysis to clients, informing them of constraints on their work and backing this up with appropriate rigor. • They should be able to assess the feasibility of customer requirements, in terms of product, cost and time-scale, being met. Within this context, they will be able to develop a solution from an idea. • The graduate will have acquired a thorough knowledge of the design, planning and development processes, project management and related topics sufficient to prepare project specifications and to overcome potential impediments to good design solutions to client problems. • The graduates of this course should be aware of business and commercial opportunities as they come to light, and may choose to develop and launch their own enterprises, as an alternative to working within larger concerns and businesses. They will therefore carry a significant knowledge of Entrepreneurship and Intra-preneurship. • A graduate working in the Industry must effectively respond to current practice and policy issues relevant to intellectual property issues, the current social and legal concerns of our wider society concerning environmental impacts, response to climate change, retention of native species and other such issues.</p>
PO5	Competence - Context	

	(a)	<p>Over the course of the programme students will be required to take ownership for their course work and behaviour. A learning culture of academic integrity and high ethical standards is cultivated and promoted. The inclusion of the module Research Methods at the final (Level 8) stage of the programme, and with the concepts behind this topic appearing at several points in the later stages of the programme, will allow students to appreciate the specific tasks involved in, and the inherent challenges encountered during scientific research. This subject will also develop a solid appreciation and practical understanding of quantitative and qualitative research methods and designs. Graduates will be able to apply course concepts and frameworks in designing and enacting scientific and technical research activities, and be able to collate, analyse and present findings in a form to facilitate reflective evaluation, and decision-making. Specific skills needed are listed here. • To successfully complete the programme a student will have to demonstrate effective self-management in terms of time, planning and behaviour, motivation, personal initiative and enterprise, ethical standards and professionalism. • They will have to cultivate an appetite for reflective, adaptive and collaborative learning and the ability to cope with a range of learning challenges and scenarios. This will lead them to identify gaps in personal knowledge, understanding and skills and identify appropriate means, in particular independent research, to gain these attributes. • They will have learnt to apply advanced, rigorous scientific thinking to regularly interpret their existing knowledge, seeing how it evolves and how its application to real-world problems is carried out. • They will accept responsibly for and learn from unsuccessful outcomes in their working life, and take on responsibility for addressing gaps in their own knowledge, thus increasing their ability to adapt to change. • They should acquire a holistic view of the Horticulture sector as an intellectual environment and as an industry, derived from a variety of learning sources and formats including independent study and guided learning. • They should remain abreast of the scientific, ethical and moral issues underpinning concerns over the environmental impact of our way of life, including the impact and sustainability, or lack of it, of commercial crop growing techniques, Landscape, garden, golfing and other facility designs and management practices on the urban, suburban and rural environments. Where appropriate, they should contribute to debates on these issues in their working context and in the sector in general. • They should integrate the need to remain abreast of all the legal and statutory obligations of Horticultural research and practice, entering into dialogue with professionals from outside the sector to acquire the necessary knowledge or information to guide themselves and other members of their working teams.</p>
PO6	Competence - Role	
	(a)	<p>Graduates who have successfully completed the Bachelor of Science (Honours) in Horticulture will have the competency to accept accountability for determining and achieving outcomes for themselves and for groups in which they are members. They will demonstrate the capacity to take significant responsibility and supervision for the work of others in specialised areas of work or study. These learning outcomes will be measured by the abilities outlined here. • They will demonstrate responsibility for establishing goals in undertaking research in areas of Horticultural science and in the technical knowledge needed for such research, as required by industry clients, state agencies or any other form of client. This will be part of a wider acceptance of the need for the highest standards of professional practice. • They will facilitate environments where they themselves and other team members can tap into their creative sources and energy, thus stimulating the production of dynamic and vibrant solutions to client briefs, with client defined as above, and contributing to the dynamism of the Horticulture Industry and sector in general. This will be achieved by clear articulation of ideas and presentation to peer groups and other colleagues. • They will be able to facilitate effective group performance in the workplace at individual and team levels, including the organisational, legal and policy contexts. This will be achieved by the development of their interpersonal skills and communication abilities as outlined in previous sections. These skills will allow them to provide responsible direction to themselves and their colleagues through intelligent risk-taking and insightful attention to human perceptions and resources. • They will identify skills and knowledge gaps deriving from the changing nature of the science of horticulture, in themselves and colleagues who report to them, and establish developmental strategies to address these gaps, including training and further study. • They will show leadership in multi-disciplinary group processes, strategic planning, cohesive teamwork, and conflict resolution in a personal and professional context; a vital part of this will be their ability to behave professionally and be aware of the responsibilities associated with working in and contributing to a multi-disciplinary team. • Finally they will demonstrate a comprehensive understanding of working in partnership while at the same time synthesizing skills necessary for critical thinking and self-reflection.</p>
PO7	Competence - Learning to Learn	
	(a)	<p>The graduates of the proposed programme will demonstrate competencies in a number of key areas concerning Life-Long Learning. They will be capable of: • Locating information in specific discipline sources and knowledge repositories, evaluating that information, and demonstrate responsibility for their learning by synthesizing this newly acquired knowledge with the their existing knowledge of the Horticulture field. • Analysing communications between colleagues in a research and/or working environments, identifying the key arguments or rhetorical structures (whether tacit or explicit), and evaluating it through reinterpretation. • Recognising and analysing problems and developing and implementing research plans to diagnose and resolve those problems. • Taking a global view of a given question and applying interdisciplinary knowledge and skills to develop and organise resources needed to solve problems arising from the external environment. To successfully complete the individual Final Year Project, the learner must choose the appropriate skill sets to conduct research, apply critical evaluation and formulate relevant opinions and solutions to posed questions. They must draw on the technical, design, planning and organisational skills acquired during study of the several streams in this programme.</p>
PO8	Competence - Insight	

	(a)	<p>On completion of the programme of study the student will be able to:</p> <ul style="list-style-type: none">• Demonstrate an awareness of the interests of a wide variety of stakeholders in the horticulture industry and wider sector.• Understand the need to perform ethically and in a socially and environmentally conscious manner in the fulfilment of their responsibilities as part of this sector.• Form a view and contribute to the development of the role of horticulture in wider society, particularly in relation to issues of the wider environment and climate change, the urban environment and the contribution ethical Horticultural practice to can make to quality of life.• Appreciate the philosophical limitations of their own knowledge, skills and competence. Graduates of the programme will demonstrate a range of interpersonal skills, and adaptive capabilities thus enabling them to thrive in the fluidity and dynamism of the modern, evolving, horticulture sector. They will also exhibit self-awareness, and an openness and sensitivity to diversity in terms of people, cultures, and management issues. The scientific/technical subjects will enable students to engage in independent research, which must integrate the concepts and issues from a number of inter-related areas. The project modules, the semester of work experience and other work-related modules ensure that students understand the stakeholders and communities that form the Horticulture sector and are also able to manage the environment and relationships encountered in working in this sector.
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Semester Schedules

Stage 1 / Semester 1

Mandatory	
Module Code	Module Title
HTSC H1013	Plant Identification & Classif
HTSC H1014	Horticultural Calculations & Measurements
HTSC H1015	Plant & Landscape Skills
HTSC H1023	Plant Biology

Stage 1 / Semester 2

Mandatory	
Module Code	Module Title
HTSC H1025	Plant Identification - Use & Management
HTSC H1022	Machinery & Equipment Skills
HTSC H1026	Graphics & CAD for Horticulture
HTSC H1028	Horticulture in the Community
HTSC H1021	Plant Propagation
HTSC H1027	Plant Nutrition

Stage 2 / Semester 1

Mandatory	
Module Code	Module Title
HTSC H2026	Vegetable Production
HTSC H2028	Ecology & Biodiversity
HTSC H2017	Turf Grass ID & Establishment
HTSC H2014	Integrated Crop Management
HTSC H2018	Nursery Stock Production
HTSC H2015	Landscape Construction

Stage 2 / Semester 2

Mandatory	
Module Code	Module Title
HTSC H2030	Industry Placement
HTSC H2029	Start Your Own Business
HTSC H2013	Contracts, Specifications & Tenders

Stage 3 / Semester 1

Mandatory	
Module Code	Module Title
HTSC H3016	Horticultural Project Management
HTSC H3018	Trees & Woodlands
HTSC H3024	Fruit Production

Elective	
Module Code	Module Title
HTSC H3021	Organic & Sustainable Horticulture
HTSC H3025	Soft Landscape Construction & Design
HTSC H3026	Floristry & Interior Landscape

Stage 3 / Semester 2

Mandatory	
Module Code	Module Title
HTSC H3027	Research Methods for Horticulture
HTSC H3029	Manage Your Own Business
HTSC H3030	Crops under Protection

Elective	
Module Code	Module Title
HTSC H3032	Retail Horticulture
HTSC H3033	Apiculture
HTSC H3034	Food Product Development 1

Stage 4 / Semester 1

Mandatory	
Module Code	Module Title
HTSC H4011	Final Year Project (Part 1)

Elective	
Module Code	Module Title
HTSC H4031	Automation in Horticulture
HTSC H4037	Health, Recreation & Green Infrastructure
HTSC H4019	Plant Treatment Regulation
HTSC H4038	Sports Surface Management
HTSC H4034	Post-Harvest Technology
HTSC H4030	Social & Therapeutic Horticulture

Stage 4 / Semester 2

Mandatory	
Module Code	Module Title
HTSC H4021	Final Year Project (Part 2)

Elective	
Module Code	Module Title
HTSC H4027	Environmental Management
HTSC H4017	Golf Course Design & Managemnt
HTSC H4023	Entrepreneurship & Ent Develop
HTSC H4035	Culinary & Medicinal Plants
HTSC H4029	Historical & Contemporary Parks and Gardens
HTSC H4036	Food Product Development 2