BAgrSc

SUMMARY OF DEGREE PROGRAMME OPTIONS

Academic Session 2005/06

BAGRSC – SUMMARY OF DEGREE PROGRAMME OPTIONS FOR ACADEMIC SESSION 2005/06

AGRICULTURAL SCIENCE (DN010 ENTRY)

Stage One [MOBDFDN010]

Semester 1

Module Code	Module Title	Level	Credit-Rating
AERD 10020	Information Skills and Computer Applications	1	5
BIOL 10010	Animal Biology and Evolution	1	5
BIOL 10030	Cell and Plant Biology	1	5
EXPH 10010	Physics I (BAgrSc)	1	5
MATH 10010	Discrete Mathematics (BAgrSc)	1	5
One of the following two 5-credit modules:		-	5
CHEM 00010	Introductory Chemistry	0	
CHEM 10040	The Molecular World	1	
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 10010	Agricultural Economics and Business	1	5
CHEM 10010	Introduction to Organic and Physical Chemistry	1	5
EXPH 10090	Physics II (BAgrSc)	1	5
MATH 10020	Calculus (BAgrSc)	1	5
	Elective Modules (2 x 5-credits)	-	10
TOTAL			30

ANIMAL AND CROP PRODUCTION

Stage One [MOBDFDN045]

Semester 1

Module Code	Module Title	Level	Credit-Rating
AERD 10020	Information Skills and Computer Applications	1	5
BIOL 10010	Animal Biology and Evolution	1	5
BIOL 10030	Cell and Plant Biology	1	5
EXPH 10010	Physics I (BAgrSc)	1	5
MATH 10010	Discrete Mathematics (BAgrSc)	1	5
One of the following two 5-credit modules:		-	5
CHEM 00010	Introductory Chemistry	0	
CHEM 10040	The Molecular World	1	
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 10010	Agricultural Economics and Business	1	5
CHEM 10010	Introduction to Organic and Physical Chemistry	1	5
EXPH 10090	Physics II (BAgrSc)	1	5
MATH 10020	Calculus (BAgrSc)	1	5
	Elective Modules (2 x 5-credits)	-	10
TOTAL			30

Second Year [AGBDF0003]

Semester 1

Module Code	Module Title	Level	Credit-Rating
CPSC 2201	Electives*	-	5
ERM 20010	Applied Plant Biology	2	5
ERM 20020	Soil Science I	2	5
ERM 20040	Agricultural Ecology and Pollution Control	2	5
FDSC 20010	Agricultural Chemistry I	2	5
INDM 20010	Agricultural Microbiology	2	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
ANSC 20010	Genetics and Biotechnology	2	5
ANSC 20020	Animal Nutrition I	2	5
BSEN 20020	Principles of Engineering	2	5
CPSC 2201	Electives*	-	5
CPSC 20020	Fundamentals of Arable Crop Production	2	5
FDSC 20020	Agricultural Chemistry II	2	5
TOTAL			30

**Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ANIMAL AND CROP PRODUCTION [AGBDF0003] CONT'D

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
ANSC 30010	Animal Physiology - Reproduction	3	5
ANSC 30020	Animal Breeding	3	5
CPSC 3302	Electives*	-	5
ERM 30020	Soil Science II	3	5
ERM 30040	Plant Protection - Pests	3	5
ERM 30050	Plant Protection - Diseases	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
CPSC 30010	Professional Work Experience	3	30
TOTAL			30

**Students must undertake elective modules amounting to 5 credits.*

Fourth Year

Semester 1

Module Code	Module Title	Credit-Rating
AERD 4003	Farm Business*	3
AERD 4016	Agricultural Policy Ia	3
ANSC 4004	Animal Husbandry IVa	12
CPSC 4005	Crop Husbandry IVa	8
CPSC 4100	Electives**	4

Semester 2

Module Code	Module Title	Credit-Rating
AERD 4002	Communications I	4
AERD 4003	Farm Business*	3
AERD 4017	Agricultural Policy Ib	3
ANSC 4005	Animal Husbandry IVb	4
CPSC 4006	Crop Husbandry IVb	6
CPSC 4100	Electives**	10
		60

** The module AERD 4003 'Farm Business' will be taught throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 14 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ANIMAL SCIENCE

Stage One [MOBDFDN046]

Semester 1

Module Code		Module Title	Level	Credit-Rating
AERD	10020	Information Skills and Computer Applications	1	5
BIOL	10010	Animal Biology and Evolution	1	5
BIOL	10030	Cell and Plant Biology	1	5
EXPH	10010	Physics I (BAgrSc)	1	5
MATH	10010	Discrete Mathematics (BAgrSc)	1	5
One of the following two 5-credit modules:			-	5
CHEM	00010	Introductory Chemistry	0	
CHEM	10040	The Molecular World	1	
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
AERD	10010	Agricultural Economics and Business	1	5
CHEM	10010	Introduction to Organic and Physical Chemistry	1	5
EXPH	10090	Physics II (BAgrSc)	1	5
MATH	10020	Calculus (BAgrSc)	1	5
		Elective Modules (2 x 5-credits)	-	10
TOTAL				30

Second Year [AGBDF0004]

Semester 1

Module Code		Module Title	Level	Credit-Rating
ANSC	20040	Principles of Animal Health, Behaviour and Welfare	2	5
CPSC	20010	Applied Biostatistics	2	5
ERM	20010	Applied Plant Biology	2	5
ERM	20040	Agricultural Ecology and Pollution Control	2	5
FDSC	20010	Agricultural Chemistry I	2	5
INDM	20010	Agricultural Microbiology	2	5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
AERD	20040	Written Communications	2	5
ANSC	20010	Genetics and Biotechnology	2	5
ANSC	20020	Animal Nutrition I	2	5
ANSC	2201	Electives	-	5
CPSC	20030	Principles of Crop Science	2	5
FDSC	20020	Agricultural Chemistry II	2	5
TOTAL				30

** Students must undertake elective modules amounting to 5 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ANIMAL SCIENCE [AGBDF0004] CONT'D

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
ANSC 3301	Electives*	-	5
ANSC 20040	Principles of Animal Health, Behaviour and Welfare	2	5
ANSC 30010	Animal Physiology - Reproduction	3	5
ANSC 30020	Animal Breeding	3	5
ANSC 30030	Animal Genomics	3	5
INDM 30010	Food Microbiology	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
ANSC 3301	Electives*	-	10
ANSC 30040	Animal Nutrition II	3	5
ANSC 30060	Animal Physiology - Systems	3	5
ANSC 30070	Professional Work Experience	-	10
TOTAL			30

** Students must undertake elective modules amounting to 15 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

Semester 1

Module Code	Module Title	Credit-Rating
AERD 4003	Farm Business*	3
AERD 4016	Agricultural Policy Ia	3
ANSC 4002	Animal Husbandry V	4
ANSC 4004	Animal Husbandry IVa	12
ANSC 4400	Electives**	4
FDSC 4017	Fresh and Processed Meat Products II	4

Semester 2

Module Code	Module Title	Credit-Rating
AERD 4002	Communications I	4
AERD 4003	Farm Business*	3
AERD 4017	Agricultural Policy Ib	3
ANSC 4003	Animal Breeding II	6
ANSC 4005	Animal Husbandry IVb	4
ANSC 4400	Electives**	6
ERM 4004	Environmental Issues in Agriculture	4
		60

** The module AERD 4003 'Farm Business' will be taught throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

APPLIED ENVIRONMENTAL SCIENCES

Stage One [MOBDFDN044]

Semester 1

Module Code		Module Title	Level	Credit-Rating
AERD	10020	Information Skills and Computer Applications	1	5
BIOL	10010	Animal Biology and Evolution	1	5
BIOL	10030	Cell and Plant Biology	1	5
EXPH	10010	Physics I (BAgrSc)	1	5
MATH	10010	Discrete Mathematics (BAgrSc)	1	5
One of the following two 5-credit modules:			-	5
CHEM	00010	Introductory Chemistry	0	
CHEM	10040	The Molecular World	1	
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
CHEM	10010	Introduction to Organic and Physical Chemistry	1	5
EXPH	10090	Physics II (BAgrSc)	1	5
AESC	10010	Land Use and the Environment	1	5
MATH	10020	Calculus (BAgrSc)	1	5
		Elective Modules (2 x 5-credits)	-	10
TOTAL				30

Second Year [AGBDF0036]

Semester 1

Module Code		Module Title	Level	Credit-Rating
CPSC	20010	Applied Biostatistics	2	5
ERM	20010	Applied Plant Biology	2	5
ERM	20020	Soil Science I	2	5
ERM	20030	Earth Science, Climatology and the Environment	2	5
FDSC	20010	Agricultural Chemistry I	2	5
INDM	20010	Agricultural Microbiology	2	5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
ANSC	20010	Genetics and Biotechnology	2	5
ANSC	20030	Principles of Animal Science	2	5
CPSC	20030	Principles of Crop Science	2	5
ERM	20050	Physiological Plant Ecology	2	5
ERM	20060	Applied Zoology I	2	5
FDSC	20020	Agricultural Chemistry II	2	5
TOTAL				30

AGRICULTURAL AND ENVIRONMENTAL SCIENCE [AGBDF0006]

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
AESC 3301	Electives*		10
ERM 20020	Soil Science I	2	5
ERM 30010	Diversity in the Rural Landscape	3	5
ERM 30020	Soil Science II	3	5
ERM 30030	Applied Zoology II	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AESC 3301	Electives*		5
ERM 30080	Human Impact on the Environment	3	5
ERM 30090	Agrichemicals and the Environment	3	5
ERM 30100	Professional Work Experience	3	10
FOR 40030	Experimental Design	4	5
Total			30

*** Students must undertake elective modules amounting to 15 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

Semester 1

Module Code	Module Title	Credit-Rating
AESC 4004	Wildlife Management**	4
AESC 4006	Pest Management**	4
AESC 4007	Plant Disease Management**	4
AESC 4400	Electives*	6
ERM 4003	Environmental Impact Assessment	4
ERM 4005	Environmental Management	8
Total		30

Semester 2

Module Code	Module Title	Credit-Rating
AESC 4005	Epidemiology and Zoonoses**	4
AESC 4008	Molecular Biology and the Environment**	4
AESC 4051	Project	12
AESC 4400	Electives*	6
ERM 4006	Soil and Water Management	8
Total		30

**Students must undertake elective modules amounting to 12 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*
*** Students must undertake and register for four of the five 4-credit modules.*

ENGINEERING TECHNOLOGY

Stage One [MOBDFDN047]

Semester 1

Module Code	Module Title	Level	Credit-Rating
AERD 10020	Information Skills and Computer Applications	1	5
BIOL 10010	Animal Biology and Evolution	1	5
BIOL 10030	Cell and Plant Biology	1	5
EXPH 10010	Physics I (BAgrSc)	1	5
MATH 10010	Discrete Mathematics (BAgrSc)	1	5
One of the following two 5-credit modules:		-	5
CHEM 00010	Introductory Chemistry	0	
CHEM 10040	The Molecular World	1	
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 10010	Agricultural Economics and Business	1	5
CHEM 10010	Introduction to Organic and Physical Chemistry	1	5
EXPH 10090	Physics II (BAgrSc)	1	5
MATH 10020	Calculus (BAgrSc)	1	5
	Elective Modules (2 x 5-credits)	-	10
TOTAL			30

Second Year [AGBDF0008]

Semester 1

Module Code	Module Title	Level	Credit-Rating
BSEN 2201	Electives*	-	5
BSEN 20040	Literature research project	2	5
Please select four of the following 5-credit modules:			20
AERD 20030	Business Management	2	
CPSC 20010	Applied Biostatistics	2	
ERM 20040	Agricultural Ecology & Pollution Control	2	
FDSC 20010	Agricultural Chemistry I	2	
INDM 20010	Agricultural Microbiology	2	
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
BSEN 2201	Electives*	-	5
BSEN 20010	Engineering and Surveying	2	5
BSEN 20020	Principles of Engineering	2	5
BSEN 30040	Computer and Manufacturing Technology	2	5
Please select two of the following 5-credit modules:			10
ANSC 20010	Genetics and Biotechnology	2	
ANSC 20030	Principles of Animal Science	2	
BSEN 20030	Food Technology	2	
CPSC 20030	Principles of Crop Science	2	
TOTAL			30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ENGINEERING TECHNOLOGY [AGBDF0008] CONT'D

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
BSEN 3301	Electives*	-	10
BSEN 30050	Computer Information Systems	3	5
BSEN 30140	Major Project (literature and planning)	3	5
Any two of the following 5-credit modules:			10
BSEN 30010	Bioprocess Engineering Principles	3	
BSEN 30200	Power and Machinery – Internal Combustion Engines	3	
BSEN 30240	Waste Management	3	
FOR 30190	Remote Sensing and GIS	3	
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
BSEN 3301	Electives*	-	5
BSEN 30150	Major Project (preparatory field/laboratory work)	3	5
BSEN 30060	Computer Programming	3	5
Any three of the following 5-credit modules:			15
AERD 30050	Financial Planning and Control	3	
BSEN 30190	Power and Machinery - Hydraulic Systems	3	
BSEN 30220	Soil Engineering	3	
BSEN 30230	Unit Operations in Bioprocess Engineering	3	
TOTAL			30

** Students must undertake elective modules amounting to 15 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

Semester 1

Module Code	Module Title	Credit-Rating
ENGT 4002	Food Manufacturing Systems	8
ENGT 4007	Power and Machinery II	8
ENGT 4008	Environmental Engineering Principles	8
ENGT 4050	Major Project II* (including professional work experience)	6
TOTAL		30

Semester 2

Module Code	Module Title	Credit-Rating
ENGT 4001	Buildings and Environment	8
ENGT 4003	Food Process Engineering	8
ENGT 4050	Major Project II* (including professional work experience)	8
ENGT 4100	Electives**	6
TOTAL		30

** Students must undertake the module ENGT 4050 'Major Project II' throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 6 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

FOOD AND AGRIBUSINESS MANAGEMENT

Stage One [MOBDFDN043]

Semester 1

Module Code	Module Title	Level	Credit-Rating
BIOL 10010	Animal Biology and Evolution	1	5
BIOL 10030	Cell and Plant Biology	1	5
EXPH 10010	Physics I (BAgrSc)	1	5
MATH 10010	Discrete Mathematics (BAgrSc)	1	5
	Elective Module (1 x 5-credit)		5
One of the following two 5-credit modules:		-	5
CHEM 00010	Introductory Chemistry	0	
CHEM 10040	The Molecular World	1	
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 10010	Agricultural Economics and Business	1	5
AERD 10030	Introduction to Food and Agribusiness Management	1	5
CHEM 10010	Introduction to Organic and Physical Chemistry	1	5
EXPH 10090	Physics II (BAgrSc)	1	5
MATH 10020	Calculus (BAgrSc)	1	5
	Elective Modules (1 x 5-credit)	-	5
TOTAL			30

Second Year [AGBDF0025]

Semester 1

Module Code	Module Title	Level	Credit-Rating
AERD 2201	Electives*	-	5
AERD 20030	Business Management	2	5
CPSC 20010	Applied Biostatistics	2	5
ERM 20010	Applied Plant Biology	2	5
FDSC 20010	Agricultural Chemistry I	2	5
INDM 20010	Agricultural Microbiology	2	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 2201	Electives*	-	5
AERD 20010	Applied Economic Analysis	2	5
AERD 20020	Business Law	2	5
AERD 20040	Written Communications	2	5
ANSC 20030	Principles of Animal Science	2	5
CPSC 20030	Principles of Crop Science	2	5
TOTAL			30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

FOOD AND AGRIBUSINESS MANAGEMENT [AGBDF0025] CONT'D

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
AERD 3302	Electives*		10
AERD 30010	Computer Analysis	3	5
AERD 30040	Farm Business Management I	3	5
BSEN 30120	Food Quality and Safety Assurance	3	5
FDSC 40110	Fresh and Processed Meat Products III	4	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 3302	Electives*	-	5
AERD 30060	Food and Agribusiness Marketing	3	5
AERD 30090	Operations and Personnel Management	3	5
AERD 30110	Professional Work Experience	-	10
AERD 30130	Quantitative Methods	3	5
TOTAL			30

** Students must undertake elective modules amounting to 15 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

AGRIBUSINESS AND RURAL DEVELOPMENT [AGBDF0005]

Fourth Year

Semester 1

Module Code	Module Title	Credit-Rating
AERD 4004	Agricultural Marketing and Trade	4
AERD 4011	Research Methods/ Project	6
AERD 4012	Taxation	2
AERD 4014	Farm Business Management II*	3
AERD 4015	IT and E-Business	4
AERD 4018	Agricultural Policy IIa	4
ECON 4101	National Economics	4
AERD 4400	Electives**	3
TOTAL		30

Semester 2

Module Code	Module Title	Credit-Rating
AERD 4006	Communications II	6
AERD 4007	Enterprise Development	4
AERD 4009	Food and Farm Input Marketing	4
AERD 4014	Farm Business Management II*	3
AERD 4019	Agricultural Policy IIb	4
AERD 4050	Major Project	4
AERD 4400	Electives**	5
TOTAL		30

**The module AERD 4014 'Farm Business Management II' will be taught throughout Semester 1 and 2*

***Students must undertake elective modules amounting to 8 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

FOOD SCIENCE

Stage One [MOBDFDN040]

Semester 1

Module Code		Module Title	Level	Credit-Rating
BIOL	10010	Animal Biology and Evolution	1	5
BIOL	10030	Cell and Plant Biology	1	5
EXPH	10010	Physics I (BAgrSc)	1	5
MATH	10010	Discrete Mathematics (BAgrSc)	1	5
		Elective Module (1 x 5-credits)	-	5
One of the following two 5-credit modules:			-	5
CHEM	00010	Introductory Chemistry	0	
CHEM	10040	The Molecular World	1	
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
CHEM	10050	Organic Chemistry and Chemical Biology	1	5
CHEM	10060	Physical and Inorganic Chemistry	1	5
EXPH	10090	Physics II (BAgrSc)	1	5
FDSC	10010	Food Diet and Health	1	5
MATH	10020	Calculus (BAgrSc)	1	5
		Elective Module (1 x 5-credits)	-	5
TOTAL				30

Second Year [AGBDF0007]

Semester 1

Module Code		Module Title	Level	Credit-Rating
CPSC	20010	Applied Biostatistics	2	5
ERM	20040	Agricultural Ecology and Pollution Control	2	5
FDSC	2201	Electives*	-	5
FDSC	20010	Agricultural Chemistry I	2	5
FDSC	20040	Sensory Analysis	2	5
INDM	20010	Agricultural Microbiology	2	5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
ANSC	20030	Principles of Animal Science	2	5
CPSC	20030	Principles of Crop Science	2	5
FDSC	2201	Electives*	-	5
FDSC	20020	Agricultural Chemistry II	2	5
FDSC	20030	Basic Food Analysis	2	5
FDSC	20050	Food Science I: Food Physics	2	5
TOTAL				30

** Students must undertake elective modules amounting to 10 credits – it is recommended that you select AERD 20030 Business Management (5 Credit) as one of your elective modules. Distribution of credits may vary across semester depending on individual selection of elective modules.*

FOOD SCIENCE [AGBDF0007] CONT'D

Third Year

Semester 1

Module Code		Module Title	Level	Credit-Rating
BSEN	30010	Bioprocess Engineering Principles	3	5
FDSC	3301	Electives*	-	5
FDSC	30020	Food Analysis I	3	5
FDSC	30040	Food Chemistry 1	3	5
INDM	30010	Food Microbiology	3	5
TOTAL				25

Semester 2

Module Code		Module Title	Level	Credit-Rating
FDSC	3301	Electives*	-	5
FDSC	30010	Biochemistry	3	5
FDSC	30030	Food Analysis II	3	5
FDSC	30050	Food Chemistry II	3	5
FDSC	30060	Nutrition I	3	5
FDSC	30070	Product Development	3	5
TOTAL				30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Outside Semester

FDSC	30080	Professional Work Experience	3	5

Fourth Year

Semester 1

Module Code		Module Title	Level	Credit-Rating
BSEN	30120	Food Quality and Safety Assurance	3	5
FDSC	40030	Food Process Technology I	4	5
FDSC	40060	Fresh and Processed Meat Products I	4	5
FDSC	40080	Milk and Dairy Products	4	5
FDSC	40090	Nutrition II	4	5
FDSC	40100	Project*		5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
FDSC	40010	Fermented Foods	4	5
FDSC	40020	Food Ingredients	4	5
FDSC	40040	Food Process Technology II	4	5
FDSC	40050	Food Safety	4	5
FDSC	40070	Marketing	4	5
FDSC	40100	Project *		5
TOTAL				30

** The module FDSC 40100 'Project' will be offered throughout Semester 1 and Semester 2*

FORESTRY

Stage One [MOBDFDN042]

Semester 1

Module Code		Module Title	Level	Credit-Rating
AERD	10020	Information Skills and Computer Applications	1	5
BIOL	10010	Animal Biology and Evolution	1	5
BIOL	10030	Cell and Plant Biology	1	5
EXPH	10010	Physics I (BAgrSc)	1	5
MATH	10010	Discrete Mathematics (BAgrSc)	1	5
One of the following two 5-credit modules:			-	5
CHEM	00010	Introductory Chemistry	0	
CHEM	10040	The Molecular World	1	
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
AERD	10010	Agricultural Economics and Business	1	5
CHEM	10010	Introduction to Organic and Physical Chemistry	1	5
EXPH	10090	Physics II (BAgrSc)	1	5
MATH	10020	Calculus (BAgrSc)	1	5
		Elective Modules (2 x 5-credits)	-	10
TOTAL				30

Second Year [AGBDF0011]

Semester 1

Module Code		Module Title	Level	Credit-Rating
AERD	20030	Business Management	2	5
ERM	20010	Applied Plant Biology	2	5
ERM	20020	Soil Science I	2	5
FOR	2201	Electives*	-	5
FOR	20040	Fundamentals of Forestry	2	5
INDM	20010	Agricultural Microbiology	2	5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
BSEN	20010	Engineering and Surveying	2	5
ERM	20050	Physiological Plant Ecology	2	5
FDSC	20020	Agricultural Chemistry II	2	5
FOR	2201	Electives*	-	5
FOR	20030	Forest Mensuration and Biometrics	2	5
FOR	20050	Principles of Silviculture	2	5
TOTAL				30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

FORESTRY [AGBDF0011] CONT'D

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
ERM 30070	Forest Protection	3	5
FOR 3301	Electives*	-	5
FOR 30060	Forest Establishment	3	5
FOR 30100	Forest Management	3	5
FOR 30190	Remote Sensing and GIS	3	5
FOR 30220	Wood Science	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
FOR 3301	Electives*	-	5
FOR 30070	Forest Harvesting	3	5
FOR 30080	Forest Inventory and Biometrics	3	5
FOR 30180	Professional Work Experience	3	10
FOR 30200	Silviculture of Forest Stands	3	5
TOTAL			30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

Semester 1

Module Code	Module Title	Credit-Rating
FOR 4003	Forest Management Plan*	4
FOR 4004	Forest Planning	6
FOR 4006	Forest Inventory and GIS	10
FOR 4100	Electives**	8
Total		28

Module Code	Module Title	Credit-Rating
FOR 4003	Forest Management Plan*	8
FOR 4005	Experimental Design	4
FOR 4051	Research Project	16
FOR 4100	Electives**	4
Total		32

** The module FOR 4003 'Forest Management Plan' will be offered throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 12 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

HORTICULTURE, LANDSCAPE AND SPORTSTURF MANAGEMENT

Stage One [MOBDFDN048]

Semester 1

Module Code		Module Title	Level	Credit-Rating
BIOL	10010	Animal Biology and Evolution	1	5
BIOL	10030	Cell and Plant Biology	1	5
EXPH	10010	Physics I (BAgrSc)	1	5
MATH	10010	Discrete Mathematics (BAgrSc)	1	5
		Elective Module (1 x 5-credits)	1	5
One of the following two 5-credit modules:			-	5
CHEM	00010	Introductory Chemistry	0	
CHEM	10040	The Molecular World	1	
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
AERD	10010	Agricultural Economics and Business	1	5
CHEM	10010	Introduction to Organic and Physical Chemistry	1	5
EXPH	10090	Physics II (BAgrSc)	1	5
HORT	10010	Introduction to Horticulture, Landscape and Sportsturf Management	1	5
MATH	10020	Calculus (BAgrSc)	1	5
		Elective Modules (1 x 5-credit)	-	5
TOTAL				30

Second Year [AGBDF0037]

Semester 1

Module Code		Module Title	Level	Credit-Rating
AERD	20030	Business Management	2	5
ERM	20010	Applied Plant Biology	2	5
ERM	20020	Soil Science I	2	5
FDSC	20010	Agricultural Chemistry I	2	5
HORT	2201	Electives*	-	5
INDM	20010	Agricultural Microbiology	2	5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
BSEN	20010	Engineering and Surveying	2	5
ERM	20050	Physiological Plant Ecology	2	5
FDSC	20020	Agricultural Chemistry II	2	5
HORT	2201	Electives*	-	5
HORT	20020	Fundamentals of Horticulture 1	2	5
HORT	20030	Fundamentals of Horticulture 2	2	5
TOTAL				30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

HORTICULTURAL SCIENCE [AGBDF0012]

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
ERM 30020	Soil Science II	3	5
ERM 30040	Plant Protection – Pests	3	5
ERM 30050	Plant Protection - Diseases	3	5
HORT 30050	Plant Materials	3	5
HORT 30030	Garden Centre Management	3	5
HORT 30060	Pomology	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
HORT 30020	Elements of Landscape Design	3	5
HORT 30040	Landscape Management	3	5
HORT 30070	Professional Work Experience	3	10
HORT 30080	Protected Horticulture	3	5
HORT 30100	Vegetable Production	3	5
TOTAL			30

Fourth Year

Semester 1

Module Code	*Module Title*	Credit-Rating
CPSC 4004	Crop Breeding	2
HORT 4004	Nursery/Garden Centre Management II	4
HORT 4005	Pomology II	4
HORT 4050	Research Project*	8
HORT 4400	Electives**	12
Total		30

Semester 2

Module Code	*Module Title*	Credit-Rating
AERD 4006	Communications II	6
AERD 4007	Enterprise Development	4
ERM 4007	Molecular Crop Breeding	2
HORT 4003	Landscape and Turfgrass Management II	4
HORT 4006	Protected Horticulture II	4
HORT 4007	Vegetable Crops II	2
HORT 4050	Research Project*	2
HORT 4400	Electives**	6
Total		30

**HORT 4050 'Research Project' will be offered throughout Semester 1 and Semester 2.*
***Students must undertake elective modules amounting to 18 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

LANDSCAPE ARCHITECTURE

Stage One [MOBDFDN041]

Semester 1

Module Code	Module Title	Level	Credit-Rating
BIOL 10010	Animal Biology and Evolution	1	5
BIOL 10030	Cell and Plant Biology	1	5
EXPH 10010	Physics I (BAgrSc)	1	5
LARC 10010	Introduction to Landscape Design Studio 1A	1	5
MATH 10010	Discrete Mathematics (BAgrSc)	1	5
One of the following two 5-credit modules:		-	5
CHEM 00010	Introductory Chemistry	0	
CHEM 10040	The Molecular World	1	
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
CHEM 10010	Introduction to Organic and Physical Chemistry	1	5
EXPH 10090	Physics II (BAgrSc)	1	5
LARC 10020	Introduction to Landscape Design Studio 1B	1	5
MATH 10020	Calculus (BAgrSc)	1	5
	Elective Modules (2 x 5-credits)		10
TOTAL			30

Second Year [AGBDF0038]

Semester 1

Module Code	Module Title	Level	Credit-Rating
ERM 20010	Applied Plant Biology	2	5
ERM 20020	Soil Science I	2	5
HORT 2202	Electives*	-	5
HORT 20040	History of Designed Landscape and Sociology	2	5
LARC 20020	Landscape Studio 2A	2	5
LARC 20030	Landscape Design Theory	2	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
ERM 20050	Physiological Plant Ecology	2	5
HORT 2202	Electives*	-	5
HORT 20020	Fundamentals of Horticulture 1	2	5
LARC 20040	Landscape Studio 2B (Place and Context)	2	5
LARC 20050	Landscape Studio 2C - Construction Techniques 1	2	5
LARC 20060	Computer Applications in Landscape Architecture	2	5
TOTAL			30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

LANDSCAPE HORTICULTURE [AGBDF0010]

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
ERM 30060	Landscape Ecology	3	5
FOR 30190	Remote Sensing and GIS	3	5
HORT 3302	Electives*	-	5
HORT 30050	Plant Materials	3	5
LARC 30020	Landscape Studio 3A (Site planning)	3	5
LARC 30030	Landscape Studio 3B (Construction Techniques 2)	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
HORT 3302	Electives*	-	5
HORT 30040	Landscape Management	3	5
HORT 30070	Professional Work Experience	3	10
LARC 30040	Landscape Studio 3C (Plant/Ecological Applications)	3	5
LARC 30050	Landscape Studio 3D (Construction Techniques 3)	3	5
TOTAL			30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

Semester 1

Module Code	Module Title	Credit-Rating
AESC 4002	Plant Protection II	6
ERM 4003	Environmental Impact Assessment	4
HORT 4009	Landscape Planning	4
HORT 4013	Landscape Design Studio 4a	4
HORT 4051	Landscape Research Project	10
HORT 4101	Electives*	2
Total		30

Semester 2

Module Code	Module Title	Credit-Rating
AERD 4006	Communications II	6
HORT 4003	Landscape and Turfgrass Management II	4
HORT 4010	Landscape Design Theory III and Professional Practice and Planning Law II	6
HORT 4014	Landscape Design Studio 4b	8
HORT 4101	Electives *	6
Total		30

**Students must undertake elective modules amounting to 8 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

BAgrSc

SUMMARY OF TRANSFER PROGRAMMES

Academic Session 2005/06

BAGRSC - SUMMARY OF TRANSFER PROGRAMMES FOR ACADEMIC SESSION 2005/06

AGRICULTURAL AND ENVIRONMENTAL SCIENCE WIT TRANSFER

Third Year [AGBDF0017]

Semester 1

Module Code	Module Title	Level	Credit-Rating
AESC 3302	Electives*	-	5
ERM 20020	Soil Science I	2	5
ERM 20030	Earth Science, Climatology and the Environment	2	5
ERM 30010	Diversity in the Rural Landscape	3	5
ERM 30020	Soil Science II	3	5
ERM 30030	Applied Zoology II	3	5
Total			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AESC 3302	Electives	-	5
ERM 30080	Human Impact on the Environment	3	5
ERM 30090	Agrichemicals and the Environment	3	5
ERM 30100	Professional Work Experience	3	10
FOR 40030	Experimental Design	4	5
Total			30

*** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

As for Fourth Year of the Agricultural and Environmental Science degree programme option [AGBDF0006]

Semester 1

Module Code	Module Title	Credit-Rating
AESC 4004	Wildlife Management**	4
AESC 4006	Pest Management**	4
AESC 4007	Plant Disease Management**	4
AESC 4400	Electives*	6
ERM 4003	Environmental Impact Assessment	4
ERM 4005	Environmental Management	8
		26/30

Semester 2

Module Code	Module Title	Credit-Rating
AESC 4005	Epidemiology and Zoonoses**	4
AESC 4008	Molecular Biology and the Environment**	4
AESC 4051	Project	12
AESC 4400	Electives*	6
ERM 4006	Soil and Water Management	8
		34/30

**Students must undertake elective modules amounting to 12 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*
*** Students must undertake and register for four of the five 4-credit modules.*

ANIMAL AND CROP PRODUCTION TEAGASC/IT TRANSFER [AGBDF0020]

Second Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
AERD 1902	Information Skills and Computer Applications	1	5
BIOL 1901	Animal Biology and Evolution (BAgrSc)	1	5
BIOL 1903	Cell and Plant Biology	1	5
CHEM 0901	Introductory Chemistry	0	5
EXPH 1901	Physics I (BAgrSc)	1	5
MATH 1801	Discrete Mathematics (BAgrSc)	1	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 1901	Agricultural Economics and Business	1	5
CHEM 1901	Introduction to Organic and Physical Chemistry	1	5
CPSC 1921	Electives*	-	10
EXPH 1909	Physics II (BAgrSc)	1	5
MATH 1802	Calculus (BAgrSc)	1	5
TOTAL			30

**Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
CPSC 2201	Electives*	-	5
ERM 20010	Applied Plant Biology	2	5
ERM 20020	Soil Science I	2	5
ERM 20040	Agricultural Ecology and Pollution Control	2	5
FDSC 20010	Agricultural Chemistry I	2	5
INDM 20010	Agricultural Microbiology	2	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
ANSC 20010	Genetics and Biotechnology	2	5
ANSC 20020	Animal Nutrition I	2	5
BSEN 20020	Principles of Engineering	2	5
CPSC 2201	Electives*	-	5
CPSC 20020	Fundamentals of Arable Crop Production	2	5
FDSC 20020	Agricultural Chemistry II	2	5
TOTAL			30

**Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ANIMAL AND CROP PRODUCTION TEAGASC/IT TRANSFER [AGBDF0020] CONT'D

Fourth Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
ANSC 30010	Animal Physiology - Reproduction	3	5
ANSC 30020	Animal Breeding	3	5
CPSC 4401	Electives*		5
ERM 30020	Soil Science II	3	5
ERM 30040	Plant Protection - Pests	3	5
ERM 30050	Plant Protection - Diseases	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 4002	Communications I		4
CPSC 4401	Electives*		26
TOTAL			30

**Students must undertake elective modules amounting to 31 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ANIMAL AND CROP PRODUCTION WIT TRANSFER

Third Year

As for Third Year of the Animal and Crop Production degree programme option [AGBDF0003]

Semester 1

Module Code	Module Title	Level	Credit-Rating
ANSC 30010	Animal Physiology - Reproduction	3	5
ANSC 30020	Animal Breeding	3	5
CPSC 3302	Electives*	-	5
ERM 30020	Soil Science II	3	5
ERM 30040	Plant Protection - Pests	3	5
ERM 30050	Plant Protection - Diseases	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
CPSC 30010	Professional Work Experience	3	30
TOTAL			30

**Students must undertake elective modules amounting to 5 credits.*

ANIMAL AND CROP PRODUCTION WIT TRANSFER CONT'D

Fourth Year

As for Fourth Year of the Animal and Crop Production degree programme option [AGBDF0003]

Semester 1

Module Code		Module Title	Credit-Rating
AERD	4003	Farm Business*	3
AERD	4016	Agricultural Policy Ia	3
ANSC	4004	Animal Husbandry IVa	12
CPSC	4005	Crop Husbandry IVa	8
CPSC	4100	Electives**	4
			30

Semester 2

Module Code		Module Title	Credit-Rating
AERD	4002	Communications I	4
AERD	4003	Farm Business*	3
AERD	4017	Agricultural Policy Ib	3
ANSC	4005	Animal Husbandry IVb	4
CPSC	4006	Crop Husbandry IVb	6
CPSC	4100	Electives**	10
			30

** The module AERD 4003 'Farm Business' will be taught throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 14 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ANIMAL SCIENCE TEAGASC/IT TRANSFER [AGBDF0021]

Second Year

Semester 1

Module Code		Module Title	Level	Credit-Rating
AERD	1902	Information Skills and Computer Applications	1	5
BIOL	1901	Animal Biology and Evolution (BAgrSc)	1	5
BIOL	1903	Cell and Plant Biology	1	5
CHEM	0901	Introductory Chemistry	0	5
EXPH	1901	Physics I (BAgrSc)	1	5
MATH	1801	Discrete Mathematics (BAgrSc)	1	5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
AERD	1901	Agricultural Economics and Business	1	5
ANSC	4400	Electives*	-	10
CHEM	1901	Introduction to Organic and Physical Chemistry	1	5
EXPH	1909	Physics II (BAgrSc)	1	5
MATH	1802	Calculus (BAgrSc)	1	5
TOTAL				30

**Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ANIMAL SCIENCE TEAGASC/IT TRANSFER [AGBDF0021] CONT'D

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
ANSC 20040	Principles of Animal Health, Behaviour and Welfare	2	5
CPSC 20010	Applied Biostatistics	2	5
ERM 20010	Applied Plant Biology	2	5
ERM 20040	Agricultural Ecology and Pollution Control	2	5
FDSC 20010	Agricultural Chemistry I	2	5
INDM 20010	Agricultural Microbiology	2	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
ANSC 3302	Electives*	-	15
ANSC 20010	Genetics and Biotechnology	2	5
ANSC 20020	Animal Nutrition I	2	5
FDSC 20020	Agricultural Chemistry II	2	5
TOTAL			30

** Students must undertake elective modules amounting to 15 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
ANSC 4402	Electives*		5
ANSC 20040	Principles of Animal Health, Behaviour and Welfare	2	5
ANSC 30010	Animal Physiology - Reproduction	3	5
ANSC 30020	Animal Breeding	3	5
ANSC 30030	Animal Genomics	3	5
INDM 30010	Food Microbiology	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
ANSC 4006	Animal Science Project	-	4
ANSC 4402	Electives*	-	16
ANSC 30040	Animal Nutrition II	3	5
ANSC 30060	Animal Physiology - Systems	3	5
TOTAL			30

**Students must undertake elective modules amounting to 21 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ANIMAL SCIENCE WIT TRANSFER

Third Year

As for Third Year of the Animal Science degree programme option [AGBDF0004]

Semester 1

Module Code	Module Title	Level	Credit-Rating
ANSC 3301	Electives*	-	5
ANSC 20040	Principles of Animal Health, Behaviour and Welfare	2	5
ANSC 30010	Animal Physiology - Reproduction	3	5
ANSC 30020	Animal Breeding	3	5
ANSC 30030	Animal Genomics	3	5
INDM 30010	Food Microbiology	3	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
ANSC 3301	Electives*	-	10
ANSC 30040	Animal Nutrition II	3	5
ANSC 30060	Animal Physiology - Systems	3	5
ANSC 30070	Professional Work Experience	-	10
TOTAL			30

** Students must undertake elective modules amounting to 15 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

As for Fourth Year of the Animal Science degree programme option [AGBDF0004]

Semester 1

Module Code	Module Title	Credit-Rating
AERD 4003	Farm Business*	3
AERD 4016	Agricultural Policy Ia	3
ANSC 4002	Animal Husbandry V	4
ANSC 4004	Animal Husbandry IVa	12
ANSC 4400	Electives**	4
FDSC 4017	Fresh and Processed Meat Products II	4
Total		30

Semester 2

Module Code	Module Title	Credit-Rating
AERD 4002	Communications I	4
AERD 4003	Farm Business*	3
AERD 4017	Agricultural Policy Ib	3
ANSC 4003	Animal Breeding II	6
ANSC 4005	Animal Husbandry IVb	4
ANSC 4400	Electives**	6
ERM 4004	Environmental Issues in Agriculture	4
Total		30

** The module AERD 4003 'Farm Business' will be taught throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ENGINEERING TECHNOLOGY ITT TRANSFER

Third Year

As for Third Year of the Engineering Technology degree programme option [AGBDF0008]

Semester 1

Module Code	Module Title	Level	Credit-Rating
BSEN 3301	Electives*	-	10
BSEN 30140	Major Project (literature and planning)	3	5
BSEN 30050	Computer Information Systems	3	5
Any two of the following 5-credit modules:			10
BSEN 30010	Bioprocess Engineering Principles	3	
BSEN 30200	Power and Machinery – Internal Combustion Engines	3	
BSEN 30240	Waste Management	3	
FOR 30190	Remote Sensing and GIS	3	
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
BSEN 3301	Electives*	-	5
BSEN 30150	Major Project (preparatory field/laboratory work)	3	5
BSEN 30060	Computer Programming	3	5
Any three of the following 5-credit modules:			15
AERD 30050	Financial Planning and Control	3	
BSEN 30190	Power and Machinery - Hydraulic Systems	3	
BSEN 30220	Soil Engineering	3	
BSEN 30230	Unit Operations in Bioprocess Engineering	3	
TOTAL			30

** Students must undertake elective modules amounting to 15 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

***As for the Fourth Year of the Engineering Technology degree programme* option [AGBDF0008]**

Semester 1

Module Code	Module Title	Credit-Rating
ENGT 4002	Food Manufacturing Systems	8
ENGT 4007	Power and Machinery II	8
ENGT 4008	Environmental Engineering Principles	8
ENGT 4050	Major Project II* (including professional work experience)	6
TOTAL		30

Semester 2

Module Code	Module Title	Credit-Rating
ENGT 4001	Buildings and Environment	8
ENGT 4003	Food Process Engineering	8
ENGT 4050	Major Project II* (including professional work experience)	8
ENGT 4100	Electives**	6
TOTAL		30

** Students must undertake the module ENGT 4050 'Major Project II' throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 6 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

ENGINEERING TECHNOLOGY WIT TRANSFER

Third Year

As for Third Year of the Engineering Technology degree programme option [AGBDF0008]

Semester 1

Module Code	Module Title	Level	Credit-Rating
BSEN 3301	Electives*	-	10
BSEN 30140	Major Project (literature and planning)	3	5
BSEN 30050	Computer Information Systems	3	5
Any two of the following 5-credit modules:			10
BSEN 30010	Bioprocess Engineering Principles	3	
BSEN 30200	Power and Machinery – Internal Combustion Engines	3	
BSEN 30240	Waste Management	3	
FOR 30190	Remote Sensing and GIS	3	
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
BSEN 3301	Electives*	-	5
BSEN 30060	Computer Programming	3	5
BSEN 30150	Major Project (preparatory field/laboratory work)	3	5
Any three of the following 5-credit modules:			15
BSEN 30230	Unit Operations in Bioprocess Engineering	3	
BSEN 30190	Power and Machinery - Hydraulic Systems	3	
BSEN 30220	Soil Engineering	3	
AERD 30050	Financial Planning and Control	3	
TOTAL			30

** Students must undertake elective modules amounting to 15 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

As for the Fourth Year of the Engineering Technology degree programme option [AGBDF0008]

Semester 1

Module Code	Module Title	Credit-Rating
ENGT 4002	Food Manufacturing Systems	8
ENGT 4007	Power and Machinery II	8
ENGT 4008	Environmental Engineering Principles	8
ENGT 4050	Major Project II* (including professional work experience)	6
TOTAL		30

Semester 2

Module Code	Module Title	Credit-Rating
ENGT 4001	Buildings and Environment	8
ENGT 4003	Food Process Engineering	8
ENGT 4050	Major Project II* (including professional work experience)	8
ENGT 4100	Electives**	6
TOTAL		30

** Students must undertake the module ENGT 4050 'Major Project II' throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 6 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

FOOD AND AGRIBUSINESS MANAGEMENT TEAGASC/IT TRANSFER [AGBDF0032]

Second Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
AERD 20030	Business Management	2	5
AERD 2202	Electives*	-	5
CHEM 0901	Introductory Chemistry	0	5
CPSC 20010	Applied Biostatistics	2	5
ERM 20010	Applied Plant Biology	2	5
INDM 20010	Agricultural Microbiology	2	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 1901	Agricultural Economics and Business	1	5
AERD 20010	Applied Economic Analysis	2	5
AERD 20040	Written Communications	2	5
AERD 2202	Electives*		5
ANSC 20030	Principles of Animal Science	2	5
CPSC 20030	Principles of Crop Science	2	5
TOTAL			30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Third Year

Semester 1

Module Code	*Module Title*	*Level*	*Credit-Rating*
AERD 3304	Electives*		10
AERD 30010	Computer Analysis	3	5
AERD 30040	Farm Business Management I	3	5
BSEN 30120	Food Quality and Safety Assurance	3	5
FDSC 40110	Fresh and Processed Meat Products III	4	5
TOTAL			30

Semester 2

Module Code	*Module Title*	*Level*	*Credit-Rating*
AERD 3304	Electives*	-	5
AERD 30060	Food and Agribusiness Marketing	3	5
AERD 30090	Operations and Personnel Management	3	5
AERD 30110	Professional Work Experience	-	10
AERD 30130	Quantitative Methods	3	5
TOTAL			30

** Students must undertake elective modules amounting to 15 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

AGRIBUSINESS AND RURAL DEVELOPMENT TEAGASC/IT TRANSFER

Fourth Year

As for Fourth Year of the Agribusiness and Rural Development degree programme option [AGBDF0005]

Semester 1

Module Code	Module Title	Credit-Rating
AERD 4004	Agricultural Marketing and Trade	4
AERD 4011	Research Methods/ Project	6
AERD 4012	Taxation	2
AERD 4014	Farm Business Management II*	3
AERD 4015	IT and E-Business	4
AERD 4018	Agricultural Policy IIa	4
AERD 4400	Electives**	3
ECON 4101	National Economics	4
TOTAL		30

Semester 2

Module Code	Module Title	Credit-Rating
AERD 4006	Communications II	6
AERD 4007	Enterprise Development	4
AERD 4009	Food and Farm Input Marketing	4
AERD 4014	Farm Business Management II*	3
AERD 4019	Agricultural Policy IIb	4
AERD 4050	Major Project	4
AERD 4400	Electives**	5
TOTAL		30

**The module AERD 4014 'Farm Business Management II' will be taught throughout Semester 1 and 2*

***Students must undertake elective modules amounting to 8 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

FOOD AND AGRIBUSINESS MANAGEMENT TWO-YEAR TRANSFER PROGRAMME [AGBDF0033]

Note: This newly established programme is for students who have obtained (a) the National Diploma in Science in Agricultural Science/Bachelor of Science in Agricultural Science; and (b) the National Diploma in Science in Agriculture/Bachelor of Science in Agriculture.

Third Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
AERD 30010	Computer Analysis	3	5
AERD 30040	Farm Business Management I	3	5
BSEN 30120	Food Quality and Safety Assurance	3	5
FDSC 40110	Fresh and Processed Meat Products III	4	5
AERD 3305	Electives*	-	10
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 20010	Applied Economic Analysis	3	5
AERD 30090	Operations and Personnel Management	3	5
AERD 30130	Quantitative Methods	3	5
AERD 30050	Financial Planning and Control	3	5
AERD 30110	Professional Work Experience	-	10
TOTAL			30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

As for Fourth Year of the Food and Agribusiness Management degree programme

AGRIBUSINESS AND RURAL DEVELOPMENT WIT TRANSFER

Fourth Year

As for the Fourth Year Agribusiness and Rural Development degree programme [AGBDF0005]

Semester 1

Module Code	Module Title	Credit-Rating
AERD 4004	Agricultural Marketing and Trade	4
AERD 4011	Research Methods/ Project	6
AERD 4012	Taxation	2
AERD 4014	Farm Business Management II*	3
AERD 4015	IT and E-Business	4
AERD 4018	Agricultural Policy IIa	4
ECON 4101	National Economics	4
AERD 4400	Electives**	3
TOTAL		30

Semester 2

Module Code	Module Title	Credit-Rating
AERD 4006	Communications II	6
AERD 4007	Enterprise Development	4
AERD 4009	Food and Farm Input Marketing	4
AERD 4014	Farm Business Management II*	3
AERD 4019	Agricultural Policy IIb	4
AERD 4050	Major Project	4
AERD 4400	Electives**	5
TOTAL		30

**The module AERD 4014 'Farm Business Management II' will be taught throughout Semester 1 and 2*

***Students must undertake elective modules amounting to 8 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

FORESTRY WIT TRANSFER PROGRAMME

Third Year

As for Third Year of the Forestry degree programme option [AGBDF0011]

Semester 1

Module Code		Module Title	Level	Credit-Rating
ERM	30070	Forest Protection	3	5
FOR	3301	Electives*	-	5
FOR	30060	Forest Establishment	3	5
FOR	30100	Forest Management	3	5
FOR	30190	Remote Sensing and GIS	3	5
FOR	30220	Wood Science	3	5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
FOR	3301	Electives*	-	5
FOR	30070	Forest Harvesting	3	5
FOR	30080	Forest Inventory and Biometrics	3	5
FOR	30180	Professional Work Experience	3	10
FOR	30200	Silviculture of Forest Stands	3	5
TOTAL				30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

As for Fourth Year of the Forestry degree programme option [AGBDF0011]

Semester 1

Module Code		*Module Title*	*Credit-Rating*
FOR	4003	Forest Management Plan*	4
FOR	4004	Forest Planning	6
FOR	4006	Forest Inventory and GIS	10
FOR	4100	Electives**	8
TOTAL			28

Semester 2

Module Code		*Module Title*	*Credit-Rating*
FOR	4003	Forest Management Plan*	8
FOR	4005	Experimental Design	4
FOR	4051	Research Project	16
FOR	4100	Electives**	4
TOTAL			32

** The module FOR 4003 'Forest Management Plan' will be offered throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 12 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

FORESTRY GMIT TRANSFER PROGRAMME

Third Year

As for Third Year of the Forestry degree programme option [AGBDF0011]

Semester 1

Module Code		Module Title	Level	Credit-Rating
ERM	30070	Forest Protection	3	5
FOR	3301	Electives*	-	5
FOR	30060	Forest Establishment	3	5
FOR	30100	Forest Management	3	5
FOR	30190	Remote Sensing and GIS	3	5
FOR	30220	Wood Science	3	5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
FOR	3301	Electives*	-	5
FOR	30070	Forest Harvesting	3	5
FOR	30080	Forest Inventory and Biometrics	3	5
FOR	30180	Professional Work Experience	3	10
FOR	30200	Silviculture of Forest Stands	3	5
TOTAL				30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

As for Fourth Year of the Forestry degree programme option [AGBDF0011]

Semester 1

Module Code		*Module Title*	*Credit-Rating*
FOR	4003	Forest Management Plan*	4
FOR	4004	Forest Planning	6
FOR	4006	Forest Inventory and GIS	10
FOR	4100	Electives**	8
TOTAL			28

Semester 2

Module Code		*Module Title*	*Credit-Rating*
FOR	4003	Forest Management Plan*	8
FOR	4005	Experimental Design	4
FOR	4051	Research Project	16
FOR	4100	Electives**	4
TOTAL			32

** The module FOR 4003 'Forest Management Plan' will be offered throughout Semester 1 and Semester 2.*

*** Students must undertake elective modules amounting to 12 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

HORTICULTURAL SCIENCE ITB/WIT TRANSFER [AGBDF0023]

Third Year

Module Code	Module Title	Level	Credit-Rating
BIOL 1901	Animal Biology and Evolution	1	5
BIOL 1903	Cell and Plant Biology	1	5
CHEM 0901	Introductory Chemistry	0	5
EXPH 1901	Physics I (BAgrSc)	1	5
MATH 1801	Discrete Mathematics (BAgrSc)	1	5
HORT 3303	Electives*	-	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 1901	Agricultural Economics and Business	1	5
CHEM 1901	Introduction to Organic and Physical Chemistry	1	5
EXPH 1909	Physics II (BAgrSc)	1	5
HORT 1901	Introduction to Horticulture, Landscape and Sportsturf Management	1	5
MATH 1802	Calculus (BAgrSc)	1	5
HORT 3303	Electives*	-	5
TOTAL			30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year

Semester 1

Module Code	Module Title	Level	Credit-Rating
ERM 20010	Applied Plant Biology	2	5
ERM 20020	Soil Science I	2	5
FDSC 20010	Agricultural Chemistry I	2	5
HORT 4402	Electives*		10
INDM 20010	Agricultural Microbiology	2	5
TOTAL			30

Semester 2

Module Code	Module Title	Level	Credit-Rating
AERD 4006	Communications II		6
HORT 4050	Research Project		10
HORT 4402	Electives*		14
TOTAL			30

**Students must undertake elective modules amounting to 24 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

LANDSCAPE HORTICULTURE ITB/WIT TRANSFER

Third Year
As for the Third Year Landscape Horticulture degree programme option [AGBDF0010]

Semester 1

Module Code		Module Title	Level	Credit-Rating
ERM	30060	Landscape Ecology	3	5
FOR	30190	Remote Sensing and GIS	3	5
HORT	3302	Electives*	-	5
HORT	30050	Plant Materials	3	5
LARC	30020	Landscape Studio 3A (Site planning)	3	5
LARC	30030	Landscape Studio 3B (Construction Techniques 2)	3	5
TOTAL				30

Semester 2

Module Code		Module Title	Level	Credit-Rating
HORT	30040	Landscape Management	3	5
HORT	30070	Professional Work Experience	3	10
HORT	3302	Electives*	-	5
LARC	30040	Landscape Studio 3C (Plant/Ecological Applications)	3	5
LARC	30050	Landscape Studio 3D (Construction Techniques 3)	3	5
TOTAL				30

** Students must undertake elective modules amounting to 10 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

Fourth Year
As for the Fourth Year Landscape Horticulture degree programme option [AGBDF0010]

Semester 1

Module Code		Module Title	Credit-Rating
AESC	4002	Plant Protection II	6
ERM	4003	Environmental Impact Assessment	4
HORT	4009	Landscape Planning	4
HORT	4013	Landscape Design Studio 4a	4
HORT	4051	Landscape Research Project	10
HORT	4101	Electives*	2
Total			30

Semester 2

Module Code		Module Title	Credit-Rating
AERD	4006	Communications II	6
HORT	4003	Landscape and Turfgrass Management II	4
HORT	4010	Landscape Design Theory III and Professional Practice and Planning Law II	6
HORT	4014	Landscape Design Studio 4b	8
HORT	4101	Electives *	6
Total			30

**Students must undertake elective modules amounting to 8 credits. Distribution of credits may vary across semester depending on individual selection of elective modules.*

BAgrSc

ELECTIVE MODULES

Academic Session 2005/06

BAGRSC - ELECTIVE MODULES FOR ACADEMIC SESSION 2005/06

Elective Modules Offered to First Year BAgrSc Students in Academic Session 2005/06

First Year students are required to register to elective modules by no later than 30 September 2005 in Academic Session 2005/06. First Year students can select free elective modules as detailed under 'Undergraduate Studies' on the 'Horizons Website' (address: **www.ucd.ie/horizons/**). For ease of reference, below (see page 2) is a list of the modules offered by the academic staff involved in teaching the BAgrSc degree which are available to First Year students as elective modules in Academic Session 2005/06 – the module descriptors for these modules are available in the relevant module descriptor documentation.

Elective Modules Offered to Second, Third and Fourth Year BAgrSc Students in Academic Session 2005/06

Second, Third and Fourth Year BAgrSc students are required to register to elective modules in order to fulfil the elective requirement of their BAgrSc degree programme option.

Below (see page 3-5) is a listing of elective modules to be offered to Second, Third and Fourth BAgrSc students in Academic Session 2005/06. Students may select from these modules to fulfil the elective requirement of their BAgrSc degree programme option.

While all modules listed will normally be available for student selection, on occasion individual elective modules may be withdrawn at the discretion of the BAgrSc Programme Board. Students should also note that choice of elective modules may be restricted by reason of one or more of the following:

1. Prerequisite requirement for certain electives;
2. Timetabling constraints;
3. Minimum or maximum limits on the number of students taking a particular elective module.
4. Students will not be permitted to take a module of similar content to a core module or an elective module which they have previously taken.

Note: Second, Third and Fourth Year students may, with the agreement of the BAgrSc Degree Programme Option Coordinator, take an elective project as a module to meet the elective requirement.

Registration to elective modules must be formally approved by the relevant BAgrSc Degree Programme Option Coordinator. The module descriptors for the elective modules as listed are available in the relevant module descriptor documentation.

Modules offered by Staff Teaching the BAgrSc Degree which are available as Elective Modules to First Year Students in Academic Session 2005/06

Module Code		***Module Title***	***Credit-Rating***	***Semester***
AERD	10010	Agricultural Economics and Business	5	2
AERD	10020	Information Skills and Computer Applications	5	1
AERD	10030	Introduction to Food and Agribusiness Management	5	2
AESC	10010	Land Use and the Environment	5	2
ANSC	10010	Introduction to Animal Science	5	2
BSEN	10010	Biosystems Engineering Design Challenge	5	2
CPSC	10010	Introduction to Crop Science	5	2
FDSC	10010	Food Diet and Health	5	2
FOR	10010	Introduction to Forestry	5	2
HORT	10010	Introduction to Horticulture, Landscape and Sportsturf Management	5	2
LARC	10010	Introduction to Landscape Design Studio 1A	5	1
LARC	10020	Introduction to Landscape Design Studio 1B	5	2

List of Modules with a Credit-Rating of Five which are available as Elective Modules to Second, Third and Fourth Year BAgrSc Students in Academic Session 2005/06

Module Code		*Module Title*	*Credit-Rating*	*Semester*
AERD	20010	Applied Economic Analysis	5	2
AERD	20020	Business Law	5	2
AERD	20030	Business Management	5	1
AERD	20040	Written Communications	5	2
AERD	30010	Computer Analysis	5	1
AERD	30040	Farm Business Management I	5	1
AERD	30050	Financial Planning and Control	5	2
AERD	30060	Food and Agribusiness Marketing	5	2
AERD	30090	Operations and Personnel Management	5	2
AERD	30100	Principles of Development	5	1
AERD	30120	Project Planning and Management	5	1
AERD	30130	Quantitative Methods	5	2
AERD	30150	Rural Development Strategies	5	1
ANSC	20010	Genetics and Biotechnology	5	2
ANSC	20020	Animal Nutrition I	5	2
ANSC	20030	Principles of Animal Science	5	2
ANSC	20040	Principles of Animal Health, Behaviour and Welfare	5	1
ANSC	30010	Animal Physiology - Reproduction	5	1
ANSC	30020	Animal Breeding	5	1
ANSC	30030	Animal Genomics	5	1
ANSC	30040	Animal Nutrition II	5	2
ANSC	30060	Animal Physiology – Systems	5	2
ANSC	30100	Applied Biotechnology	5	2
BSEN	20010	Engineering and Surveying	5	2
BSEN	20020	Principles of Engineering	5	2
BSEN	30010	Bioprocess Engineering Principles	5	1
BSEN	30050	Computer Information Systems	5	1
BSEN	30060	Computer Programming	5	2
BSEN	30120	Food Quality and Safety Assurance	5	1
BSEN	30190	Power and Machinery – Hydraulic Systems	5	2
BSEN	30200	Power and Machinery – Internal Combustion Engines	5	1
BSEN	30220	Soil Engineering	5	2
BSEN	30230	Unit Operations in Bioprocess Engineering	5	2
BSEN	30240	Waste Management	5	1
CPSC	20010	Applied Biostatistics	5	1
CPSC	20020	Fundamentals of Arable Crop Production	5	2
CPSC	20030	Principles of Crop Science	5	2
ERM	20010	Applied Plant Biology	5	1
ERM	20020	Soil Science I	5	1
ERM	20030	Earth Science, Climatology and the Environment	5	1
ERM	20040	Agricultural Ecology & Pollution Control	5	1
ERM	20050	Physiological Plant Ecology	5	2
ERM	20060	Applied Zoology I	5	2
ERM	30010	Diversity in the Rural Landscape	5	1
ERM	30020	Soil Science II	5	1
ERM	30030	Applied Zoology II	5	1
ERM	30040	Plant Protection – Pests	5	1
ERM	30050	Plant Protection – Diseases	5	1
ERM	30060	Landscape Ecology	5	1
ERM	30070	Forest Protection	5	1
ERM	30080	Human Impact on the Environment	5	2
ERM	30090	Agrichemicals and the Environment	5	2
ERM	30130	Peatland Management	5	2

List of Modules with a Credit-Rating of Five which are available as Elective Modules to Second, Third and Fourth Year BAgrSc Students in Academic Session 2005/06 Cont'd

Module Code		*Module Title*	*Credit-Rating*	*Semester*
FDSC	20010	Agricultural Chemistry I	5	1
FDSC	20020	Agricultural Chemistry II	5	2
FDSC	20030	Basic Food Analysis	5	2
FDSC	20040	Sensory Analysis	5	1
FDSC	20050	Food Science I: Food Physics	5	2
FDSC	30010	Biochemistry	5	2
FDSC	30020	Food Analysis I	5	1
FDSC	30030	Food Analysis II	5	2
FDSC	30040	Food Chemistry I	5	1
FDSC	30050	Food Chemistry II	5	2
FDSC	30060	Nutrition I	5	2
FDSC	40010	Fermented Foods	5	2
FDSC	40020	Food Ingredients	5	2
FDSC	40030	Food Process Technology I	5	1
FDSC	40040	Food Process Technology II	5	2
FDSC	40050	Food Safety	5	2
FDSC	40060	Fresh and Processed Meat Products I	5	1
FDSC	40070	Marketing	5	2
FDSC	40080	Milk and Dairy Products	5	1
FDSC	40090	Nutrition II	5	1
FDSC	40110	Fresh and Processed Meat Products III	5	1
FOR	20030	Forest Mensuration and Biometrics	5	2
FOR	20040	Fundamentals of Forestry	5	1
FOR	20050	Principles of Silviculture	5	2
FOR	30200	Silviculture of Forest Stands	5	2
FOR	30030	The Biology, Silviculture and Management of Sitka Spruce	5	1
FOR	30060	Forest Establishment	5	1
FOR	30070	Forest Harvesting	5	2
FOR	30080	Forest Inventory and Biometrics	5	2
FOR	30100	Forest Management	5	1
FOR	30110	Forest Policy and Law	5	1
FOR	30130	Forest Tree Improvement	5	2
FOR	30150	Multi-Purpose Forest Management	5	1
FOR	30190	Remote Sensing and GIS	5	1
FOR	30220	Wood Science	5	1
FOR	40030	Experimental Design	5	2
HORT	20020	Fundamentals of Horticulture 1	5	2
HORT	20030	Fundamentals of Horticulture 2	5	2
HORT	20040	History of Designed Landscape and Sociology	5	1
HORT	30020	Elements of Landscape Design	5	2
HORT	30030	Garden Centre Management	5	1
HORT	30040	Landscape Management	5	2
HORT	30060	Pomology	5	1
HORT	30080	Protected Horticulture	5	2
HORT	30100	Vegetable Production	5	2
LARC	20030	Landscape Design Theory	5	1
LARC	20060	Computer Applications in Landscape Architecture	5	2

List of Modules with a Credit-Rating of Two/Four which are available as Elective Modules to Second, Third and Fourth Year BAgrSc Students in Academic Session 2005/06

Module Code		***Module Title***	***Credits***	***Semester***
AERD	4012	Taxation	2	1
AERD	4101	Project Development and Management	4	1
AERD	4104	Farm Input Marketing	2	2
AERD	4106	Food Marketing	2	2
AERD	4110	Farm Management	2	1
AERD	3014	Health and Safety on Farms	4	2
AESC	4004	Wildlife Management	4	1
AESC	4005	Epidemiology and Zoonoses	4	2
AESC	4006	Pest Management	4	1
AESC	4007	Plant Disease Management	4	1
AESC	4008	Molecular Biology and the Environment	4	2
AESC	4101	Apiculture	2	1
AESC	4104	Livestock Health Products	2	2
AESC	4110	Reclamation of Marginal and Damaged Land	4	1
ANSC	4101	Advanced Beef Production	4	2
ANSC	4102	Advanced Dairy Production	4	2
ANSC	4103	Advanced Sheep Husbandry	4	2
ANSC	4104	Advanced Swine Production	4	2
ANSC	4105	Applied Animal Physiology	4	1
ANSC	4106	Equine Husbandry	4	2
ANSC	4107	Feed Formulation and Quality Control	2	1
ANSC	4109	Animal Behaviour and Welfare	2	2
ANSC	4115	Applied Biotechnology	4	2
ANSC	4116	Poultry Production	2	2
CPSC	4101	Developments in Cereal Production	4	2
CPSC	4103	Organic Agriculture and Horticulture	2	1
CPSC	4112	Alternative Crop Development	4	2
ENGT	4107	Buildings for Animal Production and Crop Storage	4	2
ERM	4004	Environmental Issues in Agriculture	4	2
ERM	4101	Forest Wildlife Management	2	2
ERM	4104	Peatland Management	4	2
FOR	4109	Forest Roads	2	1
FOR	4125	Agro-Forestry	2	1
FOR	4129	Forestry in Europe	2	1
FOR	4130	Sustainable Forest Management	2	1
FOR	4132	Elective Essay I	2	1/2
FOR	4133	Elective Essay II	4	1/2
HORT	4102	Computer Aided Design	2	2
HORT	4104	Exotic Trees and Shrubs	2	2
HORT	4106	Interior Plantscaping	2	1
HORT	4110	Photographic Image Editing	2	2
HORT	4111	Photography	2	2
HORT	4112	Plant Biotechnology	4	1
HORT	4114	Advanced Pomology	4	2
HORT	4115	Garden Restoration	2	2
HORT	4117	Garden Centre Management	4	1
HORT	4118	Social Horticulture	4	1
LANG	4102	Advanced French	4	1 and 2*
LANG	4105	Spanish	4	1 and 2*

- *Language Modules will run through Semester 1 and 2*

BAgrSc

MODULE DESCRIPTORS

Academic Session 2005/06

Modules Coded 'AERD' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Agricultural Economics and Business**
Module Code:	**AERD 10010/AERD 1901**
Module Coordinator:	**Dr Deirdre O'Connor**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies:

Description:

This module is designed to provide first year undergraduate students with an overview of the role, structure and operation of the agri-food sector in Ireland within the context of the wider economy and society. While the primary focus of the module will be on the structure and operation of the sector itself, it will also be necessary to provide an overview of the national economy and rural economy in Ireland and the key policy making bodies in the European Union, in order to set the context in which the agri-food sector in Ireland operates. No prior knowledge of economics is expected or assumed.

Learning Outcomes:
On completion of this module students should be able to:

- Specify the different roles and functions of the key economic institutions in Ireland and the EU.
- Identify the most important factors in the development of an economy and the operation of the inter-linkages between them
- Identify the principal components of the agri-food sector in Ireland and how they interact with each other
- Explain the role and importance of the agri-food sector in Ireland
- Use basic tools of economic analysis to show how markets for goods and services in the agri-food sector operate

Workload:	**Approximate Hours:**
Class Contact: Lectures	33
Class Contact: Small Group	6
Class Contact: Practical	-
Specified learning activities	6
Autonomous student learning	66
	111

Module Title:	**Information Skills and Computer Applications**
Module Code:	**AERD 10020**
Module Coordinator:	**Anne Markey**
Credits:	**5**
Level:	**1**
Semester:	**1**

Module Dependencies:

Description:

Development of the ability to retrieve, report on and present material relevant to area of study; introduction to information technology and computer applications; information retrieval and communications.

Learning Outcomes:
On completion of this module students should be able to:

- Access a range of relevant information in/via UCD library (manually and electronically)
- Report on information accessed through written communication
- To use the MS Office suite of applications and the Internet and e-mail within the UCD computer environment

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	24
Class Contact: Practical	24
Specified learning activities	-
Autonomous student learning	36
	108

Module Title:	**Introduction to Food and Agribusiness Management**
Module Code:	**AERD 10030**
Module Coordinator:	**Dr Deirdre O'Connor**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies: None

Description:

The programme-specific component relating to Food and Agribusiness Management (FAM) takes the form of an overview of the food system in an Irish and European context. This latter component introduces FAM students to the range of actors engaged in the food chain in Ireland – such as farmers, food companies, supermarkets and consumers, and specifies the relationships between them. Case studies and field trips are an integral component of this module.

Learning Outcomes:

On successful completion of this module students should be able to:

- Identify the various roles and contributions of the different actors in the agri-food system in Ireland.
- Describe the impact of relevant key historic and current trends on the operation and development of the sector.
- Identify the key areas of policy in Ireland and Europe which impact upon the operation and development of the sector.

Workload:	**Approximate Hours:**
Class Contact: Lectures	10
Class Contact: Small Group	-
Class Contact: Practical	18
Specified learning activities	22
Autonomous student learning	50
	100

Module Title:	**Applied Economic Analysis**
Module Code:	**AERD 20010**
ModuleCoordinator:	**Dr Deirdre O'Connor**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: None

Description:
This second year module is designed to equip students with the tools and skills necessary to analyse the operation of the agri-food economy in a national and global context. Students will gain insights into the structure, conduct and performance of the food supply chain; develop their capacity to analyse producer and consumer behaviour as it applies to the sector and understand the implications of agricultural, trade and environmental policy for the agri-food sector

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

- Analyse the structure, conduct and performance of the food supply chain in Ireland
- Apply the tools of economic analysis to model producer and consumer behaviour in relation to agri-food markets.
- Identify and evaluate the impacts of agricultural, trade and environmental policy on the operation of agri-food markets.

Workload:	**Approximate Hours:**
Class Contact: Lectures	36
Class Contact: Small Group	
Class Contact: Practical	16
Specified Learning Activities	12
Autonomous Student Learning	36
	100

Module Title:	**Business Law**
Module Code:	**AERD 20020**
Module Coordinator:	**Mr Laurence Harte**
Credits:	**5**
Level:	**2**
Semester	**2**

Module Dependencies: Prerequisites: Business Management, or equivalent

Description:
Definition and theories of law, sources of law, the Irish courts system and the Constitution of Ireland. Law of contract: essence of a contract, expressed and implied terms of contracts and the special case of insurance contracts. Law of torts: trespass, defamation, negligence, and occupier and employer liabilities. Company law: forms of business entity, separate legal personality, the memorandum and articles of association, duties of directors, company wind-up and bankruptcy. EU law: institutional structure, EU and national laws, and legislative acts with particular reference to agricultural trade. EU and Irish competition law: Labour law: contract of employment and duties and obligations of employers and employees.

Learning Outcomes:
On completion of this module students should be able to:

- Cite the sources of law and describe the operation of the Irish court system
- Outline the essential elements of a contract and the principles of contract law
- Describe breaches of the law of torts and the consequent liabilities of occupiers and employers
- Distinguish between legal forms of business organization with particular reference to the limited liability company and the legislative framework within which it operates
- Describe EU law in terms of its institutional structure, relationship with Irish law and application in agricultural trade and in the regulation of market competition
- Discuss the nature of a contract of employment and the duties and obligations of employers and employees

Workload:	**Approximate Hours:**
Class Contact: Lectures	36
Class Contact: Small Group	0
Class Contact: Practical	0
Specified learning activities	10
Autonomous student learning	62
	108

Module Title:	**Business Management**
Module Code:	**AERD 20030**
Module Coordinator:	**Mr Laurence Harte**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: None

Description:

The process of management and decision-making in companies/organizations in terms of planning, leadership, organizing and controlling.

Definition and role of marketing. Process of and stages in producing a written marketing plan from research through decision making in relation to market segmentation, positioning and marketing mix elements to headings and format of written marketing plan.

Financial accounting principles and concepts. Structure of financial accounting statements, measurement and analysis of financial performance and issues in asset management and sources of business funding.

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

- Describe the nature of management, corporate structures and management processes within an organization or firm and its role in achieving objectives.
- Explain the role of marketing in business life and in society and describe, explain and apply the process of marketing management and produce a written marketing plan for a business.
- Outline the structure of the financial accounts of a business and describe and use the more important indicators of financial performance.
- Describe business asset structures and the principles of business funding.

Workload:	**Approximate Hours:**
Class Contact: Lectures	36
Class Contact: Small Group	0
Class Contact: Practical	0
Specified learning activities	0
Autonomous student learning	64
	100

Module Title:	**Written Communications**
Module Code:	**AERD 20040**
Module Coordinator:	**Anne Markey**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: None

Description:
This is an undergraduate module designed for second year students. This module is important because of the key role of good communication skills among professionals. Topics covered include:

- The meaning of communication
- Context and role of communications in businesses and organisations
- Communications models
- Factors influencing the effectiveness of interpersonal communications
- Writing skills including the principles of effective writing, writing structures and writing styles

Learning Outcomes:
On completion of this module students should be able to:

- Explain the meaning of communication and describe its importance in businesses and organisations
- Describe the process of communication; discuss the factors that influence effectiveness as communicators and assess the implications of these factors
- Analyse their own writing effectiveness
- Recognise and apply appropriate writing styles and structures
- Plan and present writing projects eg essays, CVs, business letters, reports and press releases

Workload:	**Approximate Hours:**
Class Contact: Lectures	32
Class Contact: Small Group	0
Class Contact: Practical	0
Specified learning activities	40
Autonomous student learning	40
	112

Module Title:	**Computer Analysis**
Module Code:	**AERD 30010**
ModuleCoordinator:	**Dr Michael Wallace**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: None

Description:

This is a third year module on the use of computer applications in the management of information and decision support within commercial organisations. Students are instructed on the use of microcomputers in business with emphasis on spreadsheets, graphics and databases and candidates gain "hands-on" experience with these applications throughout the module. The module aims to facilitate students in gaining key computing skills applicable to the business environment.

The module is divided into two sections. Part I deals with spreadsheet applications of simulation modelling for business decisions. Practical examples comprise spreadsheet models in financial analysis and planning, investment appraisal, inventory management and risk analysis. Part II introduces database management systems with emphasis on database design, construction, application and maintenance of databases. Issues of data security and data protection are also considered.

Learning Outcomes:

On successful completion of this module students should be able to:

- Explain the potential roles of spreadsheets and databases in decision support within an organization.
- Define core spreadsheet and database concepts and terminology.
- Use Spreadsheets (Microsoft Excel) for key business applications and simulation modeling.
- Develop a database application using Microsoft Access and use that application to generate appropriate reports to support a decision making function.

Indicative Student Workload	**Approximate Hours:**
Class Contact: Lectures	17
Class Contact: Small Group	-
Class Contact: Practical	32
Specified learning activities	20
Autonomous student learning	40
	109

Module Title:	**Farm Business Management I**
Module Code:	**AERD 30040**
Module Coordinator:	**Anne-Marie Butler**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: None

Description:
This third year module develops student understanding of core concepts in farm business management The content includes: (1) Objectives and goals of the farm manager, farm management functions and the family life cycle. (2) Economic principles underlying production decisions. (3) Farm accounts required for management and taxation purposes; account preparation and application in financial and management analysis. (4) Law and the farmer; farm registration and taxes, forms of ownership, succession and inheritance.

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

- Describe the functions of farm management, the decision making process and the nature and role of farm family goals.
- Apply economic principles to analyse farm production decisions
- Outline the role of computerisation in farm record keeping.
- Prepare and analyse/interpret a farm account
- Discuss key aspects of the legal environment relevant to Irish farmers

Workload:	**Approximate Hours:**
Class Contact: Lectures	35
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	35
Autonomous student learning	30
	100

Module Title:	**Financial Planning and Control**
Module Code:	**AERD 30050**
Module Coordinator:	**Mr Laurence Harte**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisite: Business Management or equivalent

Description:
Background and relevance of financial planning and control to food and agribusiness management, the respective roles of financial and managerial accounting are distinguished, costs are defined and systems of cost classification are presented. Issues in accounting for materials, labour and overhead expenditure for the purposes of decision making and for management control. Approaches to costing including variable (marginal) costing, costs for pricing purposes, joint product costing and concepts of waste and scrap are presented. Other main topics include: cost-volume-profit analysis, capital investment analysis, and activity based costing. The module is completed with discussion of the budgetary control process.

Learning Outcomes:
On completion of this module students should be able to:

- **Explain how management accounting differs from financial accounting**
- **Outline and explain bases for classifying costs and revenues and systems of accounting for materials, labour and overhead**
- **Explain the principles and use the methods of cost-volume-profit analysis and of investment analysis**
- **Describe budgetary control systems and construct simple departmental and functional budgets**
- **Discuss the strengths and limitations of traditional and more modern costing and managerial accounting methods**
- **Outline the information needs of business managers and discuss behavioural and other issues in designing and specifying management information systems.**

Workload:	**Approximate Hours:**
Class Contact: Lectures	36
Class Contact: Small Group	0
Class Contact: Practical	0
Specified learning activities	10
Autonomous student learning	62
	108

Module Title:	**Food and Agribusiness Marketing**
Module Code:	**AERD 30060**
Module Coordinator:	**Dr John O'Connell**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: None

Description:
Consumer behaviour relating to food marketing in a European context covering, inter alia, political, legal, economic, technological, cultural, social psychological, lifestyle/psychographic commercial and marketing aspects.
Specialised topics include: GMOs, organic foods, food branding, cost/value of food marketing, and structural, conduct and performance aspects of the Irish food processing sector.
Models of farmer buying behaviour and of farmer purchasing processes
Application of the process of marketing analysis and strategy formulation to the farm sector marketing function.
Marketing structures and strategies in feedstuffs, animal health, consultancy, banking and other farm sector inputs and services.

Learning Outcomes:
On completion of this module students should be able to:
- Describe, analyse and explain the forces at work in relation to consumer food marketing in a European context
- Predict the likely evolution of such forces in the medium term and the consequences of same.
- Describe and apply theoretical models of farmer buying behaviour and purchasing processes
- Demonstrate and articulate a good knowledge of the structure and trading characteristics of the main industries serving the farm sector.
- Outline the process of marketing strategy formulation and give examples of marketing strategies appropriate in the main farm supply industries and services.

Workload:	**Approximate Hours:**
Class Contact: Lectures	36
Class Contact: Small Group	0
Class Contact: Practical	0
Specified learning activities	**10**
Autonomous student learning	**62**
	108

Module Title:	**Operations and Personnel Management**
Module Code:	**AERD 30090**
Module Coordinator:	**Dr Dermot Ruane**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisite: Business Management, or equivalent

Description:

The concepts in the subjects areas of operations, personnel/HRM management and industrial relations are introduced. The module will focus upon the development of key concepts: · in *Operations management*: the operations function, operations planning and interface with key functional areas, plant location and layout, production, inventory and quality control systems of operations, World Class Business, Total Quality Management in *Personnel-HRM Management* policy, planning, recruitment, performance appraisal management development. in *Industrial Relations* :Historical development, IR structures in the State, identification of key employment legislation, Equality in employment, National Agreements, Unions and Employers organizations.

Learning Outcomes:

On completion of this module students should be able to

- Explain the main activities in which operations/ production managers are engaged in a business environment to produce a quality product or service in a corporation
- Describe and analyse the role of the HRM/personnel manager in meeting corporate needs and functions in human resources
- Explain the relationship of HRM/functional management to other functions in the firm
- Make the links and connections between Industrial Relations' organisations, Government, Trade Unions and Employers in Irish Industrial relations and collective agreements

	Approximate Hours:
Class Contact: Lectures	30
Class Contact: Small Group	0
Class Contact: Practical	0
Specified learning activities	25 Industry-based project
Autonomous student learning	60
	115

Module Title:	**Professional Work Experience**
Module Code	**AERD 30110**
Module Co-ordinator	**Dr John O'Connell**
Credits:	**10**
Level:	**-**
Semester:	**2**

Module Dependencies:

For BAgrSc (Food and Agribusiness Management) degree programme option students only

Description:
In this module students gain practical experience in appropriate aspects of food and agribusiness management in the food chain. The work experience assignments are undertaken over a period of five months in third year. Assignments are completed in a number of areas: food processing; food distribution and financial services and others.

Learning Outcomes:
On completion of this module students should be able to:

- Describe organisational structures
- Describe management roles and responsibilities
- Evaluate marketing and financial performance
- Develop inter-personal skills in a working environment
- Assess future career prospects in the food and agribusiness management field

Workload:	**Approximate Hours:**
Class Contact: Lectures	
Class Contact: Small Group	
Class Contact: Practical	
Specified learning activities	
Autonomous student learning	

Module Title:	**Quantitative Methods**
Module Code:	**AERD 30130**
Module Coordinator:	**Deirdre O'Connor**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Introductory Module in Statistical Methods

Description:

This third year module for agribusiness students aims to provide candidates with an understanding of a range of quantitative techniques that have applications within business and economics. The module content includes: (1) Construction and application of index numbers. (2) Applications of matrix algebra in economics (Market equilibrium and input-output analysis). (3) Economic applications of linear programming. (4) Econometrics: applications of multiple regression with examples using time series and cross-sectional data. The module includes a number of computer practical classes to allow students to gain 'hands-on' experience using software to solve example problems.

Learning Outcomes:

On successful completion of this module students should be able to:

1. Calculate and interpret Laspeyre, Paasche and Fisher price and quantity indices for a set of data.
2. Apply the tools of matrix algebra to the solution of elementary economic problems.
3. Specify and solve linear optimisation problems both graphically and in Microsoft Excel and evaluate the solution results obtained.
4. Apply regression techniques to the analysis of relationships between economic variables; state the assumptions underpinning the OLS method and interpret output from econometric software.

Indicative Student Workload	**Approximate Hours:**
Class Contact: Lectures	32
Class Contact: Small Group	-
Class Contact: Practical	8
Specified learning activities	20
Autonomous student learning	40
	100

Module Title:	**Principles of Development**
Module Code:	**AERD 30100**
Module Coordinator:	**Professor James Phelan**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:

Description:
This module introduces students to the fundamental social, economic and environmental dimensions of the development process in both an Irish and a global context, with particular reference to the inter-linkages between the different components of development. It critically examines the meaning and measurement of the development concept in the broadest sense from international to the local level as well as explaining the role of structures and societal organization to the development process. The disciplines of sociology and economics are used to address issues such as sustainable development, globalisation, poverty, trade and debt, culture, community organization and power in order to understand development/underdevelopment

Learning Outcomes:
On completion of this module students should be able to:
1. Explain the social, economic and environmental effects of key issues in development.
2. Identify key indicators of economic, social and environmental development.
3. Ilustrate the linkages between economic and social development theory and policies and outcomes.
4. Assess the role of community in the development process
5. Identify and explain differential responses to the development process

Workload:	**Approximate Hours:**
Class Contact: Lectures	36
Class Contact: Small Group	6
Class Contact: Practical	-
Specified learning activities	28
Autonomous student learning	40
	110

Module Title:	**Project Planning and Management**
Module Code:	**AERD 30120**
Module Coordinator:	**Dr Jim Kinsella**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:

Description:
This module takes students from the of projects right through to their evaluation by examining and applying all stages of the project cycle. Examples are used and assessed throughout the module to ensure practical application of the concepts and stages covered. The Logical Framework Matrix is used as the tool for planning, appraisal and management of projects. Monitoring and evaluation of projects is addressed as well as identification of the main roles and functions of management as they relate to projects. Throughout the module emphasis is placed on the development of individual project proposals by the students themselves and which are presented and discussed at workshops.

Learning Outcomes:
On completion of this module students should be able to:
1. Explain the composition of a project and how it is assembled.
2. Analyse the contextual factors which impact on project success.
3. Apply the concepts and methods of needs analysis as they relate to project identification.
4. Design and present a project proposal which comprises goal to inputs linkages, indicators and means of verification as well as the critical underpinning assumptions.
5. Explain and apply through examples the flows and sequencing associated with the Logical Framework Approach to planning, appraising and managing projects
6. Illustrate the key management roles and functions of projects.

Workload:	**Approximate Hours:**
Class Contact: Lectures	26
Class Contact: Small Group	8
Class Contact: Practical	-
Specified learning activities	40
Autonomous student learning	35
	109

Module Title:	**Rural Development Strategies**
Module Code:	**AERD 30150**
Module Coordinator:	**Dr Jim Kinsella**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:

Description:
This module highlights the current issues which give rise to the need for rural area development including the role of farming and rural enterprise in securing a living countryside. It explores the concepts of sustainability, livelihoods, power, equality and capacity building as well as analyzing the main strategies applied in bringing about development in rural areas. It also identifies and discusses the main policies and programmes that enable rural development in Ireland and the EU and provides insights to the current policy debates on the future of rural areas.

Learning Outcomes:
On completion of this module students should be able to:

- Recognise the importance of rural development and the related current issues and challenges facing rural area development
- Illustrate the key concepts in sustainable rural development through examples
- Analyse the main development strategies used in rural area development
- Describe the relevant policies and programmes of RD in Ireland and the EU
- Indicate the main trends and likely scenarios as they relate to rural area development.

Workload:	**Approximate Hours:**
Class Contact: Lectures	28
Class Contact: Small Group	6
Class Contact: Practical	-
Specified learning activities	35
Autonomous student learning	40
	109

Module Title:	**Health and Safety on Farms**
Module Code:	**AERD 3014**
Module Coordinator:	***Jim Phelan***
Credits:	**4**
Level:	**3**
Semester:	**2**

Module Dependencies: None

Description:
This is an undergraduate module designed for final year students. It focuses on developing greater awareness and knowledge on health and safety issues related to farming and associated activities. Content includes health and safety legislation, the role of the Health and Safety Authority, categorization and assessment of risk as well as systems of good practice in relation to animals, chemicals, machinery farm buildings, children and farm forestry The module will also address issues of disability and their impact on the economic and social well being of the farm household.

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

- Recognise major risk areas on the farm
- Know the legal requirements surrounding the farm as a workplace
- Assess the safety status of a farm
- Identify the health and safety issues associated with farm forestry
- Successfully develop a Health and Safety Statement for a farm
- Be able to advise on correct procedures regarding the use of farm equipment and proper maintenance of the farm yard
- Be able to assess the economic and social impact of disability in the farm household

Indicative Student Workload	**Approximate Hours:**
Class Contact: Lectures	20
Class Contact: Small Group	
Class Contact: Practical	5
Specified student learning	25
Autonomous student learning	30
	80

Module Title:	**Electives**
Module Code:	**AERD 2201**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**AERD 2202**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**AERD 3302**
Credits:	**15**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 15. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**AERD 3304**
Credits:	**15**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 15. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**AERD 3305**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Communications I**
Module Code:	**AERD 4002**
Credits:	**4**
Semester:	**2**

Description:
The development of communications skills which are most commonly used in professional careers. These include individual, group and mass media methods of communication such as: advising/counselling; lecturing and public speaking; facilitating group meetings and discussions; organising demonstrations; scripting and presenting for local radio; and writing skills (lecture handouts, technical reports, press articles, CV).
Project work to include: lecture presentation and accompanying handout and radio scripting and recording.

Module Title:	**Farm Business**
Module Code:	**AERD 4003**
Credits:	**6**
Semester:	**1 and 2**

Description:
Accounting procedures and systems. Farm record keeping, preparation and completion of farm accounts. Farm record and accounts analysis. Generation of financial and management accounts and the use of computerised accounting systems. Farm case project.
Comparative accounts analysis; gross margin analysis; budgeting – partial complete, break-even and capital. The farm planning and control process. Farm planning assignment detailing a development plan for a farm visited during the year. Farm finance: capital and credit – sources, types and use. Farm insurance and farm taxation.

Module Title:	**Agricultural Marketing and Trade**
Module Code:	**AERD 4004**
Credits:	**4**
Semester:	**1**

Description:
Marketing
Marketing from the viewpoint of the farmer and the agribusiness sector; factors within and outside the sector's control; special characteristics and problems of agricultural marketing and the methods and institutions – such as co-operatives – employed to deal with these problems; Irish agricultural marketing by commodity; the consequences of alternative commodity marketing systems for farmers, agribusiness, consumers and taxpayers; CAP mechanisms both in general and in relation to particular commodities; assessment of current developments in the CAP and prospects for the future.
Trade
The basis of trade; demand and supply aspects including comparative advantage; terms of trade; tariffs and customs unions; GATT – origins, structure, principles and achievements; agricultural trade and the balance of payments.

Module Title:	**Communications II**
Module Code:	**AERD 4006**
Credits:	**6**
Semester:	**2**

Description:
The development of communication skills which are most commonly used in professional careers. These include individual, group and mass media methods of communication such as: advising/counselling; lecturing and public speaking; facilitating group meetings and discussions; organising demonstrations; scripting and presenting for local radio; and writing skills (lecture handouts, technical reports, press articles, CV).
Project work to include: lecture presentation and accompanying handout; group work; individual consultation and radio scripting and recording.

Module Title:	**Enterprise Development**
Module Code:	**AERD 4007**
Credits:	**4**
Semester:	**2**

Description:
Study of the importance of innovation and renewal in agribusiness; the entrepreneurial process, sources of venture ideas, success and failure factors, market entry strategies and venture evaluation and enterprise planning. The subject is project based and each student will be required to identify a new venture, conduct an appraisal of its potential and draw up a strategy for its implementation.

Module Title:	**Food and Farm Input Marketing**
Module Code:	**AERD 4009**
Credits:	**4**
Semester:	**2**

Description:
Extent and characteristics of the food and farm inputs markets served by Irish agribusiness firms; structures of the industries serving these markets, competitive issues and appropriate business and marketing strategies; operational aspects of marketing such as selling techniques and distribution and sales force management in these agribusiness sectors.

Module Title:	**Research Methods/Project**
Module Code:	**AERD 4011**
Credits:	**6**
Semester:	**1**

Description:
Introduction to problem investigation focusing on agricultural economic, marketing, extension and rural development issues. Review of sampling principles and methods of data collection with particular emphasis on questionnaire design and administration. Outline of analytical techniques, statistical tests and appropriate computing systems. Procedures for preparation and input of data for computer analysis. Techniques for the minimisation of sampling and data errors. Reporting and presentation of survey results.
Research project relating to an agribusiness, agricultural economic or rural development topic with staff guidance on methodology, analysis and reporting.

Module Title:	**Taxation**
Module Code:	**AERD 4012**
Credits:	**2**
Semester:	**1**

Description:
Taxation principles and issues of equity and incentive; assessment of income and corporation tax liability; tax planning for effective use of allowances and investment incentives by farmers and agricultural businesses; systems of capital taxation and methods of minimising capital gains tax.

Module Title:	**Farm Business Management II**
Module Code:	**AERD 4014**
Credits:	**6**
Semester:	**1 and 2**

Description:
Principles of strategic management and planning. Systematic analysis of enterprise gross margin accounts to identify strengths and weakness in the farming system. Farm planning techniques: partial budgeting, whole farm budgeting gross margin planning, ad hoc budgeting, cash flow budgeting, linear programming. Principles of budgetary control. Investment appraisal techniques: pay back, rate of return, discounted cash flow. Economics of mechanisation and labour use. Influence of risk and uncertainty in decision-making. Direct payments and grants schemes. Farm computerisation and IT.

Module Title:	**IT and E-Business**
Module Code:	**AERD 4015**
Credits:	**4**
Semester:	**1**

Description:
Importance of Information and Communications Technology in agribusiness and rural development. Use and potential of commonly used ICTs. Role of ICT in promoting rural development. Internet, Intranet and Extranet services; impact of E-technology on business in market place, management and control systems. Information procurements; portals and web development; Investment for E-business including human resources; case studies in B2B, B2C and B2E situations in Food and Agribusiness. Legal requirements and protections in E-business trading; future developments in E-business.

Module Title:	**Agricultural Policy Ia**
Module Code:	**AERD 4016**
Credits:	**3**
Semester:	**1**

Description:
Agriculture in the national economy: measurement of the agricultural sector – output, nonfactor inputs, value added, income, factor inputs. Linkages between agriculture and the rest of the economy; the food value added chain. Measurement of and trends in, volumes, productivity, prices and incomes. Review of supply-demand principles relating to agricultural product and factor markets. The Treadmill Model of agricultural adjustment and its policy implications. Rationale for market intervention. History of agricultural protection. Policy formation. The European Union – origin and evolution.

Module Title:	**AERD 4017**
Module Code:	**Agricultural Policy Ib**
Credits:	**3**
Semester:	**2**

Description:
The Common Agricultural Policy (CAP) and its funding. Economic surplus analysis of gains and losses at EU level and in Ireland attributable to the CAP; the "small country" and "large country" cases. Objectives of the CAP and their attainment, especially in relation to incomes. CAP Reform: economic surplus analysis of price reduction and supply control. Other approaches including demand-side policies, deficiency payments and tiered pricing. Direct payments: Rationale, coupling, funding and duration. Socio-structural Policy and Rural Development. The Uruguay Round Agreement and its implications. Future developments in agricultural policy, such as enlargement to the East, the trade liberalisation. Agricultural Policy in Developing Countries.

Module Title:	**Agricultural Policy IIa**
Module Code:	**AERD 4018**
Credits:	**4**
Semester:	**1**

Description:
Agriculture in the national economy: measurement of the agricultural sector – output, nonfactor inputs, value added, income, factor inputs. Linkages between agriculture and the rest of the economy; the food value added chain. Measurement of, and trends in, volumes, productivity, prices and incomes. Review of supply-demand principles relating to agricultural product and factor markets. The Treadmill Model of agricultural adjustment and its policy implications. Rationale for market intervention. History of agricultural protection. Policy formation. The European Union – origin and evolution.

Module Title:	**Agricultural Policy IIb**
Module Code:	**AERD 4019**
Credits:	**4**
Semester:	**2**

Description:
The Common Agricultural Policy (CAP) and its funding. Economic surplus analysis of gains and losses at EU level and in Ireland attributable to the CAP; the "small country" and "large country" cases. Objectives of the CAP and their attainment, especially in relation to incomes. CAP Reform: Economic surplus analysis of price reduction and supply control. Other approaches including demand-side policies, deficiency payments and tiered pricing. Direct payments: Rationale, coupling, funding and duration. Socio-structural Policy and Rural Development. The Uruguay Round Agreement and its implications. Future developments in agricultural policy, such as enlargement to the East, the trade liberalisation. Agricultural Policy in Developing Countries.

Module Title:	**Major Project**
Module Code:	**AERD 4050**
Credits:	**4**
Semester:	**2**

Description:

Module Title:	**Project Development and Management**
Module Code:	**AERD 4101**
Credits:	**4**
Semester:	**1**

Description:

Projects and programmes as tools of development. Identifying development needs at community and area level. Project components and project cycle. Planning the project (including feasibility and appraisal). Management of the project; managing time and people; monitoring; liaison with support bodies and groups. Evaluation criteria and methods. The content of this module is supported throughout by examples of development projects.

Module Title:	**Farm Input Marketing**
Module Code:	**AERD 4104**
Credits:	**2**
Semester:	**2**

Description:

Extent and characteristics of farm supply markets served by Irish agribusiness firms; structures of the industries serving these markets, competitive issues and appropriate business and marketing strategies; operational aspects of marketing such as selling techniques, distribution and salesforce management.

Module Title:	**Food Marketing**
Module Code:	**AERD 4106**
Credits:	**2**
Semester:	**2**

Description:

Extent and characteristics of food markets served by Irish agribusiness and food firms; structures of the industries serving these markets, competitive issues and appropriate business and marketing strategies; operational aspects of marketing such as selling techniques, distribution and salesforce management.

Module Title:	**Farm Management**
Module Code:	**AERD 4110**
Credits:	**2**
Semester:	**1**

Description:

Objectives and goals of the farm manager, farm management functions, farm family life cycle. Farm accounting definitions and analysis techniques; planning and enterprise budgets, direct payments, REPS and other State supports. Farm management control, computerisation and IT; alternative enterprises, farm labour and risk analysis, part-time farming.

Module Title:	**Electives**
Module Code:	**AERD 4400**
Credits:	**8**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 8. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Modules Coded 'AESC' AND 'ERM' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Land Use and the Environment**
Module Code:	**AESC 10010**
Module Coordinator:	**Professor John Whelan**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies: None

Description:
The module will provide an orientation to the inter-relationships between land use and the environment. The course will examine the evolution of the farmed landscape and the impact of modern farming and other land uses on landscape, soil and water. The importance of environmental issues in relation to farming in Europe and the impact of new environmental schemes on farming in Ireland will be discussed. Students are required to prepare a project report and make a class presentation on one aspect of the interrelationship between land use and the environment.

Learning Outcomes:

On completion of this module students should be able to:

- Assess the impact of land use on landscape, soil and water;
- Determine the consequences of intensification in farming;
- Describe the environmental schemes available to Irish farmers and other land users;
- Write and present a project report.

Workload:	**Approximate Hours:**
Class Contact: Lectures	20
Class Contact: Small Group	5
Class Contact: Practical	5
Specified learning activities	25
Autonomous student learning	45
	100

Module Title:	**Applied Plant Biology**
Module Code:	**ERM 20010**
Module Coordinator:	**Dr Tamara Hochstrasser**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: Prerequisites: First Year Biology Module(s)

Description:
This course covers the morphology of seed plants (Angiospermophyta, Coniferophyta). A detailed understanding of plant morphology is necessary for plant species identification as well as to develop an ecological understanding of plants. We will discuss how plants (cultivated and wild) reproduce/ are propagated, their basic physiological functions and how they evolved. Different classification systems for plants and vegetation have been developed based on the characteristics discussed in the course. You will learn to classify plants according to the most commonly used classification schemes. Finally, the course allows you to reflect on the significance of plants and their diversity for your life.

Learning Outcomes:
On completion of this module students should be able to:

- Define basic terms used in plant biology and explain how they are used.
- Describe plant morphology in botanical terms and prepare botanical records of plants.
- Classify plants according to taxonomic, physiological and ecological criteria.
- Explain how basic principles of plant physiology and ecology apply to management.
- Evaluate the notion of biodiversity and how it relates to classification.

Workload:	**Approximate Hours:**
Class Contact: Lectures	18
Class Contact: Small Group	6
Class Contact: Practical	24
Specified learning activities	30
Autonomous student learning	40
	118

Module Title:	**Soil Science I**
Module Code:	**ERM 20020**
Module Coordinator:	**Dr Patrick O'Toole**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: Prerequisites: First Year Chemistry Module(s), or equivalent

Description:

Soil as the natural medium for plant growth and the concept of soils as 3D-bodies that cover land surfaces more or less as a continuum but differing in the type and arrangement of horizons that make up their profiles. The constitution of soil is explained in terms of it being a porous medium comprising solid, liquid and gaseous phases. The importance of size distribution and mineralogy of their particles are emphasized as enduring characteristics of soils. The structure of soils is described and classified and the physical, chemical and biological processes involved in its development explained. The static and dynamic behaviour of water in soil is described with reference to plant availability and impact on soil management. The chemistry underlying the unique ability of soil to supply and retain plant nutrients is discussed and explained.

Learning Outcomes:

- Interpret the terminology associated with the description and classification of rocks and rock forming minerals;
- Explain the physical, chemical and biological weathering of rocks, the geomorphological processes responsible for Irish land forms and formation of soil parent materials;
- Interpret the intrinsic differences between soils in terms of physical, chemical, mineralogical and biological characteristics;
- Outline the principles which underpin management of soils for their maintenance and improvement.

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	24
Specified learning activities	**-**
Autonomous student learning	60
	108

Module Title:	**Earth Science, Climatology and the Environment**
Module Code:	**ERM 20030**
Module Coordinator:	**Dr J. Feehan**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies:

Description:

This module will cover elements of physical geology and geomorphology, sedimentology, historical geology and stratigraphy, elementary mineralogy and petrography, palaeontology, climatology and meteorology. Special emphasis is placed on the way in which the fundamental qualities of particular landscapes relate to determining geological factors, on glacial geology and on the geology of water resources. The measurement of meteorological elements and the climate of Ireland will be discussed and the implications of climate for rural management addressed. The module will enable the student to experience the intellectual excitement of earth science, and to come to appreciate the fundamental bearing it has on landscape, land cover, land use and resource exploitation. There will be two full-day geological excursions.

Learning Outcomes:

On completion of this module students should be able to:

- Apply a clear understanding of the fundamentals of geology in a way which will enable you to analyse and evaluate its influence on ecology, landscape and agriculture, at a level that is appropriate for those not intending to specialise in geology.
- Apply a clear understanding of the fundamentals of meteorology and climatology to the management of the rural landscape.

Workload:	**Approximate Hours:**
Class Contact: Lectures	18
Class Contact: Small Group	-
Class Contact: Practical	18
Specified learning activities	40
Autonomous student learning	36
	112

Module Title:	**Agricultural Ecology and Pollution Control**
Module Code:	**ERM 20040**
Module Coordinator:	**Dr Olaf Schmidt**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: Prerequisites: First Year Biology Module(s)

Description:
This course consists of a discussion of basic ecological principles applying to natural and managed terrestrial ecosystems, and a consideration of the human impacts upon managed ecosystems. Ecological principles discussed are: energy, hydrological and nutrient cycles; populations and communities; biodiversity; food chains; bioaccumulation; plant-environment interactions; major biomes; weed biology and succession. Human impacts considered are: sources of water, soil and air pollution, soil loss and degradation. Management options of animal manures and water supply, as well as alternative production systems are evaluated with regard to environmental awareness and legislation.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the basic ecological processes operating in agri-ecological systems and the constraints and opportunities that these offer for the development of sustainable agriculture.
- Identify the potential impacts farming can have upon the environment and be familiar with the various schemes and measures to control or limit such impacts.

Workload:	**Approximate Hours:**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	**-**
Autonomous student learning	72
	108

Module Title:	**Physiological Plant Ecology**
Module Code:	**ERM 20050**
Module Coordinator:	**Dr John Fry**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prequisites: Applied Plant Biology, or equivalent

Description:

The course provides an understanding of the physiological processes underlying plant growth and productivity, with emphasis on the physiological basis for interactions between plants and the environment. Topics covered include: growth and development in plants; limits on growth; growth analysis and modelling; the hierarchy of development control; age and growth phase. Chemical regulation of plant growth: the biology and mode of action of plant growth regulators (PGR); regulation of principal stages in the life cycle by endogenous and exogenous PGRs; ecologically active chemicals. Principles and practices of crop nutrition; nutrient uptake and mobility; involvement of symbiotic associations. Water relations in relation to yield; stress physiology of crops including nutrient, drought, water-logging, saline, temperature (high and low); dormancy and survival. Photosynthesis; nutrition and source-sink relationships; plant-atmosphere interactions; canopy structure and influences; shade physiology. Photobiology and other forms of plant-environment interaction/co-ordination: plant phototropism; photomorphogenesis and photoperiodism: endogenous rhythms, vernalisation.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the hierarchical control of plant growth and development.
- Explain the physiological bases of plant-environment interactions.
- Describe the physiological basis of plant and crop productivity.
- Demonstrate an ability to follow protocols and manipulate experimental data.
- Construct analytical summaries of interpreted data.

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	12
Specified learning activities	30
Autonomous student learning	40
	112

Module Title:	**Applied Zoology I**
Module Code:	**ERM 20060**
Module Coordinator:	**Dr Gordon Purvis**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: First Year Biology Module(s) or equivalent

Description:

This introductory course provides an overview of the biology and ecology of vertebrate and invertebrate animal groups of agricultural, environmental and conservation interest. The following topics will be covered:

1. *Introduction to the classification, biology and ecology of the Phylum Arthropoda:* structure and function of arthropod anatomy; developmental biology; sensory perception; communication and host recognition; basis of crop pest resistance; practical recognition of arthropod groups.
2. *Introduction to selected non-arthropod invertebrate groups of agricultural importance (Oligochaeta, Nematoda, Gastropoda):* classification, diversity, biology, ecology, importance, practical recognition.
3. *Introduction to the biology and ecology of freshwater invertebrates:* identification, ecological role and monitoring value of key freshwater macroinvertebrates.
4. *Introduction to the biology and ecology of vertebrates:* identification, ecology, and agricultural and environmental relevance of selected species of birds and mammals.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the biology, ecology and economic importance of major animal groups.
- Identify in the field the major groups of economically and environmentally important animals in terrestrial and fresh water habitats.
- Identify the nature and cause of major types of crop pest damage.
- Explain the role and significance of beneficial animal groups in ecosystems.

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	24
Specified learning activities	-
Autonomous student learning	60
	108

Module Title:	**Diversity in the Rural Landscape**
Module Code:	**ERM 30010**
Module Coordinator:	**Dr J. Feehan**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prequisites: Applied Zoology I, Applied Plant Biology, or equivalent

Description:
In this course the student is introduced to concepts and methods in natural and cultural heritage evaluation. The defining characteristics of and the processes at work in each of the major habitats of significance in the Irish rural landscape are reviewed, and their global context is surveyed: woodland, grassland, hedgerows, arable land, freshwater, peatlands and marginal habitats. Practical identification modules are devoted to each of the major plant groups (trees, herbaceous flowering plants, ferns, bryophytes, fungi and algae). The course provides an introduction to Irish vertebrate species and management issues relating to their control and conservation. The course also introduces the student to the implications of recent changes in CAP policy for rural land use and in particular for agriculture. The cultural heritage of the landscape is introduced in some detail: archaeology, agri-industrial archaeology, vernacular architecture and cultural landscape detail. The recently-published *Farming in Ireland: History, Heritage and Environment* has been specifically written as a textbook for this course.

Learning Outcomes:
On completion of this module students should be able to:
- Identify the natural and cultural components present in the rural landscape.
- Analyse the processes at work in such a way as to be able to evaluate these components.
- Decipher how the natural heritage of the Irish landscape relates to heritage on the broader global scale.
- Possess the competency to undertake rural heritage evaluation and participate in its management in a fully informed and competent manner.

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	10 (short field sessions)
Specified learning activities	**-**
Autonomous student learning	65
	105

Module Title:	**Soil Science II**
Module Code:	**ERM 30020**
Module Coordinator:	**Dr Patrick O'Toole**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:

Description:

Soil Biology and Biochemistry: factors driving the formation and accumulation of the organic component of mineral soils.

Soil - Plant Relations and Soil Fertility: the principles underlying the capacities of mineral soils to supply nutrients essential for plant/crop growth and animal/human health.

*Pedology: s*oil profile description, inferences and interpretation; soil horizon recognition, designation and nomenclature; properties of master horizons and diagnostic horizons; major pedogenic processes; climate, biota, parent material, relief and time as soil-forming processes; FAO-UNESCO major soil groupings, Irish Soils (great-groups, sub-groups); soil interpretation; land-use appraisal.

Learning Outcomes:
On completion of this module students should be able to:

- Outline the major pedogenic processes in Irish soils and major Irish soil types;
- Describe soil morphological properties and make inferences from them;
- Outline the basic principles of soil fertility;
- Recognize and describe (using conventional terminology) soil horizons in the field;
- Recognize and describe major Irish soil types in the field;
- Conduct a soil sampling protocol and soil fertility tests by standard laboratory procedures.

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	24
Specified learning activities	**-**
Autonomous student learning	60
	108

Module Title:	**Applied Zoology II**
Module Code:	**ERM 30030**
Module Coordinator:	**Professor James Curry**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Applied Zoology 1 or equivalent

Description:

Invertebrate ecology: factors influencing the structure and dynamics of invertebrate populations and communities; herbivore-plant interactions; the role of invertebrates in terrestrial ecosystems. Origins of pest outbreaks, biology and ecology of selected arthropod pests of crop plants and stored products.

Principles of animal parasitology: review of the main groups of animal parasites in livestock – identification, biology, ecology, symptoms and signs. Control - development and use of anti-parasitic drugs; vaccines; cultural control; integrated approaches.

Learning Outcomes:
On completion of this module students should be able to:

- Describe and analyse the factors influencing invertebrate populations and communities, and their role in terrestrial ecosystems.
- Describe the economic importance, management and control of major arthropod crop pests.
- Describe host/parasite relationships, mechanisms of pathogenicity and host immunity.
- Describe parasite transmission strategies, nature of interaction with the environment and dependence and principles of intervention strategies.

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	24
Specified learning activities	10
Autonomous student learning	52
	110

Module Title:	**Plant Protection - Pests**
Module Code:	**ERM 30040**
Module Coordinator:	**Professor James Curry**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: First Year Biology module(s), or equivalent

Description:

This course provides an overview of the biology and ecology of vertebrate and invertebrate pests of economic importance. Topics include: the morphology, classification and identification of Nematoda, Mollusca, Arthropoda and Chordata. Recognition of the damage caused by pest species and methods for damage prevention and control. The nature and incidence of pest outbreaks and principles of control. Properties, formulation and application of pesticides; pesticide resistance, environmental and health hazards. Non-chemical pest control: cultural, physical and biological methods. Pest management concepts.

Learning Outcomes:
On completion of this module students should be able to:

- Recognise, and describe the biology, ecology and economic importance of, the main pest species.
- Recognise types of pest damage, identify the causal organisms and make recommendations for their control.
- Describe the properties, uses and hazards associated with the main groups of pesticides.
- Evaluate alternative methods for pest control and describe the principles and aims of integrated pest management.

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	24
Specified learning activities	**-**
Autonomous student learning	60
	108

Module Title:	**Plant Protection - Diseases**
Module Code:	**ERM 30050**
Module Coordinator:	**Professor BM Cooke**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: First Year Biology module(s), or equivalent

Description:
This course provides an overview of the biology, symptoms and signs, diagnosis and control of pathogens of crop plants. The following topics will be addressed:

- The economic and social impact of diseases on crop production.
- Important fungal, bacterial and virus diseases of field crops.
- Analysis of the impact of pathogens on yield and quality of field crops.

Chemical, cultural and integrated methods for prevention and control including forecasting.

Learning Outcomes:
On completion of this module students should be able to:

- Diagnose, and identify the principal causes of, crop diseases using macroscopic, microscopic and molecular techniques.
- Explain how plant pathogens build up to cause epidemics on field crops.
- Implement appropriate guidelines for disease control measures and develop an understanding of integrated management for the major pathogens of crop plants.
- Explain how resistance towards fungicides can develop.

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	24
Specified learning activities	**-**
Autonomous student learning	60
	108

Module Title:	**Landscape Ecology**
Module Code:	**ERM 30060**
Module Coordinator:	**Dr John Fry**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
Prerequisites: Applied Plant Biology, Physiological Plant Ecology, or equivalents

Description:

This course provides an understanding of landscape ecological patterns, with emphasis on the processes of colonisation and succession, and of the relationships and interface between habitats. Geographic control of plant distribution: biomes and global ecosystems; the development of the post-glacial flora and fauna in Ireland; aspects of plant ecophysiology of relevance to landscape planting. Phytosociology and the classification of communities in the landscape. Biodiversity. Natural and anthropogenic ecosystems, ecotones; principles of ecosystem and habitat management.

The structure, development, management and landscape legacy of specific 'native' ecosystems (e.g. alluvial wetlands, salt marshes, sand dunes, moor/heathlands, hedgerows and woodlands); functions and values of ecosystems; landscape ecology principles in design and habitat.

Learning Outcomes:
On completion of this module students should be able to:

- Distinguish the geomorphological, ecological and sociological components of the discipline of landscape ecology.
- Describe the previous glacial history of Ireland and its implications for current flora and fauna.
- Identify and describe a range of major Irish habitats.
- Discuss the eco-physiological basis of plant growth.
- Utilise principles of landscape ecology for landscape design.
- Appraise strategies for, and the implications of, landscape management for multiple end-uses.

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	10
Class Contact: Practical	5
Specified Workload: Field trips	10
Autonomous student learning	60
	115

Module Title:	**Forest Protection**
Module Code:	**ERM 30070**
Module Coordinator:	**Dr Kevin Clancy**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: First Year Biology module(s), or equivalent

Description:
This course provides a comprehensive treatment of the biotic pathogens and pests of forest and amenity trees. There is emphasis on the classification, identification, biology and ecology of the major biotic agents of damage, and on the nature and incidence of outbreaks both locally and internationally. The nature of damage caused, the development of symptoms and the procedures in diagnosis of causal agents receive major attention in relation to fungal, viral, bacterial, arthropod, nematode, avian and mammalian pests of woody plants. Students study all aspects of current control strategies, relevant to sustainable forest management, including regulatory, cultural and biological methods.

Learning Outcomes:
On completion of this module students should be able to:

- Interpret symptoms of damage on woody plants and to attribute the cause to the appropriate biotic agent, and be aware of the appropriate specialist diagnostic procedures that are available;
- Discuss the relationship between agents of damage and the host-agent interactions and thus anticipate risk and further development of the problem;
- Decide if control measures are needed and recommend control strategies appropriate to the value and situation of the affected trees.

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	18
Specified learning activities	25
Autonomous student learning	48
	115

Module Title:	**Human Impact on the Environment**
Module Code:	**ERM 30080**
Module Coordinator:	**Dr Patrick O'Toole**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:

Incompatible Module: Agricultural Ecology and Pollution Control

Description:

This course critically examines the role of humans as agents of global environmental change. The extent of historical and current human exploitation of global environmental resources is reviewed. Major issues of global and Irish significance (including population growth; energy use; waste generation; land use change; biodiversity loss; water, air and soil pollution; climate change and ozone depletion) are described and the underlying causes and potential impacts on the global system are discussed.

Students must undertake an approved, supervised Literature Review Project [2 Credits] in a relevant topic. Findings will be presented in written and oral (seminar) formats.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the underlying principles of global environmental change.
- Describe the complex interactions between natural processes and human activities as multiple causes of environmental change.
- Critically assess the role and extent of human activities in global environmental problems.
- Conduct a detailed literature search.
- Present a critical review (written and oral) of the literature findings.

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities (Literature Review)	40
Autonomous student learning	44
	108

Module Title:	**Agrichemicals and the Environment**
Module Code:	**ERM 30090**
Module Coordinator:	**Dr Gordon Purvis**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Agricultural Chemistry II, or equivalent

Description:

This course provides an introduction to the use of agrichemicals for the control of pest, disease and weed problems in agricultural systems. Specific attention will be given to the use of: insecticides, fungicides, herbicides, preventative and therapeutic livestock products. The course stresses the environmental consequences of over-reliance on such inputs, procedures to regulate use and developments to integrate such use into environmentally sustainable production systems. Topics include the types, properties and modes of action of the products used, their formulation and methods of application. The course will stress the ecological problems and environmental hazards associated with use, including target resistance, food residues, non-target impacts, generation of secondary problems and accumulation in the wider environment. A brief overview of alternative, non-chemical control strategies - cultural, physical and biological – will be given and the principles and concepts of the Integrated Management of crop and livestock production systems will be introduced.

Learning Outcomes:

On completion of this module students should be able to:

- Describe the nature and properties of pesticides and animal health products used in agriculture, the problems associated with their practical use and regulation of their development.
- Explain the essential role of such inputs into crop and animal production systems.
- Outline the wider ecological and environmental consequences of over-reliance and dependence on the use of agrichemicals to control pest problems.
- Describe the value of alternative control methods and explain the principles and wider aims of the Integrated Management of crop and livestock production systems.

Workload:	**Approximate Hours:**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	12
Autonomous student learning	72
	120

Module Title:	**Professional Work Experience**
Module Code:	**ERM 30100**
Module Coordinator:	**Professor John Whelan**
Credits:	**10**
Level:	**-**
Semester:	**2**

Module Dependencies:

For BAgrSc (Agricultural and Environmental Science) degree programme option students only

Description:
In this module students gain practical experience in appropriate aspects of practical land use and environmental management. The work experience assignments are undertaken over a period of five months in third year. Assignments are completed in a number of specified areas: *Teagasc office, Farming/Forestry and general environmental work.*

Learning Outcomes:
On completion of this module students should be able to:

- Evaluate the impact of land use (farming/forestry) on the environment.
- Gain practical knowledge of farming and other land use practices.
- Describe the various environmental schemes and their application.
- Develop inter-personal skills in a working environment.
- Assess future career prospects in the environmental field.

Workload:	**Approximate Hours:**
Class Contact: Lectures	
Class Contact: Small Group	
Class Contact: Practical	
Specified learning activities	
Autonomous student learning	

Module Title:	**Peatland Management**
Module Code:	**ERM 30130**
Module Coordinator:	**Dr John Feehan**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: No prerequisites

Description:

The course provides an introduction to the peatlands of Ireland and in a broader way to peatlands in general. Key topics dealt with include: the nature of peatlands - distribution, classification, evolution and hydrology; natural history and ecology; peatland soils; historical and cultural heritage of peatlands; peat as a raw material; historical aspects and industrial archaeology; peatland restoration and ecological rehabilitation; modelling future ecologies for cutaway bog; the archaeology of peatlands; the industrial utilisation of peat today; the agricultural and forestry options; the conservation of peatlands; peatlands and carbon.

The Bogs of Ireland: an Introduction to the Natural, Cultural and Industrial Heritage of Irish Peatlands was written primarily to serve as the standard text book for this course, and is currently being re-written.

The number of places on this module (30) is limited by staff resources for the residential three-day field trip to the Midlands between the second and third semesters and the one half-day field visit to the blanket bog on the Dublin-Wicklow mountains.

Learning Outcomes:

On completion of this module students should be able to:

- Evaluate and manage undisturbed, cutaway and cutover peatlands with due regard to biodiversity and the development of amenity areas;
- Relate the physical and chemical properties of peat to practical issues relating to the development of peatlands for forestry and agriculture, and for recreational use.

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	10
Specified learning activities	30
Autonomous student learning	50
	120

Module Title:	**Electives**
Module Code:	**ERM 3301**
Credits:	**15**
Semester:	**1 and/or 2**

Description:

A student must undertake individual elective modules with a cumulative credit-rating of 15. Each student is required to register to the individual elective modules and the selection of elective modules must be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**AESC 3302**
Credits:	**10**
Semester:	**1 and/or 2**

Description:

A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules must be approved by the Degree Programme Option Coordinator.

Module Title:	**Plant Protection II**
Module Code:	**AESC 4002**
Credits:	**6**
Semester:	**1**

Description:

Horticultural Zoology

This section provides an overview of the biology and ecology of vertebrate and invertebrate animals of horticultural interest. The following topics will be addressed:

Introduction to the classification, structure, physiology and biology of Annelida, Nematoda, Mollusca, Arthropoda and Chordata.

Importance of biodiversity; methods for encouraging beneficial organisms and enhancing their role in horticultural landscapes.

Nature and incidence of pest outbreaks and principles of control. Properties, formulation and application of pesticides; pesticide resistance and environmental hazards. Non-chemical pest control: cultural, physical and biological methods. Pest management concepts.

The biology, ecology and control of the major invertebrate, bird and mammal pests of field and protected fruit, vegetable and ornamental crops and turf grass. Identification of the main species, recognition of the damage caused, their biology and population dynamics, and methods for damage prevention and control.

Plant Pathogens

Economic and social impact of plant diseases: sources of loss and effects on the landscape. Symptoms and signs; infectious disease vs. non-infectious disorders. Koch's postulates. Symptomatology, etiology and control of diseases of ornamental and landscape plants. Epiphytology. Disease control: regulatory, cultural and biological methods, protective and eradicative chemicals.

Module Title:	**Wildlife Management**
Module Code:	**AESC 4004**
Credits:	**4**
Semester:	**1**

Description:

Wildlife management is the application of management techniques for the conservation and use of our wildlife resource. The module will examine: resident and migrant species; population census and analysis; habitat evaluation, monitoring and analysis; management for conservation and hunting; impact of man on wildlife with emphasis on the conservation/damage interface; the role and importance of wildlife law.

Course projects will include an essay and a management plan.

Module Title:	**Epidemiology and Zoonoses**
Module Code:	**AESC 4005**
Credits:	**4**
Semester:	**2**

Description:
This module deals with the epidemiology and control of human and livestock diseases that involve a significant free-living, vector-borne or zoonotic stage and for which environmental considerations are especially important. The emphasis will be on diseases encountered in Ireland, but where necessary for illustration of principles, tropical diseases such as malaria will also be dealt with. The module will consist of the following components: ecology of major parasitic infections of livestock, ecology of parasitic zoonoses, ecology of major non-parasitic zoonoses, immunobiology, principles of epidemiology, epidemiological tools including diagnostics and mathematical models, control measures including general principles, chemotherapy, vaccination and environmental management.

Module Title:	**Pest Management**
Module Code:	**AESC 4006**
Credits:	**4**
Semester:	**1**

Description:
This module examines the pest management concept as an alternative to more traditional approaches to pest control. Basic principles and tactics are examined, including establishment and implementation of economic injury thresholds and the integration of biological, cultural and chemical approaches. Case studies based on programmes which have been put into operation will be considered.

Module Title:	**Plant Disease Management**
Module Code:	**AESC 4007**
Credits:	**4**
Semester:	**1**

Description:
Relevance of epidemiology to disease management; disease epidemics; disease build-up; pathogen dispersal; quantification of disease – phytopathometry and the analysis of epidemics; modelling and forecasting epidemics; genetics and epidemiology – strategies for the use of resistant cultivars; management of virus diseases: novel plant breeding, molecular biology and genetic engineering techniques for the production of virus resistant transgenic plants; developments in chemical control of plant disease; fungicide groupings and modes of action, application techniques, legislation, food residues; pathogen resistance to fungicides.

Module Title:	**Molecular Biology and the Environment**
Module Code:	**AESC 4008**
Credits:	**4**
Semester:	**2**

Description:
A lecture/laboratory module designed to provide a basic understanding of the molecular techniques currently used in studies of environmental biology. The topics covered in this module will include the use of DNA diagnostics, immunodiagnostics, molecular variability and molecular markers in environmental biology. The techniques will include DNA diagnostic, immunodiagnostic, DNA variation, DNA marker, protein marker and protein variation analyses.

Module Title:	**Project**
Module Code:	**AESC 4051**
Credits:	**12**
Semester:	**2**

Description:

Module Title:	**Apiculture**
Module Code:	**AESC 4101**
Credits:	**2**
Semester:	**1**

Description:
Scientific basis of bee-keeping; taxonomy, morphology, genetics and behaviour of bees; diseases, management and commercial aspects; demonstration and handling of bee colonies.

Module Title:	Livestock Health Products
Module Code:	AESC 4104
Credits:	2
Semester:	2

Description:
The veterinary pharmaceutical industry in relation to the discovery, marketing and use of drugs, vaccines and antibiotics; brief review of the target organisms and their economic importance; a profile of the major companies involved; discovery and marketing strategies; current use of products; drug resistance problems; environmental concerns and innovative approaches for the future.

Module Title:	Reclamation of Marginal and Damaged Land
Module Code:	AESC 4110
Credits:	4
Semester:	1

Description:
General concepts of 'reclamation', 'marginality', 'damage', 'dereliction'; the nature and scale of the problem. Irish incentives and controls regarding habitats, reclaimed, derelict and contaminated land.
Case study analyses: (a) Combating desertification; water availability and irrigation, approaches to salinity problems, flood water farming; (b) Reclaiming land from the sea: small-scale salt marsh reclamation, polders, coastal mangroves; (c) Industrial reclamation: the nature of industrial dereliction, strategies for reclamation, amelioration, revegetation schedules; (d) Pernicious contamination problems: hydrocarbon

Module Title:	Electives
Module Code:	AESC 4400
Credits:	12
Semester:	1 and/or 2

Description:

A student must undertake individual elective modules with a cumulative credit-rating of 12. Each student is required to register to the individual elective modules and the selection of elective modules must be approved by the Degree Programme Option Coordinator.

Module Title:	**Environmental Impact Assessment**
Module Code:	**ERM 4003**
Credits:	**4**
Semester:	**1**

Description:
Attitudes to environmental management, dominance and control; planning vs. control; sustainable development.
The relationship between EU and national controls; EU regulations, directives, policies, etc; the European Environmental Agency (EEA); freedom of environmental information.
Environmental policies, programmes and plans; strategic environmental assessment (SEA).
Environmental impact assessment (EIA) at the project level; the North American experience; the EU directive; Irish regulations.
Environmental Protection Agency (EPA); pollution and control legislation; integrated pollution licences; tradeable licences.
Concepts of environmental audit.
Case-study based tutorials, seminars and EIA simulation.

Module Title:	**Environmental Issues in Agriculture**
Module Code:	**ERM 4004**
Credits:	**4**
Semester:	**2**

Description:

In this module, selected issues which were introduced in AESC 2001 are developed.

Topics discussed include: countryside management (the Irish landscape; wildlife habitats and their management, wildlife conservation); fertilizer and waste management (pollution control, risk assessment, landspreading of farm and non-agricultural wastes and effluents, statutory regulations, e.g. Waste Management Act, Water Pollution Acts, Nitrate Directive REPS, and their implications, nutrient management, codes of practice); environmental impact assessment (EIA concepts and practice, EU Directives, EIA and EIS for agricultural, projects, IPC licensing); REPS (raison d'être, provisions, roles of consultant/advisor/farmer).

Module Title:	**Environmental Management**
Module Code:	**ERM 4005**
Credits:	**8**
Semester:	**1**

Description:

Environmental Economics

Economic issues concerning the use of renewable resources, externalities, pollution and environmental control, and natural resource scarcity and economic growth. The nature and role of rural resources in economic growth and development. The concept of sustainability and sustainable development.

Environmental Evaluation and Assessment

Environmental values in the rural landscape. Global biodiversity; biodiversity in Ireland; the valuation of natural and cultural diversity; biodiversity and its management and conservation in the rural landscape. Issues in conservation biology; conservation strategies. Diversity as resource: alternative enterprise identification; payments for environmentally-friendly farming and land use management; rural tourism. Techniques for managing the rural environment: traditional management of the rural landscape; strategies for the maintenance and protection of environmental integrity and diversity: information and training, legislation: nitrate and habitats directives; NHAs, SACs and their context; environmental designations. Incentive schemes: REPS in Ireland, ESAs in the UK; approaches in other countries; cross–compliance.

Computer Techniques for Environmental Management

Introduction to the history, theory and use of remote sensing techniques. Topics including use of maps, aerial photographs, satellite imagery (MSS, LANDSAT series, SPOT and RADAR). Case studies of Irish projects involving remote sensing and GIS. Introduction to image processing software (ERDAs Imagine).

Module Title:	**Soil and Water Management**
Module Code:	**ERM 4006**
Credits:	**8**
Semester:	**2**

Description:
This module builds on material given in second and third year to apply principles of soil science to management of soil and water resources.
Overview of earth system components; pedology and hydrology as part of atmosphere – hydrosphere – biosphere – lithosphere systems. Earth's fluid envelopes; atmosphere and oceans as transporters of mass and energy.
Major cycling systems – energy, moisture, carbon, sulphur. Transfer systems and residence times of surface, soil and ground waters. Soil as a key hydrologic routing system. River basins as units of research and management; characteristics of river flow and well data.
Soil resources – variability and quality. Soil properties important to soil management. Soil as a filtering/buffering system; aquifer protection. Runoff risk assessment.
Arterial and land drainage. Irrigation systems. Land information and appraisal of land resources. Soil quality assessment.
Conceptual model of the soil plant system: requirements for optimum growth: nutrient storage and supply for growth; characterization of aeration status; gas exchange; soil solution composition; solid solution equilibria. Nutrient acquisition by crops – transport processes, uptake, off-take, nutrient interactions.
Review of soil testing procedures and limitations of soil testing. Fertilizer use in Ireland; fate of fertilizers in soil-plant continuum; sample calculations relating to soil testing and fertilizer applications. Chemical and biological characterization of water quality.
Animal manures and other wastes – BOD and nutrient loads. Nutrient management planning; sample calculations of nutrient applications. Safe landspreading of organic wastes-rates, timing and methods of application for maximal efficiency and soil and environmental protection; assessment of soil, site and weather criteria. Statutory and voluntary regulations.

Module Title:	**Molecular Crop Breeding**
Module Code:	**ERM 4007**
Credits:	**2**
Semester:	**2**

Description:

Genotyping of plant species, genera and varieties; gene cloning; gene modification; plant transformations; reporter genes; RFLPs, RAPDs, PCR; coupled reverse transcription and PCR; diagnostic uses of DNA and RNA probes

Module Title:	Forest Wildlife Management
Module Code:	ERM 4101
Credits:	2
Semester:	2

Description:

This module will evaluate the forest habitats for wildlife management and conservation. The module will discuss: (i) the management of individual species, (ii) the general management of the forest area for wildlife, (iii) the importance of tree species, forest structure and age to wildlife, (iv) the value of the forest area for the future conservation of Irish wildlife.

Module Title:	Peatland Management
Module Code:	ERM 4104
Credits:	4
Semester:	2

Description:

Origin of peat soils, development and distribution of peatlands, classification; stratigraphy, pollen analysis, subpeatian archaeology.

Properties of peat soils for plant growth; degree of decomposition, cation exchange capacity, nutrient relations; moisture characteristics, hydraulic conductivity.

Conservation of peatlands; identification of significant features, characteristics of principal peatland types; impact of arterial and local drainage schemes on hydrological balance.

Mining of peatlands; hand cutting, private machine, industrial; character of operations; nature of residues; drainage systems impact on landscape.

Utilisation for agriculture/horticulture; site selection and suitability, reclamation techniques, deep peat shallow peat areas; development of cutover peatland, nature and significance of subpeat mineral soils; design of drainage systems, installation, incorporation of traditional techniques; cost benefit aspects, problems of peatland agriculture; grass utilization, trafficability, surface subsidence, infrastructure deficiencies.

Afforestation of peatlands; site selection and preparation, crop establishment techniques; management objectives, potential harvesting problems; impact on landscape, interaction with conservation interests; options in relation to peatland utilization; socio-economic aspects, aesthetics, conservation interests.

Modules Coded 'ANSC' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Introduction to Animal Science**
Module Code:	**ANSC 10010**
Module Coordinator:	**Mr Patrick Brophy**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies:

Description:

This module is designed to give agricultural and other students an introduction to the study of Animal Science. It will give an overview of animal production at world, EU and national levels, with emphasis on those aspects most relevant to animal production in Ireland. It will deal briefly with the roles of animal breeding/genetics, animal physiology and Science, including aspects of ongoing and future research areas. Students will be helped explore how scientific principles, concepts and ideas are applied in Animal Science. Students will also be required to engage in a small-group project that will enable them to more closely examin and analyse a particular aspect of Animal Science and will facilitate further development of their ICT (Information/Communication/Technology) and interpersonal skills.

Learning Outcomes:

On completion of this module students should be able to:

- Give a brief overview of animal production most relevant to Ireland
- Outline examples of how fundamental scientific principles of the relevant sciences contribute to Animal Science
- Access, evaluate, organize and present information from a variety of sources
- Demonstrate inter-personal and group working skills

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	6
Class Contact: Practical	-
Specified learning activities	30
Autonomous student learning	48
	108

Module Title:	**Genetics and Biotechnology**
Module Code:	**ANSC 20010**
Module Coordinator:	**Dr David MacHugh**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: **Prequisites:** Introductory Biology Module(s)

Description:

This course provides an overview of genetics and biotechnology, particularly as it applies to plant and animal agriculture. The course covers the following topics: genetic consequences of cell division and gametogenesis; Mendelian genetics and extensions of Mendelian genetics; population genetics; chromosomal inheritance, recombination and genetic linkage; structure and properties of nucleic acids; DNA replication and repair; the molecular basis of mutation; the genetic code and the path from gene to protein; laboratory manipulation of DNA including hybridisation techniques, restriction enzymes and the polymerase chain reaction (PCR); molecular cloning using DNA vectors; genetic engineering and agriculture; reproductive technologies; transgenic plants and animals and gene pharming.

Learning Outcomes:

On completion of this module students should be able to:

- Explain the genetic consequences of meiotic cell division and fertilization and the particulate nature of the gene;
- Outline chromosome structure and the concepts of genetic recombination and linkage;
- Outline nucleic acid structures and conceptualise gene expression;
- Describe the molecular basis of mutation and mutagenesis;
- Outline methods used for *in vitro* laboratory manipulation of DNA;
- Describe methods used for molecular cloning of recombinant DNA;
- Outline methods used for genetic engineering in plant and animal agriculture;
- Discuss practical applications for transgenic plants and animals.

Workload:	**Approximate Hours**
Class Contact: Lectures	33
Class Contact: Small Group	
Class Contact: Practical	2
Specified learning activities	15
Autonomous student learning	55
	105

Module Title:	**Animal Nutrition I**
Module Code:	**ANSC 20020**
Module Coordinator:	**Dr Frank O'Mara**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prequisites: Introductory Chemistry and Biochemistry Modules

Description:
This course is designed for students in *Animal Science/Animal & Crop Production*. It is a basic/foundation level course designed to give students an understanding of nutrition for both ruminant and monogastric farm animals. Topics dealt with include the following:- structure and functioning of the digestive system, the processes of digestion and absorption plus digestive disorders; metabolism of nutrients, especially in relation to energy, protein, minerals and vitamins plus an introduction to metabolic disorders; nutrient requirements and systems of energy and protein evaluation of feeds; dry matter intake; feed additives; feed processing; major classes of feedstuffs and introduction to the formulation of feeding programmes.

Learning Outcomes:
On completion of this module students should be able to:

- Summarise the key facts and principles about digestion, absorption and metabolism of nutrients, nutrient requirements of farm animals, and major classes of feedstuffs;
- Outline and explain, at an appropriate level, the main principles, concepts and ideas relevant to digestive and metabolic disorders and the feeding of farm animals;
- Access, interrogate and interpret databases on both feedstuffs and nutrient requirements of farm animals;
- Apply nutritional knowledge to concrete situations and solve simple feed formulation and animal feeding problems.

Workload:	**Approximate Hours**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	12
Specified learning activities	**-**
Autonomous student learning	66
	108

Module Title:	**Principles of Animal Science**
Module Code:	**ANSC 20030**
Module Coordinator:	**Mr P Brophy**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prerequisites: Introductory Biology Module(s)

Description:
This module is intended for students other than those specialising in Animal Science and Animal and Crop Production. It is designed to give an overview of the principles of Animal Science and their application in the major animal production enterprises in Ireland. The key principles and concepts dealing with animal breeding and the genetic improvement of farm animals; animal nutrition and feeding; reproductive physiology; and animal health, behaviour, and welfare will be outlined. The following aspects of the main animal production enterprises in Ireland will be addressed: organisation and management of the production systems at farm level; seasonality of production; product quality; export markets; factors affecting farm profitability, competitiveness and sustainability; environmental aspects of animal production enterprises.

Learning Outcomes:
On completion of this module students should be able to:

- Explain, at an introductory level, the main principles and concepts of the main disciplines in Animal Science; and indicate how they are applied in animal production in Ireland;
- Describe the main features of animal production systems in Ireland;
- Access the main national (and international) sources of information on systems of animal production in Ireland.

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	-
Autonomous student learning	72
	108

Module Title:	**Principles of Animal Health, Behaviour and Welfare**
Module Code:	**ANSC 20040**
Module Coordinator:	**Mr P Brophy and Dr Trudee Fair**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: Prerequisites: Introductory Biology Module(s)

Description:

Animal Health

Definition of health and disease, dynamic state of disease, causes of disease, role of secondary factors in disease, resistance to disease, how disease spreads, factors influencing spread of disease, principles of disease control.

Animal Behaviour

The behaviour section deals with innate and learned behaviour; the effect of domestication/intensification on behaviour; ingestive, social, agonistic, sexual, parturient and maternal behaviour.

Animal Welfare

The welfare section is designed to give an understanding of the concepts of animal welfare and deals with legislation, historical perspective, ethical considerations, the five freedoms, stress and pain, welfare of farm animals and laboratory animals.

Learning Outcomes:

On completion of this module students should be able to:

- Apply the principles of disease control and prevention in practical situations;
- Explain the different forms of animal behaviour;
- Evaluate management decisions that influence/modify behaviour;
- Explain the concepts of animal welfare and evaluate the welfare implications of various systems of animal production;
- Contribute to the welfare debate on agricultural issues.

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	**-**
Autonomous student learning	72
	108

Module Title:	**Animal Physiology - Reproduction**
Module Code:	**ANSC 30010**
Module Coordinator:	**Dr Patrick Lonergan**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prequisites: Introductory Biology Module(s)

Description:
This course is for students with an interest in the physiology of reproduction in domestic animals. The course includes comprehensive components on the physiological systems of reproduction and on approaches used to manipulate reproduction in domestic animals. Emphasis is placed on the production, collection and preservation of high quality gametes (sperm and eggs), on the establishment and maintenance of pregnancy and on assisted reproductive technologies in animal science. Students will be exposed to comparative differences in reproductive function between the species (cattle, horses, pigs, sheep).

Learning Outcomes:
On completion of this module students should be able to:

- Explain factors controlling sperm production, reproductive cycles, ovarian follicular growth and the establishment and maintenance of pregnancy in different farm species;
- Evaluate the level of reproductive efficiency in different farm species;
- Evaluate the efficiency and impact of assisted reproductive technologies in farm animals;
- Apply an understanding of reproductive physiology to formulate solutions to reproductive problems in domestic animals.

Workload:	**Approximate Hours**
Class Contact: Lectures	32
Class Contact: Small Group	
Class Contact: Practical	8
Specified learning activities	15
Autonomous student learning	60
	115

Module Title:	**Animal Breeding**
Module Code:	**ANSC 30020**
Module Coordinator:	**Dr Patrick Lonergan**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Genetics and Biotechnology

Description:
This course initially deals with the main concepts and principles including:- domestication; qualitative and quantitative traits; types of gene action; variation and its measurement; selection between and within breeds; factors affecting rates of genetic gain and the response to selection. The second section deals with the applications of the basic principles to dairy, beef, sheep and pig breeding. The national breed improvement strategies for the various species are outlined and include the breeding goals, traits recorded, and selection of breeds and breed crosses used.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the underlying concepts and principles involved in selection for breed improvement;
- Outline factors controlling the rate of genetic gain and the response to selection in breeding programmes;
- Demonstrate how the basic principles are applied in breed improvement strategies.

Workload:	**Approximate Hours**
Class Contact: Lectures	**36**
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	**-**
Autonomous student learning	**72**
	108

Module Title:	**Animal Genomics**
Module Code:	**ANSC 30030**
Module Coordinator:	**Dr David MacHugh**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Genetics and Biotechnology, or equivalent

Description:

The course provides a detailed overview of modern genetics and genomics as it relates to animal science and livestock production. The material complements the Animal Breeding course by providing a molecular framework for the statistical and theoretical underpinnings of animal breeding and quantitative genetics. The course consists of the following: Basic structural genomics—the organisation and 'geography' of vertebrate genomes. Genetic identification and DNA profiling. Transcriptional and translational mechanisms controlling gene expression. Genomic imprinting and other epigenetic phenomena. The molecular genetic control of morphogenesis and pattern formation in eukaryotes. Livestock genomics and genome mapping: the hunt for single genes and quantitative trait loci (QTLs) of economic and veterinary importance. Marker-assisted selection and introgression (MAS and MAI). The genetic origins of domestic animals and molecular methods for studying genetic diversity in cattle and other livestock species.

Learning Outcomes:

On completion of this module students should be able to:

- Discuss the structure and function of vertebrate genomes using diagrams where appropriate;
- Describe molecular methods used for genetic identification and how these can be applied in animal science and the livestock industry;
- Outline the molecular machinery controlling gene expression in complex eukaryotes and analyse the molecular and evolutionary basis of parental/genomic imprinting, providing examples from a range of mammalian species;
- Outline, using diagrams where appropriate, the molecular genetic control of development in eukaryotes using *Drosophila melanogaster* as model;
- Describe, using examples, how molecular genetic maps can be used to hunt for single genes or QTLs of economic or veterinary importance in livestock species. Outline the concepts of MAS and MAI;
- Analyse how molecular tools have contributed to our knowledge about the domestic origins and genetic diversity of cattle and other livestock species.

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	15
Autonomous student learning	57
	108

Module Title:	**Animal Nutrition II**
Module Code:	**ANSC 30040**
Module Coordinator:	**Dr Frank O'Mara**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Animal Nutrition I

Description:
This course is for students in *Animal Science/Animal and Crop Production*. It develops on the material included in Animal Nutrition I, especially quantitative aspects, as well as introducing some new topics. The material deals with both ruminant and monogastric nutrition and includes the following: feed processing and ration formulation for ruminant and non ruminant livestock; systems of energy and protein evaluation of feeds plus nutrient requirements of animals; factors affecting the intake, metabolism and utilization of nutrients in animals and how these processes relate to efficiency of production, quality of product; nutrition and the environment; metabolic disorders plus nutrition and disease.

Learning Outcomes:
On completion of this module students should be able to:

- Discuss, in detail, the concepts of nutrient supply and nutrient requirements and integrate these concepts in a quantitative manner to analyse the adequacy of existing diets for farm animals and to formulate new diets;
- Explain how voluntary intake is regulated in farm animals and its implications;
- Explain, at a metabolic level, the occurrence, prevention and treatment of metabolic disorders in ruminants;
- Explain how the digestion and metabolism of nutrients impact on the efficiency of production and product quality;
- Explain how nutrition can impact on the output of animal excreta and outline strategies to minimise the environmental impact of animal production.

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	-
Autonomous student learning	72
	108

Module Title:	**Animal Physiology - Systems**
Module Code:	**ANSC 30060**
Module Coordinator:	**Dr Alex Evans**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Introductory Biology Module(s)

Description:
This course is for students interested in the physiology (a study of the integrated structure and function of all parts of the body) of domestic animals. The course gives students a foundation knowledge and understanding of the main physiological systems including circulation, digestion, excretion, locomotion, lactation, neural, respiration, the senses and thermoregulation. Emphasis is placed on the overarching relationships between structure and function and the regulating mechanisms that maintain the internal environment of the body stable (homeostasis).

Learning Outcomes:
On completion of this module students should be able to:
- Explain the relationship between the structure and function of organ systems in animals;
- Discuss the relative importance of the neural and hormonal factors that regulate the functions of tissues in animals;
- Summarise the key factors that contribute to the metabolic rate of animals;
- Apply their knowledge of physiology to explain the mechanisms that maintain homeostasis.

Workload:	**Approximate Hours**
Class Contact: Lectures	35
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	15
Autonomous student learning	60
	110

Module Title:	**Professional Work Experience**
Module Code:	**ANSC 30070**
Module Coordinator:	**Dr John O'Doherty**
Credits:	**10**
Level:	**-**
Semester:	2

Module Dependencies: For BAgrSc (Animal Science) degree programme option students only

Description:

Professional Work Experience (PWE) takes place from the start of the Trinity term in the 3rd Year until the start of the Michaelmas term in 4th Year. Students are expected to gain appropriate experience on approved farms with suitable animal production enterprises. A period of placement in research laboratories or centers and in agribusiness organizations is also acceptable. Experience may be obtained in Ireland or abroad. The PWE programme may be adjusted to suit the requirements of individual students based on their prior experience, interest and aptitude. The PWE programme of each student must be approved in advance by the Module Coordinator.

Learning Outcomes:

On completion of this module students should be able to:

- collect, analyse and report information on a range of enterprises and organizations.
- describe the business organization and the responsibilities of key operatives in the enterprises/organizations on which they were located.

In addition, depending on the nature of their particular PWE programme, students will have an opportunity to develop important teamwork, interpersonal and self management transferable skills such as:

- work independently in unfamiliar situations;
- manage their time effectively;
- work effectively as a member of a team, respecting the views of other team members;
- accept and respond to constructive criticism;
- account for their actions and decisions;
- critically reflect on their experiences;
- identify and develop possible sources of employment.

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	**-**
Autonomous student learning	**-**
	-

Module Title:	**Applied Biotechnology**
Module Code:	**ANSC 30100**
Module Coordinator:	**Dr David MacHugh**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Genetics and Biotechnology or equivalent

Description:

This elective module provides an overview of modern biotechnology, particularly as it applies to plant and animal agriculture. The module covers the following topics: geneitic engineering and agriculture (transgenic crops and food products); environmental biotechnology and bioremediation; reproductive and therapeutic cloning (including stem cells); biotechnology and agricultural biodiversity; new genomic technologies relevant to agriculture (bioinformatics, structural, functional, and comparative genomics); biotechnology and livestock disease. Students taking the module will also produce a literature review on a biotechnology topic of their choice. In addition, there is a laboratory practical and write-up that demonstrates basic principles of DNA-based biotechnology.

Learning Outcomes:

On completion of this module students should be able to:

- Evaluate the agricultural and social consequences of transgenic plants and crops
- Discuss the use of environmental biotechnologies for bioremediation
- Evaluate the potential of reproductive and therapeutic cloning
- Discuss biotechnology and agricultural biodiversity
- Discuss new genomic technologies and their relevance for agriculture
- Explain the role of biotechnologies in livestock disease.

Workload:	**Approximate Hours**
Class Contact: Lectures	12
Class Contact: Small Group	-
Class Contact: Practical	12
Specified learning activities	16
Autonomous student learning	60
	100

Module Title:	**Electives**
Module Code:	**ANSC 2201**
Credits:	**5**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 5. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**ANSC 3301**
Credits:	**15**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 15. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**ANSC 3302**
Credits:	**15**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 15. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Animal Husbandry V**
Module Code:	**ANSC 4002**
Credits:	**4**
Semester:	**1**

Description:
Animal Behaviour/Health/Welfare
This module complements the Animal Health Section of the module ANSC 4004 'Animal Husbandry IVa'. Behaviour of the newborn, acquired or innate behaviour, social, sexual, aggressive, ingestive and other forms of behaviour. Factors affecting behaviour and the role of behaviour in animal production. Definition of animal welfare. Areas of concern. Transport of animals. Role of behaviour/abnormal behaviour in assessing welfare.

Module Title:	**Animal Breeding II**
Module Code:	**ANSC 4003**
Credits:	**6**
Semester:	**2**

Description:
This module covers the application of the following topics to farm livestock. Prediction of genetic progress in single trait selection with overlapping generations using Hill's transition matrix. Estimating breeding values using BLUP. Defining the breeding objectives. Economic weights. Selecting for several traits using selection indexes. Investment appraisal of breeding programmes. Criteria for optimising breeding programmes. Discounted geneflow techniques.

Module Title:	**Animal Husbandry IVa**
Module Code:	**ANSC 4004**
Credits:	**12**
Semester:	**1**

Description:
This module is designed for students in *Animal Science/Animal Production*. It consists of four equal sections dealing with Dairy, Sheep and Swine Husbandry, and Animal Health.
Animal Health
Definition of health and disease, dynamic state of disease, causes of disease, role of secondary factors in disease, resistance to disease, how disease spreads, factors influencing spread of disease, control of disease including common diseases of farm animals.
Dairy Husbandry
The dairy industry at farm and national levels; changes in the structure of the industry; milking and milking installations; milk quality; breeding and rearing dairy replacements; feeding dairy cows; management in milk production, including disease prevention and control; costs and returns.
Swine Husbandry
Structure and importance of the pig industry in Ireland; pig production as a major or minor farm enterprise; pig co-operatives; pig production management; critical aspects in pig production; carcase of pork and bacon pigs; outlook for profitable pig production, including disease prevention and control; costs and returns.
Sheep Husbandry
The sheep industry at farm, national and EU level; place of sheep in different farming systems; systems of lamb production; sheep production management, including disease prevention and control; key issues relating the sustainable production of a quality product, sheep housing and handling facilities; selection and marketing of lamb for the various markets; costs and returns in sheep production.
Basic modules in Animal Breeding/Animal Physiology (ANSC 3011) and Animal Nutrition (ANSC 3002), or their equivalent, are prerequisites for this module.

Module Title:	**Animal Husbandry IVb**
Module Code:	**ANSC 4005**
Credits:	**4**
Semester:	**2**

Description:
This module is designed for students in *Animal Science/Animal Production*. It consists of two parts that deal with Beef production and Farm Buildings/Animal Wastes/Mechanisation.
Beef Cattle Husbandry
Structure and importance of the beef industry in the national economy; historical perspective, current position and possible future trends; principles and practice of different systems of beef production under Irish conditions, including feeding and disease prevention and control; natural advantages and limitations in beef production; current developments in systems of beef production and possible implications for Ireland; costs and returns.
Farm Buildings/Animal Wastes/Mechanisation
Farm structures, environmental control in animal housing, planning and layout of farm buildings. Slurry storage and handling, disposal of farm wastes, fertilizer planning and pollution control. Mechanisation of forage handling, feeding systems and effluent disposal.
Basic modules in Animal Breeding/Animal Physiology (ANSC 3011) and Animal Nutrition (ANSC 3002), or their equivalent, are prerequisites for this module.

Module Title:	**Animal Science Project**
Module Code:	**ANSC 4006**
Module Coordinator:	
Credits:	**4**
Level:	**3**
Semester:	**2**

Module Dependencies: *This module is restricted to students undertaking the Animal Science Teagasc/IT Transfer programme*.

Description:
Students may select projects in a variety of areas and following a variety of formats. Students must get the agreement of a member of staff to supervise the individual projects. Projects may be carried out during normal term time or they may be carried out during normal vacation periods. These projects, for which independent credit is awarded, may, on occasion, be carried out in association with some other course.

Learning Outcomes:
The outcomes will depend on the nature of the project undertaken. The student should be able to demonstrate their ability to carry out the various steps involved in the conduct of a project and the preparation of a project report. The student will, in general, have an opportunity to practice higher level cognitive (thinking) skills, such as analysis, synthesis, evaluation and problem solving and, where appropriate, practical skills. The student will also have an opportunity to enhance his/her communication and ICT skills, learning skills, plus interpersonal and, perhaps, teamwork skills.

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	10
Class Contact: Practical	-
Specified learning activities	40
Autonomous student learning	40
	90

Module Title:	**Advanced Beef Production**
Module Code:	**ANSC 4101**
Credits:	**4**
Semester:	**2**

Description:
This module addresses current changes in beef production practices as affected by developments in science and technology relating to all aspects of production and evolving market demands. Specific areas dealt with include: (i) veal production; (ii) cereal beef; (iii) bull beef; (iv) cull cows and replacement strategies; (v) manipulation of growth and efficiency; and (vi) update on nutritional and metabolic problems.

Module Title:	**Advanced Dairy Production**
Module Code:	**ANSC 4102**
Credits:	**4**
Semester:	**2**

Description:
This module develops selected topics from the Dairy Husbandry section of ANSC 4004 Animal Husbandry IVa, which is a prerequisite. Topics selected usually include grassland management, concentrate feeding, dairy breeding, economics/management and diseases/disorders. The module includes a project usually based on a case study of a dairy farm.

Module Title:	**Advanced Sheep Production**
Module Code:	**ANSC 4103**
Credits:	**4**
Semester:	**2**

Description:
This elective covers in greater depth the areas covered in the core module and also includes new topics. The major components include energy and protein nutrition, sheep production in northern Europe and in the Mediterranean areas, store lamb finishing, breeding from ewe lambs, intensive lamb production, ingredients used in sheep rations and wool growth, wool faults and characteristics.

Module Title:	**Advanced Swine Production**
Module Code:	**ANSC 4104**
Credits:	**4**
Semester:	**2**

Description:
This module will deal more comprehensively with the science and practice of pig production than what is studied in the core module. This module will also address areas which are not covered in the core module as well as dealing with changes in swine production as affected by development in research relating to all aspects of pig production.

Module Title:	**Applied Animal Physiology**
Module Code:	**ANSC 4105**
Credits:	**4**
Semester:	**1**

Description:
This module deals with aspects of applied reproductive technology in farm animals, examining means of improving reproductive efficiency. A literature review and seminar will account for 75% of the marks.

Module Title:	**Equine Husbandry**
Module Code:	**ANSC 4106**
Credits:	**4**
Semester:	**2**

Description:
This module is designed to give the student a basic understanding of horse production in Ireland. The topics covered in the module are: evolution of the horse; development of the horse in Ireland; anatomy of skeletal and digestive systems; systems of horse production; nutrition and feeding of horses; grassland management for horses; housing for horses; reproduction and breeding management; artificial insemination and embryo transfer; dentition and ageing; the sport horse industry; marketing the Irish horse.

Module Title:	**Feed Formulation and Quality Control**
Module Code:	**ANSC 4107**
Credits:	**2**
Semester:	**1**

Description:
This module deals with the compound feed industry in Ireland, dealing with aspects such as the structure of the compound feed industry, raw materials, formulation of rations, legislation governing ration formulation, quality control/assurance and plant layout and design. While Animal Nutrition I is not an absolute prerequisite, it is strongly recommended.

Module Title:	**Animal Behaviour and Welfare**
Module Code:	**ANSC 4109**
Credits:	**2**
Semester:	**2**

Description:
Behaviour of the newborn, acquired or innate behaviour, social, sexual, aggressive, ingestive and other forms of behaviours. Factors affecting behaviour and the role of behaviour in animal production. Definition of animal welfare. Areas of concern. Transport of animals. Role of behaviour/abnormal behaviour in assessing welfare.

Module Title:	**Applied Biotechnology**
Module Code:	**ANSC 4115**
Credits:	**4**
Semester:	**2**

Description:
The emphasis will be on up to date developments and techniques in biotechnology including transgenic plants and animals, GM foods, disease resistance, gene therapy and genomics. A literature review, presentation and laboratory practicals will account for 50% of the marks.

Module Title:	**Poultry Production**
Module Code:	**ANSC 4116**
Credits:	**2**
Semester:	**2**

Description:
The poultry industry at farm, national and EU level; systems of poultry production, poultry production management, including disease prevention and control, nutrition, breeds, reproduction and housing; costs and returns in poultry production.

Module Title:	**Electives**
Module Code:	**ANSC 4400**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**ANSC 4402**
Credits:	**21**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 21. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Modules Coded 'BIOL' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Animal Biology and Evolution**
Module Code:	**BIOL 10010/BIOL 1901**
Module Coordinator:	**Dr Patrick Joyce**
Credits:	**5**
Level:	**1**
Semester:	**1**

Module Dependencies: Corequisites: Cell and Plant Biology

Description:
Diversity of animals from unicellular protista to mammals. Role of animals in ecosystems, as parasites, agents of disease, etc. Key physiological processes in animals. Origin and nature of diversity. Evidence for evolution. Natural selection. Microevolution. Speciation.

Learning Outcomes:
On completion of this module students should be able to:

- Distinguish between and explain the diversity within the major groups of animals.
- Outline the importance of these groups to agriculture
- Describe the basic physiological processes in animals
- Outline the key concepts in evolutionary and explain the principles of natural and artificial selection

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	15
Specified learning activities	**-**
Autonomous student learning	63
	102

Module Title:	**Cell and Plant Biology**
Module Code:	**BIOL 10030/BIOL 1903**
Module Coordinator:	**Dr Graham Wilson**
Credits:	**5**
Level:	**1**
Semester:	**1**

Module Dependencies: Corequisites: Animal Biology and Evolution

Description:
Structure of cells and intracellular components. Enzymes in growth and maintenance of cells. Respiration and Photosynthesis. Structure and growth of plants. Plant diversity. Structure of bacteria and viruses. Fungi as a distinct life-form. Role of fungi in ecosystems.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the basic structure of and physiological processes in cells
- Describe and distinguish between the structure and diversity of the major groups of plants, fungi, bacteria and viruses.
- Outline the importance of these groups to agriculture

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	15
Specified learning activities	**-**
Autonomous student learning	63
	102

Modules Coded 'BSEN' AND 'ENGT' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Biosystems Engineering Design Challange**
Module Code:	**BSEN 10010**
Module Coordinator:	**Dr Thomas Curran**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies: None

Description:

This level 1 module provides a practical introduction to Biosystems Engineering. The focus is on designing and building a working bench-scale device that solves a practical engineering problem relevant to Biosystems Engineering. You will work as a member of a team in conjunction with an assigned mentor to plan: time management, create a design, source materials, fabricate, test and operate the device and report on the project.

Learning Outcomes:

On completion of this module students should be able to:

- Describe the principles of engineering design, time management and teamwork.
- Solve a practical engineering problem.
- Locate materials, construct and operate a working bench-scale device.
- Use communication skills in writing a group reports and presenting a poster.

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	36
Autonomous student learning	70
	106

Module Title:	**Engineering and Surveying**
Module Code:	**BSEN 20010**
Module Coordinator:	**Dr Patrick Grace**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies:

Description:

This level 2 module consists of two components: mechanics and surveying. In the mechanics section of the module you will be introduced to concepts such as stress, strain and dynamics, that are used in the design of structures and machinery. In the surveying section you will be introduced to the concepts and technologies of surveying. You will find out why surveying is necessary and the approaches that can be taken. Surveying methods and equipment such as chains, levels and theodolites will be introduced and their use for land and building surveys will be considered. Finally you will be introduced to the calculation of areas, volumes and slopes from survey data.

Learning Outcomes:
On completion of this module students should be able to:

- explain and calculate basic mechanical properties such as forces and moments for simple structures
- describe and use basic surveying equipment
- design and conduct a small survey of land or a building
- calculate simple site properties from survey data

Workload:	**Approximate Hours**
Class Contact: Lectures	32
Class Contact: Small Group	-
Class Contact: Practical	8
Specified learning activities	40
Autonomous student learning	32
	112

Module Title:	**Principles of Engineering**
Module Code:	**BSEN 20020**
Module Coordinator:	**Professor DaWen Sun**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies:

Description:

This level 2 module examines the engineering principles associated with energy and environment. In the energy component of the module you will be introduced to energy transfer and conservation considering: units, dimensions, forms of energy, the properties of pure substances, the application of energy conservation, power generation and refrigeration. In the environment component you will consider both heat transfer with an emphasis on heat generation, and transfer in bioresource situations. Finally, psychrometrics, which deals with humidity and the amount of water vapour contained in air at any particular time will be introduced. These topics are combined with practical examples such as ventilation of stock houses and the storage of vegetables.

Learning Outcomes:
On completion of this module students should be able to:

- explain some basic principles of energy and apply the energy conservation principle for example systems
- define elements and processes associated with the psychometric chart and use them to solve example problems relevant to Engineering Technology
- specify energy requirements and design simple ventilation systems for animal houses and storage facilities

Workload:	**Approximate Hours**
Class Contact: Lectures	32
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	**-**
Autonomous student learning	70
	102

Module Title:	**Food Technology**
Module Code:	**BSEN 20030**
Module Coordinator:	**Dr Enda Cummins**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: none

Description:
This module focuses on physical, rheological and thermal properties of biomaterials including the principles and design of measurement techniques. Colour measurement of biomaterials (including tristimulus colorimetry), mass transfer and diffusion will be discussed including the experimental analysis of food composition and properties. The module places emphasis on the measurement of physical properties of biomaterials and the technology used in doing so. The module focuses on fundamental and empirical rheological measurement techniques and the corresponding application of the measurement results in material characterization.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the needs, benefits and processes involved in biomaterial (including food) rheometry.
- Explain the fundamentals of heat transfer in biomaterials (including thermal conductivity, thermal diffusivity, convection).
- Demonstrate differences between methods of measuring the thermal conductivity of foods.
- Describe different methods of colour measurement.
- Illustrate the impact of processing practices on the texture of biomaterials.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	10
Specified learning activities	10
Autonomous student learning	70
	114

Module Title:	**Literature Research Project**
Module Code:	**BSEN 20040**
Module Coordinator:	**Professor Shane Ward**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies:

Description:

For this level 2 project you will carry out a literature review and analysis on a subject relevant to Engineering Technology and/or Biosystems Engineering. You select a project on a relevant subject of your choice. With guidance from your personal supervisor you will use library books, journals and documents as your principal sources, possibly supplemented by Internet material, to compile a literature review which should include discussion of theory, applications and analysis of the chosen subject. You will be required to make a short presentation to your peers and teaching staff on the subject of your literature review

Learning Outcomes:
On completion of this module students should be able to:

- use the library for efficient academic research
- compile material from various sources into a report type document
- prepare a fully cross-referenced, reasoned description of a technical subject
- make a short presentation to a limited audience with suitable visual aids

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	108
Autonomous student learning	**-**
	108

Module Title:	**Bioprocess Engineering Principles**
Module Code:	**BSEN 30010**
Module Coordinator:	**Dr Francis Butler**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Principles of Engineering or equivalent

Description:

In this course you will be introduced to some of the fundamental theories that govern the design and operation of equipment used in bioprocessing. You will encounter the principles governing heat and mass transfer in food and bioproducts and specific case studies will illustrate these principles.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the basic principles governing heat and mass transfer.
- Employ theory to carry out simple heat and mass balance calculations
- Apply the principles of heat and mass transfer to analyse specific technologies.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	2
Class Contact: Practical	24
Specified learning activities	24
Autonomous student learning	36
	110

Module Title:	**Computer and Manufacturing Technology**
Module Code:	**BSEN 30040**
Module Coordinator:	**Dr Patrick Grace**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies:

Description:
In this second level module you will:

- be introduced to basic manufacturing technology found in the workshop environment
- build upon your first year IT skills and gain confidence using computers for practical applications such as document preparation, data analysis and presentation graphics to accompany oral presentations. These fundamental skills are required to complete course and project work throughout the degree programme
- be introduced to basic Computer Aided Drafting (CAD)

Learning Outcomes:
On completion of this module students should be able to:

- explain the function and operation of basic workshop equipment
- identify and apply, workshop health and safety strategies
- use a PC for document preparation, simple data analysis and presentation graphics
- draft a simple schematic using CAD

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	-
Class Contact: Practical	60
Specified learning activities	40
Autonomous student learning	20
	120

Module Title:	**Computer Information Systems**
Module Code:	**BSEN 30050**
Module Coordinator:	**Dr Nicholas Holden**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Any introductory computer course

Description:
In this course you will be introduced to the information technology and computer concepts and skills essential for integrating technical knowledge associated with Engineering Technology into a working environment. The course will focus on the link between fundamental theory and application in reality. You will be introduced to fundamental aspects of information technology including: hardware (e.g. computers, telephones, networks); systems theory; data manipulation and analysis (e.g. data to knowledge, data mining); information technology systems in the workplace (e.g. office and manufacturing systems); and the Internet as a work place tool.

Learning Outcomes:
On completion of this module students should be able to:

- explain the fundamentals of information technology (hardware, systems, data management and analysis) and concepts of computer programming
- relate information technology theory to practise (using real-world examples)
- use information technology to research a subject and report on it
- design the content of a simple web site and build it using html

Workload:	**Approximate Hours**
Class Contact: Lectures	20
Class Contact: Small Group	-
Class Contact: Practical	9
Specified learning activities	40
Autonomous student learning	40
	109

Module Title:	**Computer Programming**
Module Code:	**BSEN 30060**
Module Coordinator:	**Dr Patrick Grace**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:

Description:

In this level 3 module you will be introduced to computer programming using Visual Basic. Concepts relating to syntax, logic, loops, functions, subroutines, visual components, debugging and macro programming will be considered. Each week you will undertake a practical intended to focus attention on specific aspects of writing working Visual Basic programmes.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the fundamental concepts associated with writing a computer programme
- Write a moderately complex computer programme in Visual Basic
- Debug a moderately complex computer programme in Visual Basic

Workload:	**Approximate Hours**
Class Contact: Lectures	12
Class Contact: Small Group	
Class Contact: Practical	24
Specified learning activities	
Autonomous student learning	70
	106

Module Title:	*Food Quality and Safety Assurance*
Module Code:	**BSEN 30120**
Module Coordinator:	**Dr Francis Butler**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Principles of Engineering or equivalent

Description:

In this course you will study legislation, standards and codes of practice relating to quality and safety assurance in food and bioprocessing industries. Topics covered include quality systems standards, hygiene regulations, risk assessment, HACCP, traceability, design and layout of food and bioprocessing plant facilities, principles of cleaning.

Learning Outcomes:
On completion of this module students should be able to:

- Appraise the significance of relevant food safety legislation and codes of practice as applied to plant operation.
- Develop HACCP and traceability protocols for a food or bio-product.
- Plan simple food and bioprocessing plant facilities and appropriate finishes to optimise hygiene and cleanability.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	30
Autonomous student learning	50
	104

Module Title:	**Major Project (Literature and Planning)**
Module Code:	**BSEN 30140**
Module Coordinator:	**Professor Shane Ward**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
For students of the BAgrSc (Engineering Technology) degree programme option only

Description:

This is the first of four modules spread over levels 3 and 4 that comprise the major project work of the Engineering Technology degree. In this module you will:

1. select a research topic (in conjunction with staff of Biosystems Engineering)
2. plan your activities over 4 semesters, including time management, resource requirement, field operations, laboratory work, reporting schedules and final report presentation
3. undertake a literature and internet review of the topic, specifically identifying scientific principles, appropriate methodologies and the nature of expected results

Learning Outcomes:
On completion of this module students should be able to:

- describe the theories and principles that pertain to the research topic chosen
- design and start to apply a project management plan
- compose and write a review of relevant literature in a structured manner

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	12
Class Contact: Practical	-
Specified learning activities	**-**
Autonomous student learning	88
	100

Module Title:	**Major Project (Preparatory field/laboratory work)**
Module Code:	**BSEN 30150**
Module Coordinator:	**Professor Shane Ward**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerquisites: BSEN 30140 Major Project (literature and planning)

Description:

This is the second of four modules spread over levels 3 and 4 that comprise the major project work of the Engineering Technology degree. In this module you will:

1. use your project management plan to guide your initial field and laboratory work
2. undertake any necessary methodological development, calibration, design and testing
3. perhaps collect an initial data set for the project
4. present a written and oral report on the progress of your project

Learning Outcomes:

On completion of this module students should be able to:

- describe a methodology appropriate to your research topic
- employ a field or laboratory technique relevant to Engineering Technology
- write a scientific report (structured as a research paper)

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	12
Class Contact: Practical	-
Specified learning activities	88
Autonomous student learning	-
	100

Module Title:	**Power and Machinery – Hydraulic Systems**
Module Code:	**BSEN 30190**
Module Coordinator:	**Professor Shane Ward**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Principles of Engineering or equivalent

Description:

In this level 3 module you will be introduced to tractor hydraulic systems . These will be analysed with particular reference to hydraulic component design and efficiency. Tractor implement mechanics will examined with particular focus on draught control, top link and lower link sensing. Axle design including stress and fatigue analysis will be considered.

Learning Outcomes:

On completion of this module students should be able to:

- describe the principles of operation of an open and closed center hydraulic circuit
- compare and contrast the functionality of hydraulic components including: pumps, valves, motors, actuators, filters, lines and couplers
- explain the principles of operation of draught control, top link and lower link sensing on a tractor
- evaluate the power requirement for typical tractor functions
- design a load bearing stub axle, incorporating factors such as fatigue failure and factor of safety

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	9
Specified learning activities	12
Autonomous student learning	58
	103

Module Title:	**Power and Machinery – Internal Combustion Engines**
Module Code:	**BSEN 30200**
Module Coordinator:	**Professor Shane Ward**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Principles of Engineering or equivalent

Description:

In this level 3 module you will be introduced to the principles of power and machinery found in mechanisation systems for bioresource management. The module starts by looking at energy and fuels and the conversion of energy to action by internal combustion engines. Basic thermodynamics are used to examine engine components, drive trains, vibration, bearings and lubricants. Traction mechanics (soil – vehicle interactions) are then considered as the basis for tillage tool design and operation.

Learning Outcomes:
On completion of this module students should be able to:

- describe how fuel (energy) is converted into mechanical movement by engines
- explain basic engine thermodynamics
- illustrate the importance of vibrations and bearings in drive train design
- analyse soil – vehicle interactions
- calculate the forces on a simple tillage tool

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	9
Specified learning activities	12
Autonomous student learning	58
	103

Module Title:	**Soil Engineering**
Module Code:	**BSEN 30220**
Module Coordinator:	**Dr Patrick Grace**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Engineering and Surveying

Description:

This module examines basic soil mechanics and soil-water interactions. The topics considered are: soil classification, phase relations, soil failure theory, retaining walls, slope stability, foundation pressures, consolidation and compaction, water seepage, flow nets, drainage.

Learning Outcomes:
On completion of this module students should be able to:

- solve basic problems of soil failure including retaining walls, slope stability and foundations.
- solve basic problems of saturated water seepage in soils

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practical	8
Specified learning activities	12
Autonomous student learning	60
	116

Module Title:	**Unit Operations in Bioprocess Engineering**
Module Code:	**BSEN 30230**
Module Coordinator:	**Dr Colm O'Donnell**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Principles of Engineering or equivalent

Description:

This module will provide an introduction to some of the fundamental theories that govern the design and operation of equipment for the food and bioprocess industries.

Specific topics covered will include mass balances in food processing and other bioprocessing applications, heat exchangers, transient heat transfer, heat transfer with phase change, psychrometrics, principles and applications of separation processes including distillation, leaching, filtration, ultrafiltration, reverse osmosis and electrodialysis.

Learning Outcomes:
On completion of this module students should be able to:

- Describe basic modes of mass transfer in food and other bioprocessing applications
- Describe the principle of operation of bioprocess separation technologies
- Use basic equations to design heat exchangers and separation equipment for bioprocessing applications
- Solve material and energy balance calculations for integrated food and bioproduct systems.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	6
Specified learning activities	20
Autonomous student learning	58
	108

Module Title:	**Waste Management**
Module Code:	**BSEN 30240**
Module Coordinator:	**Dr William Magette**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Principles of Engineering or equivalent

Description:

This level 3 module will introduce you to fundamental principles of waste management, with particular emphasis on organic wastes (from animals). Waste generation and waste characterization are examined, as are techniques for waste collection, storage, transport, utilization (including recycling and recovery). Some attention is given to municipal solid wastes.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the waste management hierarchy and key European and Irish waste management legislation and regulations
- Specify the essential elements to be included in a waste management plan
- Develop a nutrient management plan in the context of an overall environmental management plan

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	20
Autonomous student learning	60
	104

Module Title:	**Electives**
Module Code:	**BSEN 2201**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**BSEN 3301**
Credits:	**15**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 15. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Buildings and Environment**
Module Code:	**ENGT 4001**
Credits:	**8**
Semester:	**2**

Description:
Animal production buildings. Environmental control systems. Dispersion and abatement of atmospheric emissions. Crop storage buildings. Concrete, timber and structural steel in agricultural buildings. Environmental and planning legislation.

Module Title:	**Food Manufacturing Systems**
Module Code:	**ENGT 4002**
Credits:	**1**
Semester:	**8**

Description:
Food Quality and Safety Assurance (4 Credits)
Quality systems standards. Food legislation. Process plant layout. Principles of cleaning. Hygienic design. HACCP.
Food Refrigeration (4 Credits)
Refrigeration cycles, equipment, thermal properties, cooling and freezing processes, mathematical modelling, IT, chilled and frozen foods. Tutorials.

Module Title:	**Food Process Engineering**
Module Code:	**ENGT 4003**
Credits:	**8**
Semester:	**2**

Description:
Unit processes, heat transfer systems and mass transfer systems in food processing including dehydration, freezing, centrifugation, crystallisation, emulsification, extraction and irradiation with the applications of each. Physical, chemical and microbiological changes in foods. Packing and storage. Integrated food processing systems.

Module Title:	**Power and Machinery II**
Module Code:	**ENGT 4007**
Credits:	**8**
Semester:	**1**

Description:
Students may take any* two *of the following modules:
Mechanisation (4 credits)
Agricultural machinery, system selection and operation: including tractors, tillage, seeding and planting; artificial fertiliser application: spraying techniques; crop harvesting.
Precision Agriculture (4 credits)
Global Positioning Systems (GPS), Geographic Information Systems (GIS) sensors, yield maps, variable rate technology, satellite imagery, decision support, soil and environmental properties.
Control (4 credits)
Modelling dynamic systems, system response, feedback control. Instrumentation, measurement of pressure, flow and temperature, compact data loggers. Programmable logic controller (PLC) technology.
Forest Engineering (4 credits)
Forest machinery design, selection and operation. Timber transport. Environmental impact. Central tyre inflation (CTI) and telemetric control systems.

Module Title:	**Environmental Engineering Principles**
Module Code:	**ENGT 4008**
Credits:	**8**
Semester:	**1**

Description:
Principles of hydrology. Nitrogen, phosphorus and carbon cycles. Transport of pollutants from the landscape. Fundamentals of water and wastewater treatment. Microbiology for wastewater treatment. Noise and atmospheric pollution.

Module Title:	**Major Project II (including Professoressional Work Experience)**
Module Code:	**ENGT 4050**
Credits:	**14**
Semester:	**1 and 2**

Description:
Students will continue to carry out a comprehensive project involving experimentation, systems analysis and/or design in an approved topic in agricultural and food engineering. The project will include: (i) a survey of the literature; (ii) oral progress report (seminar style); (iii) the presentation of a comprehensive report; (iv) a component of Professoressional work experience.

Module Title:	**Electives**
Module Code:	**ENGT 4100**
Credits:	**6**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 6. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Buildings for Animal Production and Crop Storage**
Module Code:	**ENGT 4107**
Credits:	**4**
Semester:	**2**

Description:
Legislation. Farm design and layout. Animal production buildings for pigs, cattle, sheep and horses. Crop storage buildings. Environmental control systems. Structural materials in agricultural buildings.

Modules Coded 'CHEM' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Introductory Chemistry**
Module Code:	**CHEM 00010/CHEM 0901**
Module Coordinator:	**Dr Grace Morgan**
Credits:	**5**
Level:	**0**
Semester:	**1**

Module Dependencies:

Description:

The module is intended for students without a strong background in Chemistry. It will cover: atomic structure and the periodic table; atomic theory, including balancing chemical equations and calculating chemical amounts as moles; ionic and covalent bonding; shapes of covalent compounds; Lewis structures; oxidation and reduction reactions and the assignment of oxidation states. The principles will be illustrated by examples of the chemistry of different elements including nitrogen, carbon, hydrogen, the alkali metals and alkaline earth metals and the halogens.

Learning Outcomes:

On completion of this module students should be able to:

- Understand the nuclear and electronic structure of atoms.
- Balance chemical equations and carry out stoichiometric calculations.
- Understand the bonding between atoms in ionic and covalent compounds.
- Predict the geometries of simple molecules.
- Draw Lewis structures of simple molecules.
- Assign oxidation numbers to atoms in compounds.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	5
Class Contact: Practical	15
Specified learning activities	15
Autonomous student learning	46
	105

Module Title:	**Introduction to Organic and Physical Chemistry**
Module Code:	**CHEM 10010/CHEM 1901**
Module Coordinator:	**Dr Paul Murphy**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies:

Corequisites: CHEM 00010 Introductory Chemistry or CHEM 10040 The Molecular World

Description:

The organic functional groups and their chemistry

Thermodynamics, kinetics, equilibria, states of matter, solvation, acids and bases.

Learning Outcomes:
On completion of this module students should be able to:

- Draw Lewis structures, expanded structures and line diagrams for a wide range of organic molecules given names.
- Describe structures, geometries, physical properties and basic reactions of the main organic functional groups.
- Define acidity, basicity, pH
- Explain/define enthalpy, bond energies, rates of chemical reactions, reversible reactions.
- Describe the basic physical chemistry of gases, liquids, solids.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	4
Class Contact: Practical	15
Specified learning activities	20
Autonomous student learning	50
	113

Module Title:	**The Molecular World**
Module Code:	**CHEM 10040**
Module Coordinator:	**Dr M Casey**
Credits:	**5**
Level:	**1**
Semester:	**1**

Module Dependencies:

Description:

This is an optional module intended for students with a background in chemistry. The module will introduce students to the central role that molecular science now plays in understanding life processes, the design and synthesis of new materials and medicines. The approach will be to explore the role of molecular structure and intermolecular interactions in areas such as the design and mode of operation of pharmaceuticals, the development of modern, "smart" materials and in the functioning of biological systems.

Learning Outcomes:
On completion of this module students should be able to:

- Show understanding of basic atomic theory
- Show understanding of the bonding in chemical compounds
- Predict the geometries and polarities of molecules and understand their importance in determining molecular function and intermolecular interactions
- Show understanding of the nature of chemical equilibrium and its relationship to acid/base reactions
- Discuss the beneficial impact of medicinal chemistry on human health
- Discus the importance of chemistry in understanding the natural environment

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	5
Class Contact: Practical	15
Specified learning activities	10
Autonomous student learning	48
	112

Module Title:	**Organic Chemistry and Chemical Biology**
Module Code:	**CHEM 10050**
Module Coordinator:	**Dr Declan Gilheany**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies:

Corequisite: CHEM 10010 Introductory Chemistry or CHEM 10040 The Molecular World

Description:

The module is an introduction to organic chemistry, the chemistry of carbon. It covers the common organic molecules (alkenes, alcohols, amines, carbonyls, etc) and emphasizes their recognition, naming, reactions and relevance to everyday life and health. Specific topics include 3D aspects of chemistry, what exactly happens in a chemical reaction and how it is done in practice. A significant proportion of the module is devoted to the larger molecules of life (proteins, carbohydrates, fats, DNA) and shows how these can be understood in terms of the simpler molecules.

Learning Outcomes:

On completion of this module students should be able to:

- Understand the structures of organic molecules; recognize and name examples of them
- Discuss the reactions of the common organic compounds.
- Design the synthesis of a simple molecule from available starting materials.
- Understand the molecular basis of life.
- Safely perform a simple chemical synthesis in the laboratory.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	5
Class Contact: Practical	15
Specified learning activities	20
Autonomous student learning	44
	108

Module Title:	**Physical and Inorganic Chemistry**
Module Code:	**CHEM 10060**
Module Coordinator:	**Professor Earle Waghorne**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies:

Corequisite: CHEM 10010 Introductory Chemistry or CHEM 10040 The Molecular World

Description:

The module will introduce the concepts of (i) chemical kinetics: rates of reactions, rate constants, reaction mechanisms, effects of concentration and temperature changes on reaction rates and (ii) chemical equilibria: the equilibrium constant, free energy, energy, enthalpy and entropy changes in reactions. It will also develop the understanding of the chemistry of selected s and p block elements, including groups 1, 2 and 17, carbon and silicon, oxygen and sulfur and nitrogen and phosphorous and introduce the transition elements.

Learning Outcomes:
On completion of this module students should be able to:

- Carry out simple calculations related to the factors that affect the rates of chemical reactions
- Carry out simple calculations on chemical equilibria
- Understand the chemistry of selected elements and their relationship to the electronic structure of the atoms

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	5
Class Contact: Practical	15
Specified learning activities	15
Autonomous student learning	46
	105

Modules Coded 'CPSC' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Introduction to Crop Science**
Module Code:	**CPSC 10010**
Module Coordinator:	**Professor Edward Walsh**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies: None

Description:

The course will provide an overview of crop agriculture at global, EU and Irish levels. You will also be provided with the opportunity to explore how scientific principles are applied in Crop Science. You will also be required to engage in a small-group project that will allow you to more closely examine and analyse a particular aspect of Crop Science and will facilitate further development of your ICT and inter-personal skills.

Learning Outcomes:

On completion of this module students should be able to:

- Explain and demonstrate the relevance of the basic sciences in Crop Science;
- Locate information (intellectually and physically) to meet defined needs;
- Organize and present information acquired from multiple sources
- Demonstrate inter-personal and group-working skills;
- Demonstrate a working relationship with academic staff in Crop Science

Workload:	**Approximate Hours:**
Class Contact: Lectures	12
Class Contact: Small Group	8
Class Contact: Practical	-
Specified learning activities	50
Autonomous student learning	30
	100

Module Title:	**Applied Biostatistics**
Module Code:	**CPSC 20010**
Module Coordinator:	**Professor Edward Walsh**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: Prerequisites: First Year Mathematics Module(s)

Description:

This introductory course, which requires only elementary algebra, is designed to explain and illustrate the statistical ideas and techniques that are an essential skill for a biological scientist engaged in the conduct or interpretation of experimentation. You will discover different types of data distributions and the parameters that define them. You will see how statistics calculated from samples are related to "true" values in the population from which the sample was drawn. The basic idea of a significance test will be developed and used to adjudicate on the significance, or otherwise, of observed differences. You will also be introduced to the measurement and analysis of the association between variables.

Learning Outcomes:
On completion of this module students should be able to:

- Summarise, describe and compare data sets.
- Estimate population parameters using sample estimates.
- Formally test hypotheses about population parameters and adjudicate on them with stated levels of confidence.
- Apply basic methods for investigating linear relationships between variables.

Workload:	*Approximate Hours:*
Class Contact: Lectures	24
Class Contact: Small Group	10
Class Contact: Practical	0
Specified learning activities	10
Autonomous student learning	56
	100

Module Title:	**Fundamentals of Arable Crop Production**
Module Code:	**CPSC 20020**
Module Coordinator:	**Professor Edward Walsh**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prerequisites: First Year Biology Modules or equivalents

Description:

This course is designed for Second Year Animal and Crop Production students. It is a prelude to courses dealing with cropping techniques and the management of individual crops and it introduces you to physical farm planning including drainage, reclamation, irrigation, shelter, rotations and principles of soil cultivation. It will also provide opportunity to explore the utility of computer applications, such as GIS, spreadsheets and word processing, in the operation and management of crop enterprises.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the necessity for good drainage and describe indicators of poor drainage
- Explain and evaluate the main drainage methods used in agricultural land
- Compare and contrast the different types of land reclamation.
- Compare and contrast the different types of fencing in an agricultural environment.
- Use computer applications for the storage, retrieval and analysis of input and output data from crop enterprises.

Workload:	*Approximate Hours:*
Class Contact: Lectures	24
Class Contact: Small Group	12
Class Contact: Practical	0
Specified learning activities	24
Autonomous student learning	40
	100

Module Title:	**Principles of Crop Science**
Module Code:	**CPSC 20030**
Module Coordinator:	**Professor Edward Walsh**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prerequisites: First Year Biology Module(s) or equivalents

Description:

This, non-specialist, course can be taken in the second year of your study programme. You will be introduced to major crops, the environmental factors that determine their geographical distribution and their importance in Irish agriculture. You will also be introduced to the fundamentals of tillage and cultivation techniques and important features of crop management including rotation, establishment, nutrition, protection, harvesting, storage and environmental impact. The concept of crop quality and its assessment will be introduced and methods for its improvement outlined. The application of conventional and novel genetic manipulation techniques for crop improvement will also be explored.

Learning Outcomes:
On completion of this module students should be able to:

- Explain and evaluate crop rotation theory and practice in various arable farming systems.
- Describe soil cultivation, seedbed preparation, seeding/planting and harvesting/storage of cereal, root and forage crops.
- Discuss the principles of crop protection and crop nutrition in relation to crop and environmental parameters.
- Define and explain "quality" in cereal, root and forage crops.
- Describe and explain the role of genetic manipulation in crop improvement and enumerate and assess the risks and benefits associated with this improvement strategy.

Workload:	*Approximate Hours:*
Class Contact: Lectures	24
Class Contact: Small Group	8
Class Contact: Practical	-
Specified learning activities	-
Autonomous student learning	68
	100

Module Title:	**Professional Work Experience**
Module Code:	**CPSC 30010**
Module Coordinator:	**Dr Trevor Storey**
Credits:	**30**
Level:	**-**
Semester:	**2**

Module Dependencies:

Description:

This Professional Work Experience (PWE) module for students in the Animal and Crop Production degree programme is taken during the period from the start of the Semester 6 to the start of Semester 7. During this period, students gain appropriate experience on approved dairy, cattle, sheep, pig and tillage farms. Students are encouraged to seek appropriate information from the host farmer or employer, to become familiar with farming newspapers, magazines and Teagasc advisory leaflets and to attend open days and information meetings.

Students are also strongly recommended to gain experience in appropriate aspects of the wider agri-industry. Experience may also be gained abroad. In all cases the student must seek approval for their study programme from the Module Coordinator.

Learning Outcomes:
On completion of this module students should be able to:

- Summarise and describe management methods as applied to animal and crop enterprises at farm level.
- List and describe the responsibilities of key operatives in a range of farm enterprises.
- Describe animal and crop production systems and relate them to underpinning scientific principles.
- Demonstrate an extended awareness of career directions and opportunities for the Agricultural Science graduate.

Workload:	*Approximate Hours:*
Class Contact: Lectures	-
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	-
Autonomous student learning	-
	-

Module Title:	**Crop Breeding**
Module Code:	**CPSC 4004**
Credits:	**2**
Semester:	**1**

Description:
This module introduces you to crop improvement strategies that are based on the application of genetic principles. You will discover the conventional (recombination) methods of plant breeding and how they have contributed to the improvement of crop performance, stability and quality (as in CPSC 4005 – Crop Husbandry IVa).

Module Title:	**Crop Husbandry IVa**
Module Code:	**CPSC 4005**
Credits:	**8**
Semester:	**1**

Description:
This module builds on earlier courses in basic science, applied science, economics and management and examines how this knowledge is integrated to formulate and refine crop production systems that are economical, profitable, safe and environmentally responsible.

Module Title:	**Crop Husbandry IVb**
Module Code:	**CPSC 4006**
Credits:	**6**
Semester:	**2**

Description:
This module supplements the earlier course - CPSC 4005 'Crop Husbandry IVa' - by considering additional crops and expanding on some of the cereal, root and forage crop topics covered in the first semester.

Module Title:	**Electives**
Module Code:	**CPSC 4100**
Credits:	**14**
Semester:	**1 and/or 2**

Description:

A student must undertake individual elective modules with a cumulative credit-rating of 14. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**CPSC 1921**
Credits:	**10**
Semester:	**1 and/or 2**

Description:

A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**CPSC 2201**
Credits:	**10**
Semester:	**1 and/or 2**

Description:

A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**CPSC 3302**
Credits:	**5**
Semester:	**1 and/or 2**

Description:

A student must undertake individual elective modules with a cumulative credit-rating of 5. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Developments in Cereal Production**
Module Code:	**CPSC 4101**
Credits:	**4**
Semester:	**2**

Description:

An in-depth study of development and innovation in cereal production; trial work in Ireland and abroad; varietal evaluation at national and international level; cereal holding and storage systems; optimum disposal of cereal products; critical examination of cereal quality and the factors influencing it under Irish conditions. Students prepare a paper on an aspect of cereal production and topical interest. They visit processing plants and laboratories, seed testing and certification plants and commercial cereal farms.

Module Title:	**Organic Agriculture and Horticulture**
Module Code:	**CPSC 4103**
Credits:	**2**
Semester:	**1**

Description:

Definition and role of organic farming; organic standards; converting to an organic system; rotations, cultivations, soil fertility; manure management, composting, green manuring; pest, weed and disease control; marketing organic produce; principles of organic livestock management.

Module Title:	**Alternative Crop Development**
Module Code:	**CPSC 4112**
Credits:	**4**
Semester:	**2**

Description:

The manufacturing industry is beginning to recognise the potential benefits of using crop-derived products as renewable raw materials. They have the benefits of being more sustainable and are biodegradable. This module provides the student with the opportunity to study in detail the production of non-food industrial crops at farm level and also to study their role at industry level.

Module Title:	**Electives**
Module Code:	**CPSC 4401**
Credits:	**31**
Semester:	**1 and/or 2**

Description:

A student must undertake individual elective modules with a cumulative credit-rating of 31. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Modules Coded 'ECON' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**National Economics**
Module Code:	**ECON 4101**
Credits:	**4**
Semester:	**1**

Indicative Module Description:
The Supply side and the Demand side of the economy.
The Demand side in more detail: fiscal, monetary, exchange rate and incomes policies.
The Supply side in more detail: the labour market, capital market distortions, industrial policy, and product market distortions. Issues in European integration: Monetary union, CAP reform, structural funds and decentralised versus centralised decision making. The performance of the Irish economy: growth, unemployment, inflation, external balance, budget balance and sectoral balances.

Modules Coded 'EXPH' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Physics I (BAgrSc)**
Module Code:	**EXPH 10010/EXPH 1901**
Module Coordinator:	**Brian McBreen**
Credits:	**5**
Level:	**1**
Semester:	**1**

Module Dependencies:

Description:

This is a first year module for Agricultural Science students that focuses on the basic principles of the physical world and their applications. The topics include Kinematics and Dynamics, Newton's Laws, Gravitation, Circular Motion, Energy and Momentum, Conservation Laws, Pressure, Surface Tension, Viscosity, Heat, Temperature, Expansion, Mechanisms of Heat Transfer.

Learning Outcomes:

On completion of this module students should be able to:

- Explain the topics covered in the physical world including, for example, mechanics, fluids, heat and heat transfer
- Use the equations to solve a wide range of problems
- Apply the topics in the physical world to examples in Agriculture**.**

Workload:	**Approximate Hours**
Class Contact: Lectures	31
Class Contact: Small Group	10
Class Contact: Practical	16
Specified learning activities	-
Autonomous student learning	68
	125

Module Title:	**Physics II (BAgrSc)**
Module Code:	**EXPH 10090/EXPH1909**
Module Coordinator:	**James McLaughlin**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies:

Description:

This is a first year module for Agricultural Science students that focuses on the basic principles of the physical world and their applications. The topics include Relative Humidity, Thermodynamics of Heat Engines and Refrigeration, Simple Harmonic Motion, Waves, Properties of Light, Mirrors and Lenses, Microscopes, Polarised Light, Spectra, Bohr Model of Atom, Electricity and Magnetism, X-rays, Radioactivity.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the topics covered in the physical world including, for example, energy usage, light, electrical technology and applications of radiation.
- Use the equations to solve a wide range of problems.
- Apply the topics in the physical world to examples in Agriculture.

Workload:	**Approximate Hours**
Class Contact: Lectures	31
Class Contact: Small Group	10
Class Contact: Practical	16
Specified learning activities	-
Autonomous student learning	68
	125

Modules Coded 'FDSC' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Food Diet and Health**
Module Code:	**FDSC 10010**
Module Coordinator:	**Professor Brian McKenna**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies:

Description:
This course will introduce students to Food Science (with particular emphasis on the composition and manufacture of key food and beverage commodities), Food Safety (eg microbial and non-microbial contamination of foods) and Nutrition-related Public Health issues (eg obesity, diabetes, diet and cancer).

Learning Outcomes:
On completion of this module students should be able to:

- describe the manufacture of key food and beverage products
- demonstrate an awareness of the contribution of these foods to a healthy diet
- identify key food safety and dietary issues

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	28
Autonomous student learning	48
	100

Module Title:	**Agricultural Chemistry I**
Module Code:	**FDSC 20010**
Module Coordinator:	**Dr Denis Cronin**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: Prerequisites: First Year Chemistry Module(s) or equivalent

Description:
This course provides an introduction to the key biologically important organic substances which are responsible for structure and function in living cells, namely, carbohydrates, lipids, proteins and nucleic acids. The main aim of the course is to focus on the occurrence, chemical structures, physical and chemical properties of important members of each group in order to illustrate why cell structure and metabolism in plants and animals is dependent on these substances. This course is a necessary prerequisite for Agricultural Chemistry II which deals with the nature of the metabolic processes taking place in living cells.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the chemical and physical properties of key members the four main classes of biomolecules.
- Illustrate how the distinctive properties of each class of biomolecule contribute unique features to structure and function in plant and animal systems.
- Demonstrate a practical ability to show that simple methods of chemical analysis can be used to distinguish between the different classes of biomolecules and to characterize individual members within a class.

Workload:	**Approximate Hours:**
Class Contact: Lectures	28
Class Contact: Small Group	-
Class Contact: Practical	10
Specified learning activities	-
Autonomous student learning	70
	108

Module Title:	**Agricultural Chemistry II**
Module Code:	**FDSC 20020**
Module Coordinator:	**Dr John Clarke**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prerequisites: First Year Chemistry Module(s) or equivalent

Description:

This course is a continuation of Agricultural Chemistry I. The main aim of this course is to introduce students to how living cells (plant and animal) can extract energy from highly reduced organic molecules (i.e. carbohydrates, fats and protein) and convert it to a usable form of energy suitable to the living cell. The various metabolic pathways common to both plant and animal and those which are specific to plant and animal systems will be covered in simple terms. The conversion of solar energy into chemical energy essential to the living cell will also be covered.

Learning Outcomes:
On completion of this module students should be able to:

- Explain how living cells can extract and transform energy from their environment and use it to build and maintain their own structures from simple raw materials
- Describe the extraordinary attribute of living organisms for precise self-replication.
- Describe the chemistry and mode of action of herbicides and pesticides and the legislation covering these substances.

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	10
Specified learning activities	-
Autonomous student learning	60
	100

Module Title:	**Basic Food Analysis**
Module Code:	**FDSC 20030**
Module Coordinator:	**Mr Michael O'Sullivan**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prerequisites: First Year Chemistry and Mathematics Modules or equivalents

Description:

The aim of this course is to provide students with the knowledge and practical laboratory skills required to conduct basic, quantitative chemical analysis, including food analysis. The course provides an understanding of 1) the principles of stochiometry and solution chemistry that underpin calculations in quantitative chemical analysis; 2) the principles of volumetric and gravimetric analysis; 3) the basic theory of acid /base and redox chemistry; 3)the principles of electro-analytical methods. A comprehensive introduction to the application of the principles of quantitative chemical analysis to foods is also given.

The weekly laboratory sessions are designed to directly relate to the lecture material being covered at that time and to develop the following : group work; practical laboratory skills; critical analysis of problems, report writing and information technology skills

Learning Outcomes:
On completion of this module students should be able to:

- demonstrate an understanding of the basic principles of quantitative chemical analysis
- demonstrate competence in basic laboratory skills
- write a properly structured and formatted laboratory report using appropriate IT
- apply the principles of quantitative analysis to foods

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	
Class Contact: Practical	24
Specified learning activities	12
Autonomous student learning	50
	110

Module Title:	**Sensory Analysis**
Module Code:	**FDSC 20040**
Module Coordinator:	**Dr Amalia Scannell**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies:
Prerequisites: First Year Biology and Mathematics Modules or equivalents
Co-Requisites: Applied Biostatistics

Description:
This module is an undergraduate course designed for Second year BScAgr Food Science students. The module will focus on techniques used in industrial sensory evaluation. Sensory training will include aspects of panelist evaluation; requirements of test area equipment and facilities; analytical and subjective tests including difference testing, and descriptive profiling.

Learning Outcomes:
On completion of this module students should be able to:

- Set up a taste panel complying with International Organisation for Standardisation (ISO standards).
- Write a sensory report documenting test procedures, results analysis and conclusions.
- Distinguish between different testing procedures.
- Assess the most appropriate test for a given product scenario, making choices based on reasoned argument using information derived throughout the course.

Workload:	**Approximate Hours:**
Class Contact: Lectures	16
Class Contact: Small Group	8
Class Contact: Practical	4
Specified learning activities: Group Project / Presentation	42
Autonomous student learning	50
	120

Module Title:	**Food Science I: Food Physics**
Module Code:	**FDSC 20050**
Module Coordinator:	**Professor Brian McKenna**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prerequisites: First Year Physics Module(s) or equivalent

Description:
Undergraduate module designed for second year BScAgr Food Science students. It is aimed at providing an understanding of the physical properties of foods and how they influence the design and operation of major food processing operations and also how they influence consumer perception and preferences for foods. The properties selected for study include: Food Colour; Thermal properties of foods (Specific Heat; Thermal Conductivity; Thermal diffusivity); Electrical properties of foods (microwave and dielectric properties -radio frequency heating); Liquid properties of foods (food rheology); Solid properties of foods (texture of solid foods);Water in foods (psychrometrics and food storage; Water activity; Influence on drying of foods).

Learning Outcomes:
On completion of this module students should be able to:

- Understand the basic sciences governing the Physical Properties of Foods.
- Have an appreciation of their importance to both the consumer and the food manufacturer.
- Be competent at carrying out simple calculations involving physical properties.
- Know how to determine the numerical values of food physical properties by:-
  (a) Laboratory measurement; (b) Literature search; (c) Calculation where appropriate.

Workload:	**Approximate Hours:**
Class Contact: Lectures	25
Class Contact: Small Group	-
Class Contact: Practical	15
Specified learning activities	15
Autonomous student learning	60
	115

Module Title:	**Biochemistry**
Module Code:	**FDSC 30010**
Module Coordinator:	**Dr John Clarke**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:
Prerequisites: First Year Chemistry Module(s); Agricultural Chemistry I; Agricultural Chemistry II; or equivalents

Description:
This course is an elaboration of Agricultural Chemistry II. The main aim of the course is to give students a more detailed insight into the workings of the living cell, particularly the various control mechanisms and interaction of the metabolic pathways operative in the cell. Topics covered will include description of mitochondria, their structure, function and their role in the regulation of metabolism, the mitochondrial electron transport chain, redox potentials, properties and functions of enzymes/coenzymes, amino acids and proteins synthesis of ATP. Structure of muscle and the process of contraction will also be covered. Mode of action and function of the hormones. Regulation of the various metabolic pathways, their integration and relationship to each other. The chemistry, function and mode of action of the various hormones and their role in the regulation of metabolism

Learning Outcomes:
On completion of this module students should be able to:
- Predict how cells and therefore the whole organism reacts to the various states of nutrition to which it may be subjected to over a period.
- Assess the role, mode of action and interaction of the various hormones produced by the glands and the consequences of under/over production.

Workload:	**Approximate Hours:**
Class Contact: Lectures	35
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	**-**
Autonomous student learning	90
	125

Module Title:	**Food Analysis I**
Module Code:	**FDSC 30020**
Module Coordinator:	**Dr Desmond J Morgan**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
Prerequisites: First Year Chemistry Module(s); Agricultural Chemistry I; Agricultural Chemistry II; or equivalents

Description:

This course will the cover the theoretical background and the applications of molecular spectroscopy (absorption, fluorescence and infra-red), atomic spectroscopy (AA and ICP), x- ray fluorescence and x-ray diffraction techniques in the analysis of foods.

Learning Outcomes:
On completion of this module students should be able to:

- Demonstrate how the demands of modern food analysis require a diversity of methodologies which must be often used in combination to achieve the desired result.
- Explain the basic principles underlying the measurement of different classes of food compounds when using specific methodologies and their associated instrumentation.
- Carry out selected experiments which demonstrate important aspects of qualitative and quantitative analysis.

Workload:	**Approximate Hours:**
Class Contact: Lectures	32
Class Contact: Small Group	-
Class Contact: Practical	14
Specified learning activities	-
Autonomous student learning	74
	120

Module Title:	**Food Analysis II**
Module Code:	**FDSC 30030**
Module Coordinator:	**Dr Denis Cronin**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:
Prerequisites: First Year Chemistry Module(s); Agricultural Chemistry I; Agricultural Chemistry II; or equivalents

Description:

The main part of this course will deal with the theoretical background and the applications in modern food analysis of separation techniques such as thin- layer chromatography, high performance liquid chromatography, gas chromatography and electrophoresis. The use of radioactive isotopes in analysis will also be covered.

Learning Outcomes:
On completion of this module students should be able to:

- Demonstrate how the demands of modern food analysis require a diversity of methodologies which must be often used in combination to achieve the desired result.
- Explain the basic principles underlying the measurement of different classes of food compounds when using specific methodologies and their associated instrumentation.
- Carry out selected experiments which demonstrate important aspects of qualitative and quantitative analysis.

Workload:	**Approximate Hours:**
Class Contact: Lectures	32
Class Contact: Small Group	-
Class Contact: Practical	14
Specified learning activities	**-**
Autonomous student learning	74
	120

Module Title:	**Food Chemistry 1**
Module Code:	**FDSC 30040**
Module Coordinator:	**Dr Dolores O'Riordan**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
Prerequisites: Agricultural Chemistry I, Agricultural Chemistry II, or equivalents

Description:

This module focuses on foods proteins with emphasis on relationships between their structure and functional properties in their modified and unmodified states. The module emphasises how processing, storage, cooking, enzymatic treatment and use of additives alters the molecular interactions and functionality of proteins. Functional properties examined include: solubility, viscosity, gelation, emulsification and foaming. Selected protein systems are used to demonstrate the structure–function relationships e.g. milk proteins and wheat proteins. The role of water in foods and its influence on food stability is also examined.

Learning Outcomes:
On completion of this module students should be able to:

- Compare and contrast the structure and functions of specific food protein systems and explain the intrinsic and extrinsic factors influencing the functions of these proteins.
- Explain the state of water in foods and discuss its influence on food stability.
- Perform laboratory techniques to assess the protein and moisture contents of foods and determine the functional properties of proteins.

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	10
Specified learning activities	10
Autonomous student learning	70
	120

Module Title:	**Food Chemistry II**
Module Code:	**FDSC 30050**
Module Coordinator:	**Dr Dolores O'Riordan**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:
Prerequisites: Agricultural Chemistry I, Agricultural Chemistry II, or equivalents

Description:

This module focuses on food carbohydrates and lipids, with emphasis on relationships between their structure and functional properties in their modified and unmodified states. The course emphasises how processing, storage, cooking, enzymatic treatment and use of additives alters the molecular interactions occurring in these food components. Selected food systems are used to demonstrate the structure–function relationships and molecular interactions e.g. sugars, starches, pectins, marine/plant gums, vegetable and animal fats. Food components, which have a major influence on the sensory properties of foods including pigments and flavours are also examined

Learning Outcomes:
On completion of this module students should be able to:

- Describe the structure, functions and food applications of selected monosaccharides, disaccharides and polysaccharides.
- Differentiate lipids on the basis of their fatty acid profile and discuss the physical properties and chemical deterioration of lipids.
- Discuss compounds contributing to the taste, aroma and colour of foods.
- Perform commonly used laboratory techniques to assess the properties of food carbohydrates, lipids and colours.

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	
Class Contact: Practical	10
Specified learning activities	10
Autonomous student learning	70
	120

Module Title:	**Nutrition I**
Module Code:	**FDSC 30060**
Module Coordinator:	**Dr Desmond J Morgan**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:
Prerequisites: First Year Chemistry module(s); Agricultural Chemistry I, Agricultural Chemistry II; or equivalents

Description:
This is an introductory course in nutrition, mainly in the human context but with reference to other mammalian groups as well. Following an overview of the structure and function of the human gut, the course focuses on the macronutrients (carbohydrate, fat, protein and alcohol) and their digestion, absorption and metabolism. The significance of fermentative digestion is considered from a comparative viewpoint. The course concludes with an appraisal of some research techniques relevant to human nutrition. Students also undertake an assessment of their own diet using weighed recording over a seven day period.

Learning Outcomes:
On completion of this module students should be able to:

- List the nutrients and their functions.
- Demonstrate a basic understanding of gut physiology, nutrient digestion and metabolism.
- Describe the major variations encountered in mammalian gut structure and function, and their impact on digestive efficiency.
- Recognise some of the problems encountered in human nutrition studies, as exemplified by the measurement of energy balance.

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	10
Autonomous student learning	70
	110

Module Title:	**Product Development**
Module Code:	**FDSC 30070**
Module Coordinator:	**Dr Amalia Scannell**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:

Prerequisites: Food Microbiology, Sensory Analysis and Food Chemistry I, or equivalents

Description:
This module is an undergraduate course designed for Third Year BScAgr Food Science students. The module consists of a series of practical workshops introducing the general concepts of product and process development combined with a major practical group product development project. The ability to of transfer skills obtained in prescribed third year modules will prove extremely advantageous to the student.

Learning Outcomes:
On completion of this module students should be able to:

- Work effectively as a member of a product development team.
- Conceptualize and formulate a novel food product.
- Determine processing and packaging requirements for the product.
- Prepare product specifications and labeling for the product.
- Write a cohesive group report, comprised of compiled individual contributions, describing the Product Development Process and use library facilities to prepare a literature review.

Workload:	**Approximate Hours:**
Class Contact: Lectures	5
Class Contact: Small Group	6
Class Contact: Practical	-
Specified learning activities	16
Autonomous student learning	93
	120

Module Title:	**Professional Work Experience (PWE)**
Module Code:	**FDSC 30080**
Module Coordinator:	**Dr James Lyng**
Credits:	**5**
Level:	**-**
Semester:	**1 and 2**

Module Dependencies: For students of the BAgrSc (Food Science) degree programme only

Description:

Students will complete a minimum of a 10-week placement in the Food Industry in the summer period following their 3rd year examinations. It is intended that on completion of their PWE placements students will have a greater understanding of the role of the food science professional and a greater appreciation of the relevance of technical information presented to them in their degree course. Students will see the practical application of many subjects, analyses and principles and will also have opportunities to improve their written, oral and communication skills and to practice appropriate professional conduct in the workplace.

Learning Outcomes:
On completion of this module students should be able to:

- Overview their PWE placement and the organisation(s) in which they completed it
- Describe any procedures/analyses they used while on their PWE placement
- Discuss the basic operation of food processing equipment and production lines used while on their PWE placement (relevant to those completing placements in food manufacturing only)
- Demonstrate a clear understanding of other practical issues, which they encountered while on placement (e.g. Cleaning, Service/Maintenance, Economics/Marketing, Health and Safety)

Workload:	**Approximate Hours:**
Class Contact: Lectures	4
Class Contact: Small Group	20
Class Contact: Practical	Not applicable
Specified learning activities	Not applicable
Autonomous student learning	Not applicable
	Not applicable

Module Title:	**Fermented Foods**
Module Code:	**FDSC 40010**
Module Coordinator:	**Dr Amalia Scannell**
Credits:	**5**
Level:	**4**
Semester:	**2**

Module Dependencies:
Prerequisites: Agricultural Chemistry I, Agricultural Chemistry II; Agricultural Microbiology, Food Microbiology II, and Biochemistry Modules; or equivalents

Description:
This module will be taken in the final year of the Food Science degree programme. The course is designed to examine in detail the fermentation processes exploited in selected food systems, the processing steps involved and impact of processing parameters and raw material components on the of the finished fermented products.

Learning Outcomes:
On completion of this module students should be able to:

- Discuss the meaning of the term quality in relation to specific food products.
- Understand the relationship between raw materials, production of fermented foods and the quality of food produced.
- Describe the processes of producing selected fermented foods eg beer and bread and, where relevant, their principle raw materials eg flour and malt.
- Understand the interactions between food components in the products studied.
- Using the above information, troubleshoot problems that may occur during production and storage of fermented food.

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	6
Class Contact: Practical / field trip	3
Specified learning activities: Project /presentation	36
Autonomous student learning	50
	119

Module Title:	**Food Ingredients**
Module Code:	**FDSC 40020**
Module Coordinator:	**Dr Dolores O'Riordan**
Credits:	**5**
Level:	**4**
Semester:	**2**

Module Dependencies:
Prerequisites: Food Chemistry I, Food Chemistry II and Food Process Technology I Modules
Corequisites: Food Process Technology II Module

Description:

This module focuses on food ingredients of greatest commercial interest in the current marketplace. The ingredients selected for study include: dairy ingredients; flavours/seasonings; ingredients to formulate low calorie products including emulsifiers and ingredients with associated health benefits. Factors affecting the functions and applications of these ingredients in food products are examined. The course also focuses on the formulation/development of food products with these ingredients.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the functions of selected ingredients in food products
- Evaluate the impact of processing and end product environment on the functionality of selected ingredients
- Formulate end products using selected ingredients

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	2
Specified learning activities	28
Autonomous student learning	60
	120

Module Title:	**Food Process Technology I**
Module Code:	**FDSC 40030**
Module Coordinator:	**Dr James Lyng**
Credits:	**5**
Level:	**4**
Semester:	**1**

Module Dependencies:
Prerequisites: First Year Mathematics Module(s), Food Science I: Food Physics, Food Engineering Principles
Corequisites: Fresh and Processed Meat Products I; Milk and Dairy Products

Description:

This course will give students a foundation knowledge of key physical operations used in the preservation of foods. The course will underpin other commodity-based courses in the Food Science programme (i.e. Food Ingredients, Fresh and Processed Meat Products I, Milk and Dairy Products and Fermented Foods, which largely focus on chemical aspects of food products and their processing. The course will be delivered in the first semester and examines the theory behind and equipment used in conventional (eg heat processing, freezing, dehydration) and alternative (eg electro heating) physical food preservation methods.

Learning Outcomes:

On completion of this module students should be able to:

- describe the principles behind heat processing, freezing and dehydration operations
- describe the principle of operation of a range of equipment for each unit operation
- apply knowledge to select the most suitable equipment for specific products or situations
- compare and contrast various items of equipment suitable for processing specific products
- calculate the correct answer and units following relatively complex mathematical calculations representative of those which they might be required to perform in an industrial environment

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	
Class Contact: Practical	8
Specified learning activities	12
Autonomous student learning	70
	120

Module Title:	**Food Process Technology II**
Module Code:	**FDSC 40040**
Module Coordinator:	**Dr James Lyng**
Credits:	**5**
Level:	**4**
Semester:	**2**

Module Dependencies:
Prerequisites: First Year Mathematics Module(s), Food Science I: Food Physics, Food Engineering Principles
Corequisites: Food Ingredients, Fresh and Processed Meat Products I; Milk and Dairy Products, Fermented Foods

Description:

This course will give Food Science students foundation knowledge of key non preservative physical operations used in the processing of foods. The course is intended to underpin other commodity-based courses in the Food Science programme (i.e. Food Ingredients, Fresh and Processed Meat Products I, Milk and Dairy Products and Fermented Foods, which largely focus on chemical aspects of food products and their processing. The course considers the theory and equipment used in the main separation (eg evaporation, crystallisation, filtration and centrifugation) and combination (eg mixing and emulsification) operations used in food processing.

Learning Outcomes:
On completion of this module students should be able to:

- describe the principles behind evaporation, centrifugation, filtration, crystallisation & emulsification
- describe the principle of operation of a range of equipment for each unit operation
- apply knowledge to select the most suitable equipment for specific products or situations
- compare and contrast various items of equipment suitable for processing specific products
- calculate the correct answer and units following relatively complex mathematical calculations representative of those which they might be required to perform in an industrial environment

Workload:	**Approximate Hours:**
Class Contact: Lectures	26
Class Contact: Small Group	-
Class Contact: Practical	4
Specified learning activities	12
Autonomous student learning	78
	120

Module Title:	**Food Safety**
Module Code:	**FDSC 40050**
Module Coordinator:	**Professor Séamus Fanning**
Credits:	**5**
Level:	**4**
Semester:	**2**

Module Dependencies: **Prerequisite**: Food Analysis I

Description:

Risk assessment is an integral component of Food Safety. This module presents a structured and detailed description of both defined and emerging risks to public health associated with the modern food chain. Examples of microbial, chemical and other hazards will be provided. Modern scientific approaches to detect and trace zoonotic agents will be presented. Theoretical treatments will be supported by laboratory-based teaching.

Learning Outcomes:

On completion of this module students should be able to:

- Relate the contribution of food borne microorganisms and non-bacterial hazards to the emergence of disease
- Apply modern diagnostic methods for the rapid detection & surveillance along the food chain
- Overview emerging infectious diseases and their impact on public health
- Review the current methods of epidemiological analysis and its relationship to risk assessment

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	24
Specified learning activities	20
Autonomous student learning	57
	125

Module Title:	**Fresh and Processed Meat Products I**
Module Code:	**FDSC 40060**
Module Coordinator:	**Dr Frank Monahan**
Credits:	**5**
Level:	**4**
Semester:	**1**

Module Dependencies:
Prerequisites: First Year Biology and Chemistry module(s); Agricultural Chemistry I, Agricultural Chemistry II; or equivalents

Description:
This course is intended to give students a knowledge of the chemistry of meat and of the technology associated with the handling and processing of meat. The course will cover the structure and composition of muscle and adipose tissue, the principal constituents of meat. The biochemical changes that accompany the post-slaughter conversion of muscle to meat will be dealt with. The chemistry of meat colour, texture and flavour will be studied and the impact of pre-slaughter (diet, production system) and post-slaughter (ageing, environment) factors on these sensory attributes of meat will be evaluated. The chemistry and technology underlying the manufacture of processed meats will be studied. A series of laboratory practicals focussing on the sensory properties of meat and on the manufacture of meat products, will run in tandem with the lectures.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the structure and composition of muscle and adipose tissue
- Explain the biochemical changes that accompany the conversion of muscle to meat
- Identify which meat components contribute to its sensory (colour, flavour, texture) quality and detail the factors (pre- and post-slaughter) which contribute to the variation in each sensory attribute
- Describe the processing steps involved in the production of cured and processed meats products and apply their knowledge of muscle and adipose tissue structure and composition to meat product manufacture
- Explain the role of non-meat ingredients in the manufacture of processed meats

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	12
Specified learning activities	**-**
Autonomous student learning	64
	100

Module Title:	**Marketing**
Module Code:	**FDSC 40070**
Module Coordinator:	**Mr John Staunton**
Credits:	**5**
Level:	**4**
Semester:	**2**

Module Dependencies:

Description:
This module is designed to provide a knowledge and understanding of the role of marketing in a corporate environment, with particular emphasis on the food industry. The course is an introduction to marketing principles and practices covering key marketing theories and their application within the food industry. The course covers elements of the marketing process including: the marketing philosophy; strategic marketing planning; the marketing environment; customer analysis; competitive strategy; segmentation, targeting and positioning; the marketing mix; customer relationship strategy; evaluation of the marketing process. This Principles of Marketing course will be taught through a combination of lectures, applied projects, practical exercises and case studies.

Learning Outcomes:

On complete of this module students should be able to:

- Identify the key marketing concepts and techniques
- Describe the importance of the marketing environment and the potential for environmental change to impact on strategic marketing planning
- Analyse customer buying behaviour and identify the potential for building customer relationships
- Describe the role for effective segmentation, targeting and positioning in building strong brands
- Describe the marketing mix and how the "tools" can be integrated to achieve strategic goals

Learning Outcomes:

On completion of this module students should be able to:

- Identify the key marketing concepts and techniques
- Describe the importance of the marketing environment and the potential for environmental change to impact on strategic marketing planning
- Analyse customer buying behaviour and identify the potential for building customer relationships;
- Describe the role for effective segmentation, targeting and positioning in building strong brands;
- Describe the marketing mix and how the "tools" can be integrated to achieve strategic goals

Workload:	**Approximate Hours:**
Class Contact: Lectures	20
Class Contact: Small Group	10
Class Contact: Practical	-
Specified learning activities	**-**
Autonomous student learning	70
	100

Module Title:	**Milk and Dairy Products**
Module Code:	**FDSC 40080**
Module Coordinator:	**Mr Michael O'Sullivan**
Credits:	**5**
Level:	**4**
Semester:	**1**

Module Dependencies:
Prerequisites: Agricultural Chemistry I, Agricultural Chemistry II, Agricultural Microbiology, Food Chemistry I, Nutrition I, Food Microbiology II, Food Engineering Principles

Description:

The course provides students with the knowledge skills required to pursue a career in the dairy sector. There are two sections, the first deals with the chemistry of milk constituents, in particular their interactions during storage and processing. The second section focuses on the flexibility of milk as a raw material for processing, covering the production of the major products of the Irish and international dairy industry with special emphasis on the impact of raw material quality and processing on final product quality. The course also includes a minor project on a topical issue, to develop the student's group-working and written communications skills.

Learning Outcomes:
On completion of this module students should be able to:

- describe in detail the chemistry of the milk system.
- analyse the interactions of the various milk constituents during processing and storage.
- describe the production of the major dairy products.
- evaluate the impact of important factors, such as variation in raw material composition or variation in processing parameters, on final dairy product quality.
- source evaluate and summarise literature on a topical issue & work effectively in a group.

Workload:	**Approximate Hours:**
Class Contact: Lectures	36
Class Contact: Small Group	
Class Contact: Practical	
Specified learning activities	12
Autonomous student learning	60
	111

Module Title:	**Nutrition II**
Module Code:	**FDSC 40090**
Module Coordinator:	**Dr Desmond Morgan**
Credits:	**5**
Level:	**4**
Semester:	**1**

Module Dependencies: **Prerequisites:** Nutrition I

Description:

This course focuses on the links between foods, diet and general health and well-being. The concept of energy balance and its regulation is examined, and the implications for maintaining stable body weight are considered. The problem of obesity is considered at length, as are the consequential health risks. Undernutrition is also discussed, both general undernutrition, and also specific deficiency conditions associated with the micronutrients. Other diet related conditions are considered such as cancer, food allergies. Finally trends in dietary habits are examined using Irish and UK food consumption data to see if they conform with current dietary guidelines. Each student will prepare an essay on a topical issue in human nutrition

Learning Outcomes:
On completion of this module students should be able to:

- Demonstrate an understanding of body weight regulation
- Recognise the consequences of overnutrition and undernutrition.
- Describe the links between diet and selected diseases

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	10
Autonomous student learning	70
	110

Module Title:	**Project**
Module Code:	**FDSC 40100**
Module Coordinator:	**Professor Brian McKenna**
Credits:	**10**
Level:	**4**
Semester:	**1 and 2**

Module Dependencies:
Prerequisites: Product Development, Food Analysis I, Food Analysis II, Food Chemistry I, Food Chemistry II, Food Microbiology II, Food Engineering Principles; or equivalents.

Description:

The academic staff in the Food Science subject area will provide a list of individual research project titles, each with an accompanying brief description. Each student will be required to choose a project from the list (1 project per student). In conjunction with an academic staff member each student will then identify a research problem within their given topic and will formulate a hypothesis around this problem. In conjunction with an academic staff member a laboratory study to test the hypothesis will be designed and the students will subsequently conduct this study. The students will evaluate the data obtained from the study, will prepare a written report and presentation. The research project will run throughout the first and second semester.

Learning Outcomes:
On completion of this module students should be able to:

- Conduct a literature review to determine what is already known about a research problem
- Manage, organise and plan their time in a laboratory
- Collect and clearly display data representing results of a laboratory study
- Organize and analyse their data in such a way as to provide clear evidence for a conclusion
- Prepare and give presentations using Powerpoint slideshows or acetates
- Communicate in verbal and written terms the meaning of their results and make interpretations and inferences from the data
- Produce a research report which conforms to pre-specified guidelines

Workload:	**Approximate Hours:**
Class Contact: Lectures	1
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	124
Autonomous student learning	125
	250

Module Title:	**Fresh and Processed Meat Products lll**
Module Code:	**FDSC 40110**
Module Coordinator:	**Dr Frank Monahan**
Credits:	**5**
Level:	**4**
Semester:	**1**

Module Dependencies:
Prerequisites: First Year Biology and Chemistry Module(s), Agricultural Chemistry I; or equivalents

Description:
This course is intended to give students a knowledge of the chemistry of meat and of the technology associated with the handling and processing of meat. The course will cover the structure and composition of muscle and adipose tissue, the principal constituents of meat. The biochemical changes that accompany the post-slaughter conversion of muscle to meat will be dealt with. The chemistry of meat colour, texture and flavour will be studied and the impact of pre-slaughter (diet, production system) and post-slaughter (ageing, environment) factors on these sensory attributes of meat will be evaluated. The chemistry and technology underlying the manufacture of processed meats will be studied. Students will be required to conduct a literature review project on a topic of relevance to the course.

Learning Outcomes:
On completion of this module students should be able to:
- Describe the structure and composition of muscle and adipose tissue
- Explain the biochemical changes that accompany the conversion of muscle to meat
- Identify which meat components contribute to its sensory (colour, flavour, texture) quality and detail the factors (pre- and post-slaughter) which contribute to the variation in each sensory attribute
- Describe the processing steps involved in the production of cured and processed meats products and apply their knowledge of muscle and adipose tissue structure and composition to meat product manufacture
- Explain the role of non-meat ingredients in the manufacture of processed meats

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	20
Autonomous student learning	56
	100

Module Title:	**Fresh and Processed Meat Products II**
Module Code:	**FDSC 4017**
Module Coordinator:	**Dr Frank Monahan**
Credits:	**4**
Level:	**4**
Semester:	**1**

Module Dependencies:
Prerequisites: First Year Biology and Chemistry module(s), Agricultural Chemistry I, Agricultural Chemistry II; or equivalents

Description:
This course is intended to give students a knowledge of the chemistry of meat and of the technology associated with the handling and processing of meat. The course will cover the structure and composition of muscle and adipose tissue, the principal constituents of meat. The biochemical changes that accompany the post-slaughter conversion of muscle to meat will be dealt with. The chemistry of meat colour, texture and flavour will be studied and the impact of pre-slaughter (diet, production system) and post-slaughter (ageing, environment) factors on these sensory attributes of meat will be evaluated. The chemistry and technology underlying the manufacture of processed meats will be studied.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the structure and composition of muscle and adipose tissue
- Explain the biochemical changes that accompany the conversion of muscle to meat
- Identify which meat components contribute to its sensory (colour, flavour, texture) quality and detail the factors (pre- and post-slaughter) which contribute to the variation in each sensory attribute
- Describe the processing steps involved in the production of cured and processed meats products and apply their knowledge of muscle and adipose tissue structure and composition to meat product manufacture
- Explain the role of non-meat ingredients in the manufacture of processed meats

Workload:	**Approximate Hours:**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	-
Autonomous student learning	56
	80

Module Title:	**Electives**

Module Code:	**FDSC 2201**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**FDSC 3301**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Modules Coded 'FOR' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Introduction to Forestry**
Module Code:	**FOR 10010**
Module Coordinator:	**Marie Doyle**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies:

Description:
The course will provide an appreciation of the role of the basic sciences in Forestry. A key element of this module will be tree species identification (dendrology). The main forest zones of the world and their tree species characteristics will be outlined.

Learning Outcomes:
On completion of this module students should be able to:

- Demonstrate an appreciation and understanding of the science of Forestry
- Identify the main tree species used in Irish forestry based upon their winter, summer and autumn characteristics
- Summarise the main ecological and silvicultural features of the main forest types found around the world.

Workload:	**Approximate Hours**
Class Contact: Lectures	17
Class Contact: Small Group	
Class Contact: Practical	19
Specified learning activities	32
Autonomous student learning	32
	100

Module Title:	**Forest Mensuration and Biometrics**
Module Code:	**FOR 20030**
Module Coordinator:	**Dr Aine Ni Dhubhain**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prerequisites: Fundamentals of Forestry

Description:

This is an undergraduate course designed for 2nd year BAgrSc forestry students. In the mensuration section of the course the students are introduced to the basic concepts of measuring growth in trees and forests. The methods of measuring the height, diameter and volume of a single tree are outlined. Students are provided with the opportunity to measure these variables in the field using a range of instrumentation. The methods of estimating stand volume using both the tariff and abbreviated tariff systems are described.

In the biometrics section of the course the students are introduced to the basic concepts of statistics as applied to biological data. Students will be shown the appropriate methods of describing different types of biological data. The principles of sampling forest populations are introduced. Using the data collected in the mensuration section of the course, students are shown how to calculate the mean, variance, standard deviation and the standard error of the mean. The steps involved in generating confidence intervals for the population mean from sample data are also outlined. Finally, an introduction to sample size theory is provided.

Learning Outcomes:
On completion of this module students should be able to:

- Measure the height, diameter and volume of felled and standing trees using a range of instrumentation.
- Estimate the volume of a stand of trees using both the tariff and abbreviated tariff systems.
- Summarise, describe and compare data sets using statistical concepts.
- Generate confidence intervals for the population mean using sample data.

Workload:	**Approximate Hours**
Class Contact: Lectures	20
Class Contact: Small Group	
Class Contact: Practical	24
Specified learning activities	10
Autonomous student learning	52
	106

Module Title:	**Fundamentals of Forestry**
Module Code:	**FOR 20040**
Module Coordinator:	**Conor O'Reilly**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: Prerequisites: First Year Chemistry and Biology modules, or equivalents

Description:
This course should provide students with foundation knowledge of the mechanisms of tree growth and development. The course is intended to underpin other forestry courses, especially Principles of Silviculture, Forest Establishment and Silviculture of Forest Stands . Students will study primary and secondary growth of the shoot, including shoot and leaf growth mechanisms and the structure and function of various tissue and cell types. Other areas of study will include: root initiation and development; branch initiation and growth; periderm formation; and whole-plant physiology. Reproductive growth in trees and some practical aspects of seed processing (procurement, seed quality testing, seed regulations, storage and pretreatment) will be examined in detail. The basic principles of forest genetics and tree improvement will also be outlined in this course.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the origin, structure and function of various cell, tissue and organ types found in trees.
- Discuss the impact of environmental factors on growth, development and physiological activity in trees.
- Outline the procedures that need to be followed to ensure that seed quality is maintained during harvesting, processing, and storage.
- Explain the approaches that might be taken to improve forest productivity through genetic manipulation or other tree improvement methods.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	
Class Contact: Practical	16
Specified learning activities	4
Autonomous student learning	64
	108

Module Title:	**Principles of Silviculture**
Module Code:	**FOR 20050**
Module Coordinator:	**Conor O'Reilly**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prerequisites: Fundamentals of Forestry.

Description:
This course should provide students with foundation knowledge of the basic principles of silviculture. The topics covered will include nursery practice, focusing on bare-root and contained nursery culture; and the handling, storage and quality of planting stock. The major soil types found in Irish forestry will be examined and topics such as pedogenic processes, soil organic matter, biogeochemical cycles, soil acidification, diagnosis and treatment of nutrient deficiency, peatlands will be explored. The effect of site and soil factors on forest productivity will be considered.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the main steps involved in culturing tree seedlings in bare-root and container nurseries, with particular emphasis on improving plant quality.
- Discuss the effect of soil physical characteristics and soil biological processes on the nutrient dynamics in a forest ecosystem and extrapolate on the implications for tree nutrition, tree growth and forest productivity.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	
Class Contact: Practical	14
Specified learning activities	10
Autonomous student learning	55
	103

Module Title:	**Forest Establishment**
Module Code:	**FOR 30060**
Module Coordinator:	**Dr Aine Ni Dhubhain**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Fundamentals of Forestry and Principles of Silviculture.

Description:
This course will focus on the key aspects of forest establishment. Methods of ameliorating adverse site conditions will be explored. Species selection for forest sites will be examined and commonly used methods of plant establishment will be outlined including artificial (planting handling, storage, quality and planting methods) and natural regeneration (seed production, seed dispersal, seed germination and plant survival) methods. The course will also consider means of site protection against browsing animals and frost as well of methods of weed control.
Each student must also undertake a case-study examination of a selected site for the purpose of evaluating its potential for afforestation. A development plan for the site, in the form of a written report and including GIS-based maps must be submitted.

Learning Outcomes:
On completion of this module students should be able to:
- Predict the impact of soil and site factors on forest productivity.
- Identify the silvicultural options available to ameliorate adverse site factors.
- Contrast the soil and other silvicultural characteristics and data for the main forest site types found in Ireland and recommend ways of ameliorating silvicultural problems associated with growing trees on such sites.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	
Class Contact: Practical	18
Specified learning activities	8
Autonomous student learning	57
	107

Module Title:	**Forest Harvesting**
Module Code:	**FOR 30070**
Module Coordinator:	**Professor Maarten Nieuwenhuis**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Soil Science 1; Engineering and Surveying; Forest Management.

Description:

This course covers the harvesting machinery and systems used in world forestry, with a special focus in Ireland. A prior knowledge of silviculture, engineering and soils is required, as harvesting interacts closely with each of these. In addition to the coverage of the machinery and systems, a range of topics is discussed that make it possible to evaluate harvesting operations as an integral part of the overall management of forest resources. These topics include systems analysis, terrain analysis, time and motion study, machine costings, harvesting and the environment, ergonomics, and health and safety issues. Timber transportation is also covered in this course.

Learning Outcomes:

On completion of this module students should be able to:

- Describe the range of harvesting machinery and systems in use in Ireland and abroad.
- Recognise factors influencing the effectiveness and efficiency of these machines and systems.
- Evaluate machinery and systems based on the full range of these factors.

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	
Class Contact: Practical	
Specified learning activities	
Autonomous student learning	72
	108

Module Title:	**Forest Inventory and Biometrics**
Module Code:	**FOR 30080**
Module Coordinator:	**Dr Máirtín Mac Siúrtáin**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:
Prerequisites: Proficient use of Microsoft Word, Excel and the library. Forest Mensuration and Biometrics module

Description:
This is a computer skills hands-on forest inventory and biometrics course. The objective is to develop quantitative computer skills for the objective quantification, analysis, interpretation and integration of the composition and dynamics of spatially distributed forest resources.
Concept of yield class, marginal thinning age, age of maximum mean annual increment and biological maturity. Use of yield models for forest management. Thinning types, marginal thinning intensity and normal thinning period and yield. Thinning control.
Volume estimation for inventory purposes using fixed area plots, yield models, stand volume alignment charts, crop form height, point samples and abbreviated tariffing. Application of volume estimation techniques in forest inventory.
Fundamental equation of regression analysis. Method of least squares and parameter estimation. Hypothesis testing and biological interpretation of the analysis of variance (ANOVA). Volume and volume assortment estimation. Theory and application of stratified random, systematic and double sampling. Probability proportional to size (PPS). Probability proportional to prediction (3P). Point sampling. Integration of the statistical methodology within a forest inventory GIS.

Learning Outcomes:
On completion of this module students should be able to:
- Demonstrate hands-on computer competence in the use of:
  Excel v8.0 for creating and analyzing quantitative forest inventory databases and
  Word v8.0 for creating short error-free papers.
- Demonstrate the application of volume estimation and sampling techniques in the forest inventory.
- Demonstrate assimilation of the digital course material with the scientific literature.

Workload:	**Approximate Hours**
Class Contact: Lectures	3 hrs per week for 8 weeks = 24 hrs
Class Contact: Small Group	
Class Contact: Practical	2 hrs per week for 8 weeks = 16 hrs
Specified learning activities	4 hrs per week for 8 weeks = 32 hrs
Autonomous student learning	4 hrs per week for 8 weeks = 32 hrs
	104

Module Title:	**Forest Management**
Module Code:	**FOR 30100**
Module Coordinator:	**Professor Maarten Nieuwenhuis**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
Prerequisites: Agricultural Economics and Business; Business Management; Fundamentals of Forestry.

Description:
This is an undergraduate course designed for third year BAgrSc Forestry students. It focuses on concepts and analytical tools associated with decision making in the sustainable management of forest resources. In the first part of the course the financial and economic criteria for forest valuation and management are introduced, including discount rate, price-size relationship, net discounted revenue, land expectation value and the valuation of non-market inputs and outputs.
This knowledge is then used to develop procedures to deal with problems such as land valuation, rotation length determination, investment appraisal, and sustained yield calculations.
In addition, areas such as the historical development of forest management in Ireland and Europe, the environmental, socio-economic and production functions of the forest, the types of rotation, and the administrative and territorial organisation of forests are examined. The concepts behind the preparation of management plans are also included.

Learning Outcomes:
On completion of this module students should be able to:

- Explain the basic principles of sustainable forest management.
- Carry out a range of financial and economic calculations as used in the strategic, tactical and operational decision making in commercial forest management.
- Recognise the significance of the range of market and non-market values in the management of specific forest resources.
- Select and evaluate potential management options aimed at specific management objectives.

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	-
Autonomous student learning	72
	108

Module Title:	**Professional Work Experience**
Module Code:	**FOR 30180**
Module Coordinator:	**Dr Aine Ni Dhubhain**
Credits:	**10**
Level:	**-**
Semester:	**2**

Module Dependencies:
Prerequisites: Forest Establishment, Forest Management, Forest Protection, Wood Science
Corequisites: Forest Harvesting, Forest Inventory and Biometrics and Silviculture of Forest Stands.

Description:
Every forestry student is required to acquire professional experience in a working forestry environment during the period between the end of second semester in the Third year and the beginning of the first[t] semester in the Fourth Year. Professional work experience gained prior to this period may also be considered for credit. The work experience may include work in any aspect of forestry and related activities (wood processing, amenity etc.). Work experience in forest research will also be considered. Students' initiative to organize work experience within the private forest sector, both in Ireland and abroad, is encouraged. In all cases the student must seek approval for their programme from the module coordinator.

Learning Outcomes:
On completion of this module students should be able to:

- Demonstrate a working knowledge of the routine manual tasks involved in some sections of forestry and/or in the forestry research environment and/or an appreciation of the steps involved in the wood processing chain.
- Evaluate the problems faced and the decisions made by professional foresters in the day-to-day management of forest resources.
- Apply and develop ideas in relation to the sectors of forestry they might want to make their career in.

Workload:	**Approximate Hours**
Class Contact: Lectures	
Class Contact: Small Group	
Class Contact: Practical	
Specified learning activities	
Autonomous student learning	

Module Title:	**Remote Sensing and GIS**
Module Code:	**FOR 30190**
Module Coordinator:	**Dr Máirtín Mac Siúrtáin**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: proficient use of Microsoft Word, Excel and the library.

Description:

This is a computer skills hands-on remote sensing and Geographic Information Systems (RSGIS) course. The objective is to develop quantitative RSGIS computer skills for the quantification, analysis and interpretation of spatially distributed resources.

Fundamental concepts of RSGIS and Global Positioning Systems (GPS) are outlined. Digital interpretation of Ordnance Survey raster maps and orthophotos. Development of hands-on RSGIS computer skills of point, line and polygon theme and attribute table creation within ArcView 3.2a and or ArcGIS v8.2.

Remote sensing skills of image enhancement and integration. GIS skills of joining external dBase files to theme attribute tables. Building GIS queries. Integration of vector, raster and attribute GIS databases. Specification of GIS database structure. Digital area and perimeter estimation.

Application of remote sensing and GIS in forest, agricultural and environmental spatial resource inventory. Applications of GIS in spatial inventory, design and planning in Forestry and applied environmental sciences. Ground survey. Remote sensing GIS exercises using ArcView 3.2a and or ArcGIS v8.2 and creation of scientific papers based on the exercises.

Learning Outcomes:
On completion of this module students should be able to:

- Demonstrate hands-on computer competence in the use of:
  ArcView 3.2a and or ArcGIS v8.2.for creating GIS projects, Excel v8.0 for creating databases and Word v8.0 for creating short error-free papers.
- Demonstrate the application of your remote sensing and GIS computer skills in forest, agricultural and environmental spatial resource inventory.
- Demonstrate assimilation of the digital course material with the scientific literature.

Workload:	**Approximate Hours**
Class Contact: Lectures	2 hrs per week for 8 weeks = 16 hrs
Class Contact: Small Group	
Class Contact: Practical	2 hrs per week for 8 weeks = 16 hrs
Specified learning activities	4 hrs per week for 8 weeks = 32 hrs
Autonomous student learning	5 hrs per week for 8 weeks = 40 hrs
	104

Module Title:	**Silviculture of Forest Stands**
Module Code:	**FOR 30200**
Module Coordinator:	**Dr Aine Ni Dhubhain**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:
Prerequisites: Fundamentals of Forestry; Principles of Silviculture; Forest Establishment.

Description:
This course will focus on the more applied aspects of silviculture, building on the principles introduced in Fundamentals of Forestry and Principles of Silviculture and other courses. Silvicultural systems (high forest, clear-cutting, shelterwood, strip and group, selection, and continuous cover systems) will form a major part of the course. The effects of tree spacing, thinning, and pruning on individual tree growth and stand growth parameters will be examined. The role of forest protection, especially wind and fire on silvicultural practices will be considered. Students will visit a large range of forest sites (representing most of the important soil groups and site types found in Ireland) during a study tour. Students must submit a report on an assigned problem, based primarily on observations made during the tour.

Learning Outcomes:
On completion of this module students should be able to:
- Summarise the main components of the various silvicultural systems used in forestry.
- Predict the effect of spacing, thinning and pruning operations on tree growth and stand development.
- Assess the potential effects of various hazards (such as wind, and fire) on forest productivity and prescribe silvicultural approaches to reduce these risks.

Workload:	**Approximate Hours**
Class Contact: Lectures	22
Class Contact: Small Group	-
Class Contact: Practical	24
Specified learning activities	10
Autonomous student learning	56
	112

Module Title:	**Wood Science**
Module Code:	**FOR 30220**
Module Coordinator:	**Dr Aine Ni Dhubhain**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
Prerequisites: First Year Chemistry and Physics modules; Fundamentals of Forestry.

Description:

This is an undergraduate course designed for 3rd year BAgrSc Forestry students. The structure of wood and identification will be dealt with. The links between the structure of wood and wood density, wood strength and the moisture content of wood will be examined and the factors influencing these properties will be outlined. The chemical structure of wood will also be described. The durability of wood is examined and the methods of preserving wood described. The drying of wood is also considered.

In the course, the technology used in sawmills to process wood will be outlined. The techniques involved in producing the range of wood-based panels manufactured in Ireland will be described. In addition, the course will provide students with an overview of the timber processing industry in Ireland.

Learning Outcomes:
On completion of this module students should be able to:

- List and describe the wood cell types and wood types found in softwoods and hardwoods
- Define the main properties of wood and describe the physical and chemical factors that influence these properties.
- Describe the main processes involved in sawing timber and manufacturing wood-based panels.
- Outline the key characteristics of the wood processing industry in Ireland.

Workload:	**Approximate Hours**
Class Contact: Lectures	24
Class Contact: Small Group	-
Class Contact: Practical	16
Specified learning activities	8
Autonomous student learning	56
	104

Module Title:	**Experimental Design**
Module Code:	**FOR 40030**
Module Coordinator:	**Dr Máirtín Mac Siúrtáin**
Credits:	**5**
Level:	**4**
Semester:	**2**

Module Dependencies: Prerequisites proficient use of Microsoft Word, Excel and the library.

Description:

This is an advanced computer skills hands-on experimental design course. The objective of this course is to develop applied quantitative computer skills for the transparent design, independent analysis and interpretation of data from elementary univariate experimental designs.

Topics covered include: Basic concepts of experimentation, treatments, spatial layout of experimental units, response variables and hypothesis testing. Review of the two-sample t tests and the fundamental equation of analysis of variance (ANOVA). Underlying assumptions.

Analysis, interpretation and reporting of data from univariate experimental designs including: the completely randomized, the randomized block, the Latin square and factorial designs. Hypothesis testing of main and interaction effects. Concept of repeated measures designs and autocorrelation. The role of simultaneous inference using Scheffé, Tukey and Student-Newman-Keuls multiple range tests.

Independent verification of analyses using the Data Analysis Tools in Microsoft Excel.

Transparent and independent analysis, interpretation and reporting of data from elementary experimental designs in exercises and from applied experimental design textbooks.

Learning Outcomes:
On completion of this module students should be able to:

- Demonstrate hands-on computer competence in the use of: Excel v8.0 for analyzing data from elementary experimental designs from first principles and using the Data Analysis Tool and the use of Word v8.0 for creating short error-free papers.
- Demonstrate an understanding of independent analysis, interpretation and reporting data from experimental designs in forestry, food science and environmental resource management.
- Demonstrate assimilation of the course material with the scientific literature.

Workload:	**Approximate Hours**
Class Contact: Lectures	3 hrs per week for 8 weeks = 24 hrs
Class Contact: Small Group	-
Class Contact: Practical	2 hrs per week for 8 weeks = 16 hrs
Specified learning activities	4 hrs per week for 8 weeks = 32 hrs
Autonomous student learning	4 hrs per week for 8 weeks = 32 hrs
	104

Module Title:	**The Biology, Silviculture and Management of Sitka Spruce**
Module Code:	**FOR 30030**
Module Coordinator:	**Conor O'Reilly**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
Prerequisites: Principles of Silviculture, Forest Establishment, Silviculture of Forest Stands.

Description:

This elective module will allow students to study the biological and silvicultural characteristics of Sitka spruce in more details than was possible in other courses and the implications of these for forest management. Study topics will include some of the following: the distribution, climate, associated species, soils, ecology and taxonomy of Sitka spruce in North America; the impact of seed factors (including seed origin) on forest productivity; forest tree improvement; nursery cultural practices and planting stock quality; the physiological characteristics of Sitka spruce (at the individual tree and stand levels); wood quality; the role of site factors and tree nutrition on productivity; and the impact of pests and diseases on the health of Sitka spruce stands.

Learning Outcomes:
On completion of this module students should be able to:

- Summarise the key biological and silvicultural characteristics of Sitka spruce.
- Explain the basis for the frequently extraordinary high productivity of the species in Irish forestry.

Workload:	**Approximate Hours**
Class Contact: Lectures	12
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	64
Autonomous student learning	24
	100

Module Title:	**Forest Policy and Law**
Module Code:	**FOR 30110**
Module Coordinator:	**Dr Aine Ni Dhubhain**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:

Description:
Elective.
This course provides an outline of forest policy in Ireland. The impact of EU forest policy on Irish forest policy is also considered. The historical development of forestry in Ireland is detailed and the impact of the policy of successive Irish governments on the development of the forestry sector in Ireland is described. The interaction between agricultural and environmental policy and forest policy is outlined. Forestry legislation and forestry taxation is reviewed is detail.

Learning Outcomes:
On completion of this module students should be able to:
- Outline the historical development of forestry in Ireland.
- List the key elements of forestry legislation and taxation.
- Explain the interaction between forest policy and agricultural and environmental policy.

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	-
Autonomous student learning	72
	108

Module Title:	**Forest Tree Improvement**
Module Code:	**FOR 30130**
Module Coordinator:	**Conor O'Reilly**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisite: Fundamentals of Forestry

Description:
Elective.
This course will provide students with the opportunity to obtain a deeper understanding of the role of tree improvement in forestry than gained during the introductory elements of the topic presented in Fundamental of Forestry. Students will study various tree improvement topics, including population genetics, tree improvement strategies and constraints to tree improvement.

Learning Outcomes:
On completion of this module students should be able to:

- Discuss how genetic differences in traits of economic importance can be exploited to improve forest productivity.
- Explain the effects of biological and other constraints on the development of a tree improvement programme for selected species.

Workload:	**Approximate Hours**
Class Contact: Lectures	12
Class Contact: Small Group	
Class Contact: Practical	
Specified learning activities	64
Autonomous student learning	24
	100

Module Title:	**Multi-Purpose Forest Management**
Module Code:	**FOR 30150**
Module Coordinator:	**Professor Maarten Nieuwenhuis**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
Prerequisites: Forest Management; Principles of Silviculture; Forest Establishment; Silviculture of Forest Stands.

Description:
Elective.
The course consists of an overview of principles and problems associated with multiple purpose management, i.e. with the simultaneous use of a forest area for two or more purposes, often in some measure conflicting. Methods of assessing a range of non-timber values, such as forest recreation, landscape, biodiversity and conservation, are discussed. Decision-support tools to produce multiple use management prescriptions will also be covered.

Learning Outcomes:
On completion of this module students should be able to:

- Describe the basic principles of multiple purpose management.
- Explain a range of non-timber valuation methodologies.
- Produce multiple purpose management prescriptions.

Workload:	**Approximate Hours**
Class Contact: Lectures	12
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	48
Autonomous student learning	40
	100

Module Title:	**Electives**
Module Code:	**FOR 2201**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**FOR 3301**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Forest Management Plan**
Module Code:	**FOR 4003**
Credits:	**12**
Semester:	**1 and 2**

Description:
Each student must undertake a case study of an actual forest area and, in compliance with stated economic, social and environmental objectives, produce a written management plan for a prescribed period based on sustainable forest management (SFM) principles. The plan will incorporate a description of the site, including both timber and non-timber aspects, based on the results of Forest Inventory and GIS (FOR 4006). Using SFM criteria and multi-criteria decision-support software, each student will carry out an analysis of the data, resulting in detailed prescriptions relation to yield regulation, harvest scheduling, silvicultural practices, forest protection, and environmental, cultural and social indicators. A financial analysis of the plan should also be included.

Module Title:	**Forest Planning**
Module Code:	**FOR 4004**
Credits:	**6**
Semester:	**1**

Description:
Principles of forest planning. Methods of planning. The fundamentals of decision-making. Applications of decision-making techniques to forest management. Decision Theory and Decision Trees: expected value of perfect information; utilities and decision-making under conditions of risk and uncertainty; sensitivity analysis; sequential decisions; decision trees; dynamic programming. Capital Budgeting: evaluation and ranking of investment proposals for purchase and replacement of harvesting equipment. Break-Even Models in Forest Harvesting: graphic and algebraic solutions; use of break-even analysis in forestry. Linear Programming: applications in harvest scheduling and yield regulation, forest road construction and transhipment problems. Integer and goal programming. Network Analysis in Forest Harvesting: transportation networks; minimum flow, shortest distance, minimum spanning tree. Project Management: critical path method; project evaluation and review technique, project crashing. Inventory Control in Forestry: the economic order quantity model; quantity discounts; production lot size model.

Module Title:	**Experimental Design**
Module Code:	**FOR 4005**
Credits:	**4**
Semester:	**2**

Description:
The objective is to develop applied quantitative computer skills for the transparent design, analysis and interpretation of data arising from elementary univariate experimental designs.
Basic concepts of experimentation, treatments, spatial layout of experimental units, response variables and hypothesis testing. Review of the two-sample t tests, the fundamental equation of analysis of variance (ANOVA) and the underlying assumptions.
Analysis, interpretation and reporting of data from univariate experimental designs including: the completely randomized, the randomized block, the Latin square and factorial designs with and without replication. Hypothesis testing of main and interaction effects. Concepts of repeated measures designs and autocorrelation.
Concept of simultaneous inference using Scheffé, Tukey and Student-Newman-Keuls multiple range tests.
Transparent analysis, interpretation and reporting of data arising from elementary experimental designs. This is an advanced hands-on computer skills experimental design module. Papers will be produced for a series of exercises.
Software: ESRI ArcView 3.2a. Microsoft Office 2000: Word, Excel. Novell Applications Launcher (NAL) under Windows 2000.

Module Title:	**Forest Inventory and GIS**
Module Code:	**FOR 4006**
Credits:	**10**
Semester:	**1**

Description:

An inventory is carried out of an environmentally sensitive commercial forest estate as a group exercise. The group will objectively quantify the spatial distribution, composition and dynamics of the forest resources including the growing stock, the roads, the water, the soils and the vegetation.

Spatial distribution: Digital interpretation of OS raster maps, orthophotos and satellite imagery. Digital creation and updating of integrated vector, raster and attribute forest inventory GIS databases in ArcView 3.1. Digital polygon, line and point theme updating of external, compartment and subcompartment boundaries, forest road, watercourse and sample point locations.

Spatial composition: Creation of a sampling area frame and specification of a sampling methodology.

Application of stratified random sampling in the forest. Estimation of the diameter distribution, the parameters of the volume-basal area relationship, the volume, assortment and value distribution at plot, subcompartment and stratum levels.

Creation and analysis of plot, subcompartment and strata attribute databases in Microsoft Excel including quantification of the associated precision of the estimates.

Spatial dynamics: Creation and analysis of the spatial dynamics database of forest growing stock parameters including planting year, age, top height, general yield class, average growing stock, marginal thinning age and age of maximum mean annual increment.

Joining selected components of the spatial distribution and dynamic databases as dbf files to selected themes within ArcView 3.1. Creation and printing of maps of the main forest parameters from the GIS.

Reporting: Production and presentation of two forest inventory and GIS reports. The first report should concentrate on the methodology used with numerous illustrative examples. The second report should present the forest inventory and GIS results for the entire forest including interoperation of the results and digital databases.

Software: ESRI ArcView 3.2a. Microsoft Office 2000: Word and Excel. Novell Applications Launcher (NAL) under Windows 2000.

Module Title:	**Research Project**
Module Code:	**FOR 4051**
Credits:	**16**
Semester:	**2**

Description:
Each student must undertake an approved project and write a dissertation . Projects may be from any of the following forestry areas: Forest Zoology, Forest Soils, Forest Chemistry, Forest Botany, Forest Economics, Forest Engineering, Forest Mensuration, Forest Management, Silviculture, Plant Pathology, Wood Technology, Wood Anatomy, Forest Harvesting and Forest Products.
The student will write a dissertation on the approved topic.
The project will normally consist of:
A literature review.
A laboratory or field study.
Supporting course work if available and appropriate.
Written report or dissertation.
The dissertation must be lodged with the Forestry Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**FOR 4100**
Credits:	**12**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 12. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Forest Roads**
Module Code:	**FOR 4109**
Credits:	**2**
Semester:	**1**

Description:
Forest road location and construction will be covered. The interaction between plantation design and road network layout will be analysed. Examples of computer-aided road network location will be discussed. Road construction methods, road building materials and equipment will be covered.

Module Title:	**Agro-Forestry**
Module Code:	**FOR 4125**
Credits:	**2**
Semester:	**1**

Description:
Classification and concepts, silvoarable, silvopastoral, windbreaks, tropical agro-forestry, economics of agro-forestry systems.

Module Title:	**Forestry in Europe**
Module Code:	**FOR 4129**
Credits:	**2**
Semester:	**1**

Description:
The module will consist of an in-depth analysis of the forestry sector in a number of selected European countries. This analysis will include the resources and their use, the silvicultural systems, forest production, forest economics, management and policy. The main current conflicts and challenges facing forestry in each country are also discussed.

Module Title:	**Sustainable Forest Management**
Module Code:	**FOR 4130**
Credits:	**2**
Semester:	**1**

Description:
The legal framework; the economic and policy framework; criteria and indicators; measures; certification.

Module Title:	**Elective Essay I**
Module Code:	**FOR 4132**
Credits:	**2**
Semester:	**1 or 2**

Description:
Individual students write a minor (2-credit) essay on an approved topic in Forestry, under the guidance of one of the Forestry staff members.

Module Title:	**Elective Essay II**
Module Code:	**FOR 4133**
Credits:	**4**
Semester:	**1 or 2**

Description
Individual students write a major (4-credit) essay on an approved topic in Forestry, under the guidance of one of the Forestry staff members.

Modules Coded 'HORT' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Introduction to Horticulture Landscape and Sportsturf Management**
Module Code:	**HORT 10010/1901**
Module Coordinator:	**Professor Michael Hennerty**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies: None

Description:

This module will provide an introduction to the study of Horticulture Landscape and Sportsturf Management at university level and will also serve as an introduction to horticulture world-wide. Ten horticultural sectors (eg Sportsturf Management, Plant Technology) will be covered by lectures and or site visits and students will be directed to background material which will enable them to complete a brief report on each sector.

Learning Outcomes:

On completion of this module students should be able to:

- Develop a working relationship with a number of staff in Horticulture Landscape and Sportsturf Management;
- Use the Library and other on-campus resources in searching for information.
- Demonstrate report writing skills

Workload:	**Approximate Hours:**
Class Contact: Lectures	12
Class Contact: Small Group	
Class Contact: Practical	15
Specified learning activities	40
Autonomous student learning	35
	102

Module Title:	**Fundamentals of Horticulture 1**
Module Code:	**HORT 20020**
Module Coordinator:	**Professor Michael Hennerty**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies:

Description:

This course taken in second year, introduces students to fundamental horticultural principles and concepts. Pollination and fertilisation principles will be covered. Students will practice classic techniques such as propagation from seed, cuttings, grafting and budding.

Introduction to the functional and ornamental uses of vegetation on the Belfield campus and elsewhere. Examination of selected planting schemes on campus. Practical sessions include planting and post planting management of plants.

Learning Outcomes:

On completion of this module students should be able to:

- Propagate selected plants from seed or vegetatively.
- Critically review and evaluate experimental data captured from practical sessions on propagation of plants.
- Prune ornamental and fruit plants
- Describe the function and ornamental uses of vegetation
- Evaluate planting schemes in rural and urban landscapes

Workload:	**Approximate Hours:**
Class Contact: Lectures	20
Class Contact: Small Group	20
Class Contact: Practical	15
Specified learning activities	25
Autonomous student learning	36
	116

Module Title:	**Fundamentals of Horticulture 2**
Module Code:	**HORT 20030**
Module Coordinator:	**Dr Alan Hunter**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Co-requisites: Soil Science I, Physiological Plant Ecology

Description:

Topics covered are earthworks, primary, secondary and tertiary drainage systems. Drainage systems for golf courses, parklands, open spaces, athletic fields, bowling greens, tennis courts, cricket squares and racecourses; Gravel and sand particle size analysis and geometry and its agronomic importance in rootzones. Irrigation system design and installation in sportsturf. Topics also include the importance of site selection for plant production; the influence of supplementary, photoperiodic and cyclic light on plant development. Growing substrates and conductivity, greenhouse irrigation systems. Students will be introduced to the regulatory framework governing Plant Protection products and the quality of horticultural produce.

Learning Outcomes:

On completion of this module students should be able to:

- Evaluate different drainage and irrigation plans and systems for specific sporting facilities and develop site specific recommendations
- Show how sports pitches are constructed to different required specifications and standards
- Explain the importance in site selection and evaluation in production horticulture
- Evaluate and compare commercially used horticultural lighting systems
- Describe and discuss commercially used horticultural substrates

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	
Class Contact: Practical	10
Specified learning activities	36
Autonomous student learning	42
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Module Title:	**History of Designed Landscape and Sociology**
Module Code:	**HORT 20040**
Module Coordinator:	**Dr Mary Forrest**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: None

Description:

The *History of Designed Landscape* section considers how from earliest times, parks and gardens have been influenced by the environment, both social and natural, in which they were created.

The *Sociology* component is designed to give second year students an appreciation of the social environment in which they live and will work.

Learning Outcomes:

On completion of this module students should be able to:

- Distinguish the characteristics of each period in landscape design history and assess how they influenced later styles.
- Show how cultural, geographic and historical factors have influenced designed landscapes of the past.
- *Define key sociological terms that are used in every day language, often incorrectly, such as society, culture, development, values, socialism, capitalism, globalisation, poverty, racism etc;*
- Discuss the development of Irish society and analyse distinguishing features in this development.

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	5
Specified learning activities	15
Autonomous student learning	60
	110

Module Title:	**Elements of Landscape Design**
Module Code:	**HORT 30020**
Module Coordinator:	**Dr Mary Forrest**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies:

Description: This is an introduction to Landscape Design Theory for those who are not majoring in Landscape Architecture. Topics discussed in lectures and in a series of short design exercises are the design process from inception to completion and the use of the materials of the designed landscape. Students prepare landscape design proposals for a site on or near the Campus.

Learning Outcomes:
On completion of this module students should be able to

- Demonstrate a comprehension of the landscape design process.
- Prepare a landscape design plan for a small site.

Workload:	**Approximate Hours:**
Class Contact: Lectures	10
Class Contact: Small Group	
Class Contact: Practical	30
Specified learning activities	40
Autonomous student learning	30
	110

Module Title:	**Garden Centre Management**
Module Code:	**HORT 30030**
Module Coordinator:	**Dr Alan Hunter**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
Prerequisites: Agricultural Economics and Business, Business Management Modules

Description:

Lecture topics cover the nature and scope of the business, garden centre design, establishing a garden center, customer base establishment. The impact of image, effective product promotion, price, display, marketing, merchandising, signage and management. Tangible and intangible marketing strategies and store theatre. Other topics covered include managing your store and business together with increasing customer numbers and spend.

Learning Outcomes:
On completion of this module students should be able to:

- Outline the components of and discuss the requirements for establishing a garden centre
- Identify key business development and promotional strategies to increase the customer base and spend
- Describe strategies to effectively manage a garden center business
- Evaluate formulae to maximize product promotion and sale
- Develop and analyse retail business strategies

Workload:	**Approximate Hours:**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	10
Specified learning activities	30
Autonomous student learning	35
	105

Module Title:	**Landscape Management**
Module Code:	**HORT 30040**
Module Coordinator:	**Dr Mary Forrest**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: None

Description:
The topics discussed are tree selection, pre and post planting practices, tree surveys and tree surgery. Weed establishment and control in the landscape.
Functions and preparation of landscape management plans.
The beneficial and detrimental effects of plants in the urban landscape.

Learning Outcomes:
On completion of this module students should be able to:

- Assess and prepare management plans for amenity landscapes.
- Undertake a tree survey
- Discuss various management strategies to assist the establishment of vegetation in hostile urban situations
- Identify and evaluate different weed management strategies

Workload:	**Approximate Hours:**
Class Contact: Lectures	26
Class Contact: Small Group	-
Class Contact: Practical	20
Specified learning activities	12
Autonomous student learning	50
	108

Module Title:	**Plant Materials**
Module Code:	**HORT 30050**
Module Coordinator:	**Dr Mary Forrest**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Fundamentals of Horticulture 1

Description:

An introduction to the general range of trees and shrubs, perennials and bulbous plants used in public and private residential landscape schemes in urban and rural areas. Learn how to identify them, how and where they can be used in planting design and how they are cultivated and maintained. This course follows from an examination of the functional and ornamental uses of vegetation in the landscape taken in 2nd Year as part of Fundamentals of Horticulture and is linked in particular with the courses Landscape Management and Landscape Design Studio.

Learning Outcomes:

On completion of this module students should be able to

- Select plant materials for a range of situation encountered in the natural and man made landscape
- Prescribe management practices for a range of planting schemes, such as ground cover schemes, climbers, amenity trees and roses
- Assess the suitability of existing and proposed vegetation for a range of situations.

Workload:	**Approximate Hours:**
Class Contact: Lectures	20
Class Contact: Small Group	
Class Contact: Practical	16
Specified learning activities	22
Autonomous student learning	52
	110

Module Title:	**Pomology**
Module Code:	**HORT 30060**
Module Coordinator:	**Professor Michael Hennerty**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:

Description:

Fruit production, emphasising management practices and practical manipulations for the important top and soft fruits. The lectures cover aspects such as site, cultivar and systems selection, diagnosis and adjustment of nutritional status and the use of physical and chemical cultural aids. Practical sessions are devoted to clone propagation, pruning and management of fruit species and cultivars and to the organisation of the harvesting, handling and marketing operations.

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

- Recognise main fruit species, systematically and identify some fruit cultivars;
- Explain how plant and fruit physiologies interact;
- Apply the main management techniques;
- Determine and manipulate nutrient levels using leaf standards;
- Organise a fruit harvest

Workload:	**Approximate Hours:**
Class Contact: Lectures	20
Class Contact: Small Group	
Class Contact: Practical	16
Specified learning activities	25
Autonomous student learning	50
	111

Module Title:	**Professional Work Experience**
Module Code:	**HORT 30070**
Module Coordinator:	**Dr Owen Doyle**
Credits:	**10**
Level:	**-**
Semester:	**2**
Module Dependencies: None	

Description:

Students are required to find employment in an area related to Horticultural Science, for example in a laboratory, food production or supply business, garden center or nursery, golf course or other sports turf facility or other approved location. Students must complete a monthly diary and journal of their activities. Students may undertake one or two placements and travel abroad is encouraged. There are opportunities to participate in exchange programmes to Europe and the United States. In all cases students must seek approval for their programmes from the Professional Work Experience Co-ordinator. Work placement is taken between April and August and of is 16 – 20 weeks duration.

Learning Outcomes:

On completion of this module students should be able to:

1. Relate course work with professional work experience.
2. Identify a particular area of interest for Fourth Year research project.
3. Demonstrate a use of a wide range of professional competencies.
4. Demonstrate an awareness of career directions and opportunities for graduates

Workload:	**Approximate Hours:**
Class Contact: Lectures	
Class Contact: Small Group	
Class Contact: Practical	
Specified learning activities	
Autonomous student learning	
	Not applicable

Module Title:	**Protected Horticulture**
Module Code:	**HORT 30080**
Module Coordinator:	**Dr Owen Doyle**
Credits:	**5**
Level:	**3**
Semester:	**2**
Module Dependencies:	**Prerequisites:** Cell and Plant Biology or equivalent

Description:

The focus for this course is the production of food crops under protection. National and international production, distribution, retailing and consumption patterns are reviewed for selected crops. Factors involved in the production of the principle protected food crops and selected alternative food crops are studied. Emphasis is given to the production of quality produce. There is particular emphasis given to the system approach to programmed growing for long season production and the application of recent technology and research findings. Industry Codes of Practice and Quality programmes will be examined.

Learning Outcomes:

On completion of this module students should be able to:

1. Describe the principles and methods of production for the major protected food crops produced in Ireland and northern Europe.
2. Critically review and evaluate data from scientific, technical and industry sources for the key factors affecting individual crops.

Workload:	**Approximate Hours:**
Class Contact: Lectures	28
Class Contact: Small Group	
Class Contact: Practical	16
Specified learning activities	14
Autonomous student learning	52
	110

Module Title:	**Vegetable Production**
Module Code:	**HORT 30100**
Module Coordinator:	**Dr Owen P.E. Doyle**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites: Physiological Plant Ecology, Soil Science 1 or equivalents

Description: This is a course on field scale vegetable crop production. Students will examine the vegetable industry nationally and internationally and critically evaluate the current topics impacting on this sector. Students will study the consumption patterns and trading practices for fresh and prepared produce. Particular emphasis will be given to the influence of global fresh produce supply systems, retailing strategies and food safety/quality systems. Students study the principles and practices of vegetable production and management for the fresh and value added markets. The course will emphasise cultural techniques, growing programmes, harvesting methodologies and quality systems for selected tuber, root, cole, and brassica crops. Industry Codes of Practice and Quality programmes will be examined

Learning Outcomes:

On completion of this module students should be able to:

- Describe the nature, structure and principles of production, supply and retailing of fresh and value added vegetable products.
- Critically review and evaluate data on the key influences; primary crop requirements, food safety, quality assurance, environmental sustainability, market demands/consumer trends, demographic changes and globalisation impacting the production and supply of vegetable produce.
- Describe the principles of production, of the major field vegetable crops produced in Ireland. Create cropping plans and evaluate quality attributes for commercial field vegetable crops.

Workload:	**Approximate Hours:**
Class Contact: Lectures	28
Class Contact: Small Group	
Class Contact: Practical	14
Specified learning activities	14
Autonomous student learning	52
	108

Module Title:	**Professional Work Experience**
Module Code:	**HORT 30070**
Module Coordinator:	**Dr Mary Forrest**
Credits:	**10**
Level:	**-**
Semester:	**2**

Module Dependencies: None

Description:

In the months April to August, Third Year students are required to find employment in an area related to Landscape Architecture. A placement in a landscape design office of a private company or a local authority is recommended. Students must complete a monthly diary and journal of their activities. Students may undertake one or two placements. Travel abroad is encouraged and there are opportunities to participate in exchange and or intern programmes to Europe and North America. In all cases students must seek approval for their programmes from the Professional Work Experience Co-ordinator. Placements should be of 16 – 20 weeks duration.

Learning Outcomes:

On completion of this module students should be able to:

- Relate course work with professional work experience.
- Identify a particular area of interest for 4th Year research project.
- Demonstrate a use of a wide range of professional competencies.
- Demonstrate an extended awareness of career directions and opportunities for graduates.

Workload:	**Approximate Hours:**
Class Contact: Lectures	-
Class Contact: Small Group	-
Class Contact: Practical	-
Specified learning activities	-
Autonomous student learning	-
	-

Module Title:	**Electives**
Module Code:	**HORT 2201**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 24. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**2202**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**HORT 3302**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**HORT 3303**
Credits:	**10**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 10. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Landscape and Turfgrass Management II**
Module Code:	**HORT 4003**
Credits:	**4**
Semester:	**2**

Description:
Turfgrass Management
This module will deal with the taxonomy and physiology of amenity and sports turfgrass, grass identification; choosing grasses for turf use; seed quality and mixtures for intensive/non-intensive use; seeding versus turfing.
Cultural practices to include earthworks, grading, drainage and construction of sports pitches, bowling greens, tennis courts, golf courses and artificial playing surfaces. Mechanisation to include mechanical operations – mowers and mowing, aeration and equipment, thatch removal and control, top dressing applicators, irrigation and irrigation systems, line marketing and methods, rolling and its effects.
Fertilizer and lime application, running repairs and renovation, maintenance of specific areas.
Pest, disease and weed control in turf – cultural and chemical methods.

Module Title:	**Nursery/Garden Centre Management II**
Module Code:	**HORT 4004**
Credits:	**4**
Semester:	**1**

Description:
Garden Centre Management
The module details the practices and methods used in retailing and marketing of green, dry and speciality goods. Topics covered include – garden centre design and its impact on customer flow; garden centre layout; product age and merchandising. The display of plants in the plantaria, A to Z; plant function/themes; pricing, pricing strategy, price position; plant labelling, computer labelling, label ledge systems; signage, Kendrew signs, information points, demonstration gardens, computerised point of sale equipment, bar codes, selling strategy and selling aids; the role of advertising and training. Garden centre security and security systems. The course will be supplemented by visits to selected production tree and shrub nurseries and garden centres.

Module Title:	**Pomology II**
Module Code:	**HORT 4005**
Credits:	**4**
Semester:	**1**

Description:
Post-harvest Physiology
The principles and practices involved in handling, storage, transportation and packaging of fruits. Lectures cover aspects of bruising physiology, pre– and post-harvest fruit physiology, pre-cooling, refrigerated and controlled atmosphere storage, refrigerated transportation, container environments and physiological disorders. Practical sessions include handling exercises, pressure and laceration tolerance of fruits, atmosphere manipulations and artificial induction of physiological disorders*. (This* module *is taught in alternate years).*

Module Title:	**Protected Horticulture II**
Module Code:	**HORT 4006**
Credits:	**4**
Semester:	**2**

Description:
Mushroom Production/Technology
This module deals with the following aspects of mushroom production and technology: Development and importance of the industry; design and construction of production units; general biology of the mushroom; compost as a substrate and its preparation; spawns and spawn making; cropping systems; spawn running and casing; crop production and harvesting; post-harvest physiology and marketing; pest and disease control; economics of mushroom production. The lecture course is supplemented by demonstrations and one industry visit. *(This* module *is taught in alternate years).*

Module Title:	**Vegetable Crops II**
Module Code:	**HORT 4007**
Credits:	**2**
Semester:	**2**

Description:
This module involves a study of the principles and practices of vegetable production and crop management for the fresh market and for primary processing. The module will emphasise cultural techniques, growing programmes, harvesting methodologies and quality systems for selected tuber, root, cole, bulb and legume crops.

Module Title:	**Landscape Planning**
Module Code:	**HORT 4009**
Credits:	**4**
Semester:	**1**

Description:
An introduction to planning. A study of the development of landscape planning internationally and in Ireland. The emergence of Statutory Planning. An introduction to the relevant planning acts and environmental designations. Landscape assessment as part of landscape planning

Module Title:	**Landscape Design Theory III and Professional Practice and Planning Law II**
Module Code:	**HORT 4010**
Credits:	**6**
Semester:	**2**

Description:
(i) Landscape Design Theory III (4 credits)
Examination of the contemporary issues in landscape design involving a study of a range of specific landscapes including housing, industrial and business parks, roads, landscapes associated with leisure activities, utilities and waterways.
(ii) Professional Practice and Planning Law II (2 credits)
General principles of law, professional responsibilities and liability, law of contract, warranties, bankruptcy, disputes, claims, nominated subcontractors, landscape contracts, bonds, arbitration, private land law, public land law, development plans and development control, special rights over land, basic principles of tort.

Module Title:	**Landscape Design Studio 4a**
Module Code:	**HORT 4013**
Credits:	**4**
Semester:	**1**

Description:
The course is structured through a series of short projects. During the academic year these projects build in complexity regarding the issues addressed. Students undertake an historic precedent study of designed spaces and gain familiarity with the various resources available to support landscape design.

Module Title:	**Landscape Design Studio 4b**
Module Code:	**HORT 4014**
Credits:	**8**
Semester:	**2**

Description:
The course builds on HORT 4013 'Landscape Design Studio 4a'. A series of short design projects give students the opportunity to apply some of the theories and knowledge acquired in concurrent lecture series. These include design methodology, and landscape construction. One project will involve a 'real' client and shall include a public exhibition of the students work.

Module Title:	**Research Project**
Module Code:	**HORT 4050**
Credits:	**10**
Semester:	**1 and 2**

Description:

Module Title:	**Landscape Research Project**
Module Code:	**HORT 4051**
Credits:	**10**
Semester:	**1**

Description:

Module Title:	**Electives**
Module Code:	**HORT 4101**
Credits:	**8**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 8. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**HORT 4400**
Credits:	**18**
Semester:	

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 18. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	**Electives**
Module Code:	**HORT 4402**
Credits:	**24**
Semester:	**1 and/or 2**

Description:
A student must undertake individual elective modules with a cumulative credit-rating of 24. Each student is required to register to the individual elective modules and the selection of elective modules is to be approved by the Degree Programme Option Coordinator.

Module Title:	Computer Aided Design
Module Code:	HORT 4102
Credits:	2
Semester:	2

Description:
This elective is directed to students who have an interest in Computer Aided Design. The module is based around a series of demonstrations explaining and carrying out commands which are coupled with a number of class assignments. Candidates will use Computer Aided Design applications on two platforms, both 'Apple' and 'IBM' computers. Students must complete a drawing project for assessment on completion of the module.

Module Title:	Exotic Trees and Shrubs
Module Code:	HORT 4104
Credits:	2
Semester:	2

Description:
This is an advanced module and expands on the range of plants suitable for use in the landscape industry, particularly in private work.
Genera to be considered include Magnolia, Erica, Camellia, Rhododendron, Pinus, Acer, Sorbus and lesser known species. The history of plant introduction.
Field trips and project are also included. This module is taught in alternate years.

Module Title:	Interior Plantscaping
Module Code:	HORT 4106
Credits:	2
Semester:	1

Description:
This module deals with all aspects of interior plantscaping including the organisation of interior spaces; design criteria of planting and interior decor; construction requirements for planting; preparation of specifications and job costing; environmental factors affecting climatisation and growth; care and maintenance of planting; plant selection and identification.

Module Title:	**Photographic Image Editing**
Module Code:	**HORT 4110**
Credits:	**2**
Semester:	**2**

Description:
The student's first encounter is with a scanning device, with which they will learn the methods involved in converting a hard copy image into a digital photo image. The module also instructs the student how to operate the many and varied art tools for retouching a digital photo image. This is an excellent computer application for producing many different variations of the original image.

Module Title:	**Photography**
Module Code:	**HORT 4111**
Credits:	**2**
Semester:	**2**

Description:
Intensive module on photographic techniques and equipment taught by staff of the Audio-Visual Centre.

Module Title:	**Plant Biotechnology**
Module Code:	**HORT 4112**
Credits:	**4**
Semester:	**1**

Description:
An introduction to the principles and practices of micropropagation as applied to commercially important plants. Lectures deal with media composition; explant excision and inoculation, propagule multiplication and establishment on heterotrophic media. Laboratory sessions will cover aseptic technique, medium preparation and explant manipulation.

Module Title:	Advanced Pomology
Module Code:	HORT 4114
Credits:	4
Semester:	2

Description:

This module covers ten selected concepts in Pomology in detail. Topics may include root, shoot and fruit physiology of temperate, sub-tropical and tropical fruits, microclimatology, micropropagation and aspects of market organisation and regulation. Reading material consists of recently published research papers.

Module Title:	Garden Restoration
Module Code:	HORT 4115
Credits:	2
Semester:	2

Description:
A project based module, researching the history of a garden, park, open space, the contribution of a particular designer, gardener, plant collector or nursery, from documentary and published sources.

Module Title:	Garden Centre Management
Module Code:	HORT 4117
Credits:	4
Semester:	1

Description:
The module details the practices and methods used in retailing and marketing of green, dry and speciality goods. Topics covered include – garden centre design and its impact on customer flow; garden centre layout; product age and merchandising. The display of plants in the plantaria, A to Z; plant function/themes; pricing, pricing strategy, price position; plant labelling, computer labelling, label ledge systems; signage, Kendrew signs, information points, demonstration gardens, computerised point of sale equipment, bar codes, selling strategy and selling aids; the role of advertising and training. Garden centre security and security systems. The module will be supplemented by visits to selected production tree and shrub nurseries and garden centres.
*** Taught in alternate years and applies to Landscape Horticulture students only.**

Module Title:	**Social Horticulture**
Module Code:	**HORT 4118**
Credits:	**4**
Semester:	**1**

Description:
Introduction and definition. Evolution of the concept of Social Horticulture. People-Plant interactions; the significance of plants in human activities. Horticultural therapy for physical rehabilitation and maintenance of mobility. Horticultural therapy for physical rehabilitation of offenders and preventative programmes. Horticulture in Special Needs education. Horticulture and the community. Horticultural tourism.

Modules Coded 'INDM' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Agricultural Microbiology**
Module Code:	**INDM 20010**
Module Coordinator:	Dr Evelyn Doyle
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies:

Description:
In this course you will be introduced to microbiological concepts relevant to agricultural, environmental and food applications. Examples will relate microbiological theory to the production & spoilage of foods & fodders, water quality, microbiological regulation of nutrient cycles, animal and plant health, and biotechnology. You will be introduced to common microorganisms and will consider growth, classification, genetics, survival and control by sterilization, disinfection, immunization and antibiotics. As part of the theoretical and practical aspects of the course you will gain experience with microbiological laboratory methodologies such as microscopy, sterile technique & the isolation and identification of pure cultures.

Learning Outcomes:
On completion of this module students should be able to:

- Explain why microbiology is relevant for agricultural, environmental and food applications
- Describe the significance of microorganisms as agents of infectious disease and their control
- Recognise the beneficial activities of microorganisms.
- Identify what is required for, and undertake a simple microbiological assessment of a product, process or system

Workload:	**Approximate Hours**
Class Contact: Lectures	20
Class Contact: Small Group	-
Class Contact: Practical	18
Specified learning activities	18
Autonomous student learning	44
	100

Module Title:	**Food Microbiology**
Module Code:	**INDM 30010**
Module Coordinator:	*Dr. Mary Upton*
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies: Prerequisites: Agricultural Microbiology Module

Description:

The course will focus on the applied aspects of food microbiology. It will deal with factors influencing the contamination and spoilage of foods and how these factors may be adjusted to control spoilage. The principles of food preservation will be described. Most commonly used methods such as heating, low temperature storage, chemical preservatives will be described in detail. New and emerging methodologies will also be included. The main food poisoning micro-organisms and methods for their elimination/control in the food chain will be described. The positive role of micro-organisms in food production will be discussed. This will include traditional methods as well as the potential of genetically modified foods. Quality control and quality assurance will be addressed and the importance of rapid and automated methods for assessment of food quality and safety will be described. Students will also undertake a short library based project, designed to inform them on information gathering, research methodology, and writing a short research report.

Learning Outcomes:

On completion of this module students should be able to:

- Discuss the basis of food spoilage and preservation;
- Identify and describe the main pathogens associated with the food chain
- Describe the value of micro-organisms in the food chain
- Outline the importance of quality systems in the food industry
- Research a food microbiology related topic and produce a research report conforming to guidelines
- Perform a range of food microbiological laboratory procedures in a competent manner

Workload:	**Approximate Hours**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	12
Specified learning activities	18
Autonomous student learning	60
	120

Modules Coded 'LANG' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Advanced French – Agriculture**
Module Code:	**LANG 4102**
Credits:	**4**
Semester:	**1 and 2**

Indicative Module Description:
Applied French 4 – Leaving Certificate or equivalent standard is required.
Skills covered include:

- Communicating in face-to-face professional situations
- Making oral presentations
- Skills in listening comprehension
- Functional writing – eg report writing, correspondence, etc

Module Title:	**Spanish – Agriculture**
Module Code:	**LANG 4105**
Credits:	**4**
Semester:	**1 and 2**

Indicative Module Description:
Beginners Spanish – no previous knowledge is needed.
Skills covered include:

- Oral communication in everyday situations
- Introduction to reading specialist texts
- Basic grammatical structures
- Functional writing

Modules Coded 'LARC' Offered as a Component of BAgrSc Degree Programmes in Academic Session 2005/06

Module Title:	**Introduction to Landscape Design Studio 1A**
Module Code:	**LARC 10010**
Module Coordinator:	**Sophia Meeres**
Credits:	**5**
Level:	**1**
Semester:	**1**

Module Dependencies: None

Description:

This course introduces the student to the world of landscape architecture. Conceptual design, design graphics and the basic skills essential to visualization of the design process are also introduced. Students are encouraged to express themselves graphically, verbally and in written form. Skills are developed via individual projects and class exercises.

Learning Outcomes:
On completion of this module students should be able to:

- Express simple design ideas
- Demonstrate familiarity with a range of graphic materials
- Refer to at least one renowned landscape architect and his/her projects.

Workload:	**Approximate Hours**
Class Contact: Lectures	6
Class Contact: Small Group	10
Class Contact: Practical	30
Specified learning activities	35
Autonomous student learning	40
	121

Module Title:	**Introduction to Landscape Design Studio 1B**
Module Code:	**LARC 10020**
Module Coordinator:	**Sophia Meeres**
Credits:	**5**
Level:	**1**
Semester:	**2**
Module Dependencies:	

Description:

This course introduces some more aspects of the design and design-graphics process. Simple spatial compositions are attempted. Individual skills are developed via class exercises and studio design projects. Students are encouraged to express themselves graphically, verbally and in written form.

Learning Outcomes:
On completion of this module students should be able to:

- Manipulate scale and proportion
- Understand a spatial composition and reproduce it as a drawing
- Attempt a simple individual design and explain its meaning.

Workload:	**Approximate Hours**
Class Contact: Lectures	4
Class Contact: Small Group	2
Class Contact: Practical	30
Specified learning activities	30
Autonomous student learning	45
	111

Module Title	**Landscape Studio 2A**
Module Code:	**LARC 20020**
Module Coordinator:	**Karen Foley**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: None

Description:

This is a 2nd year studio based module for Landscape Architectural Students. While it builds on the introductory studio modules in the first year of the Landscape architectural programme these are not prerequisites. The course, structured through a series of short design exercises, introduces students to a range of design situations. The majority of these focus on spatial issues, while others will address the design process in a more abstract manner. Students will be introduced to a variety of methods of representation, including computer applications and 3-D models. The module is studio based and involves group and individual work.

Learning Outcomes:
On completion of this module students should be able to:

- Respond in an imaginative and critical manner to a range of spatial design problems
- Further develop their methods of representation introduced in Landscape Design Studio 1A and Landscape Design Studio 1B
- Develop skills in evaluation, creation and representation of landscape design

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	30
Class Contact: Practical	30
Specified learning activities	40
Autonomous student learning	20
	120

Module Title:	**Landscape Design Theory**
Module Code:	**LARC 20030**
Module Coordinator:	**Karen Foley**
Credits:	**5**
Level:	**2**
Semester:	**1**

Module Dependencies: none

Description:

This is a 2nd year module for landscape architectural students and others and introduces students to some of the different theories of design that underpin landscape architectural practice.

Learning Outcomes:

On completion of this module students should be able to:

- Appreciate the differences and inter relationships between art and design.
- Demonstrate knowledge of the palette of materials available to the landscape architect.
- Explain the importance of sense of place in landscape design
- Identify the steps in the landscape assessment process, the factors to be analyzed at each stage and the appropriate graphic communication of this material
- Differentiate between different landscape archetypes and identify their expression in contemporary landscape schemes.
- Demonstrate the ability to apply current theories on the influence of design on human behavior to landscape design.
- Understand the role of the landscape architect within the design team.

Workload:	**Approximate Hours**
Class Contact: Lectures	30
Class Contact: Small Group	-
Class Contact: Practical	10
Specified learning activities	20
Autonomous student learning	55
	115

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Module Title: ... [1]

Module Title:	**Landscape Studio 2B (Place and Context)**
Module Code:	**LARC 20040**
Module Coordinator:	**Karen Foley**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: Prerequisites: Landscape Studio 2A

Description:

This is a 2nd year studio based module for landscape architectural students. The course, is structured through a series of short design exercises and introduces students to a range of design situations of increasing complexity.

Learning Outcomes:
On completion of this module students should be able to:

- Prove a critical knowledge of significant designers and iconic designs influential in contemporary landscape design practice.
- Show skill in the understanding and application of principles of design
- Demonstrate skill in verbal communication and the ability to evaluate their own work and the work of others
- Display competent graphic presentation skills in terms of plan, section, and 3D representation of external space
- Demonstrate understanding of human scale in design solutions

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	30
Class Contact: Practical	30
Specified learning activities	40
Autonomous student learning	20
	120

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Module Title: ... [2]

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Module Title:	**Landscape Studio 2C Construction Techniques 1**
Module Code:	**LARC 20050**
Module Coordinator:	**Sophia Meeres**
Credits:	**5**
Level:	**2**
Semester:	**2**

Module Dependencies: None

Description:

The course introduces fundamental construction techniques necessary in landscape architecture : site survey and analysis; technical drawing : changing scale, plan, section, details; ground modeling : contours, grading, slope, stability, cut and fill; building and paving materials : concrete, masonry, bricks, earth, metals, timber; the construction team : architectural and engineering terms.

Learning Outcomes:
On completion of this module students should be able to:

- Produce plan, section and detailed drawings at varying scales
- Solve problems concerning ground modeling
- Demonstrate familiarity with a wide range of building materials and terms

Workload:	**Approximate Hours**
Class Contact: Lectures	12
Class Contact: Small Group	-
Class Contact: Practical	48
Specified learning activities	12
Autonomous student learning	46
	118

Module Title:	**Computer Applications in Landscape Architecture**
Module Code:	**LARC 20060**
Module Coordinator:	**Karen Foley**
Credits:	**5**
Level:	**2**
Semester:	**2**

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Module Dependencies: None

Description:

This is a 2nd year Computer Laboratory based module for Landscape Architectural Students which introduces the range of computer applications likely to be encountered in a design office

Learning Outcomes:

On completion of this module students should be able to:

- Demonstrate a working knowledge of Computer Aided Design (CAD) as an a every day design office tool
- Create presentation drawings using CAD and associated graphics packages
- Demonstrate using Photo Image Editing the conversion of a paper image into a digital image, the manipulation of the resulting digital image, and saving it for use in a range of presentation types.
- Exhibit competence in Desk Top Publishing software by the preparation of documents combining graphics and text material
- Show an understanding of image file size and demonstrate an ability to manage file size.

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	30
Class Contact: Practical	30
Specified learning activities	40
Autonomous student learning	20
	120

Module Title:	**Landscape Studio 3A (Site Planning)**
Module Code:	**LARC 30020**
Module Coordinator:	**Karen Foley**
Credits:	**5**
Level:	**3**
Semester:	**1**
Module Dependencies:	**Prerequisites:** Landscape Design Studio 2B

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Description:

This 3rd year module for landscape architectural students builds on the skills acquired in **Landscape Design Studio 2B**. The course is structured through a series of short projects.

Learning Outcomes:
On completion of this module students should be able to:

- Demonstrate an understanding of the process of concept development, design strategies and design resolution in landscape architecture
- Show the development of their graphic communication skills across a range of media
- Demonstrate an awareness of contemporary landscape architecture, trends and issues
- Formulate a sensitive detailed design response to site, the users

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	30
Class Contact: Practical	30
Specified learning activities	40
Autonomous student learning	20
	120

Module Title:	**Landscape studio 3B (Construction Techniques 2)**
Module Code:	**LARC 30030**
Module Coordinator:	**Sophia Meeres**
Credits:	**5**
Level:	**3**
Semester:	**1**

Module Dependencies:
Prerequisites: Landscape Studio 2C - Construction Techniques 1

Description:
This course applies and increases the students' knowledge of construction techniques through lectures and studio work. Paving details, drainage, construction of free standing walls and earth and water retaining structures are explained in lectures. Individual research is ensured via studio design projects.

Learning Outcomes:

On completion of this module students should be able to demonstrate the fundamentals of :

- paving and drainage including site furniture.
- earth and water retaining structures
- plan, section and detailed drawings at varying scales.

Workload:	**Approximate Hours**
Class Contact: Lectures	12
Class Contact: Small Group	
Class Contact: Practical	48
Specified learning activities	12
Autonomous student learning	46
	118

Module Title:	**Landscape Studio 3C (Plant/Ecological Applications)**
Module Code:	**LARC 30040**
Module Coordinator:	**Karen Foley**
Credits:	**5**
Level:	**3**
Semester:	**2**

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Module Dependencies: Prerequisites: Plant Materials, Landscape Design Studio 3A

Description:

This is a 3rd year module for landscape architectural students which builds on the spatial design skills acquired in earlier landscape design studio modules and on the theoretical modules Plant Materials and Landscape Ecology. It explores the specific challenges associated with designing with organic elements.

Learning Outcomes:
On completion of this module students should be able to:

- Demonstrate understanding of the requirements of using a palette of living material when designing the external environment.
- Apply ecological principles to design of the external environment
- Show familiarity with specification and implementation techniques when using living material in landscape design
- Demonstrate an understanding of natural site processes when proposing design interventions

Workload:	**Approximate Hours**
Class Contact: Lectures	-
Class Contact: Small Group	30
Class Contact: Practical	30
Specified learning activities	40
Autonomous student learning	20
	120

Module Title:	**Landscape Studio 3D (Construction Techniques 3)**
Module Code:	**LARC 30050**
Module Coordinator:	**Sophia Meeres**
Credits:	**5**
Level:	**3**
Semester:	**2**

Module Dependencies: Prerequisites; Landscape Studio 3B (Construction techniques 2)

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Description:

The course introduces the notion of sustainable construction through lectures and studio work. Sustainability is examined as an approach and in terms of techniques : choice of materials, light pollution, bioengineering, run off and storm water management, urban drainage, protection of water courses and ground water. Individual research is ensured via studio design projects.

Learning Outcomes:

On completion of this module students should be able to:

- Demonstrate the principles of sustainability and their application in landscape design
- Demonstrate familiarity with sustainable construction techniques
- Demonstrate imaginative use of said techniques producing detailed plan and section drawings at varying scales.

Workload:	**Approximate Hours**
Class Contact: Lectures	12
Class Contact: Small Group	-
Class Contact: Practical	48
Specified learning activities	12
Autonomous student learning	46
	118

Module Title:	**Discrete Mathematics (BAgrSc)**
Module Code:	**MATH 10010/MATH 1801**
Module Coordinator:	**Michael Mackey**
Credits:	**5**
Level:	**1**
Semester:	**1**

Module Dependencies:

Description:
This is one of two mathematics modules offered to First Year BAgrSc students. The module begins with revision of some basic material and proceeds with the topics of optimisation by linear programming, probability and matrix algebra. The emphasis is on technique rather than theory, and the solution of ``real-world'' problems.

Learning Outcomes:
On completion of this module you should be able to:

- Work confidently with algebraic expressions to solve equations,
- Express physical constraints as inequalities and optimise an objective function with regard to these constraints
- Describe a simple sample space and use it to calculate probabilities of events
- Express a problem as a simultaneous system of linear equations and solve that problem by means of matrix techniques.

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	-
Cals Contact: Practical	10
Specified learning activities	36
Autonomous student learning	42
	124

Module Title:	**Calculus (BAgrSc)**
Module Code:	**MATH 10020/MATH 1802**
Module Coordinator:	**Michael Mackey**
Credits:	**5**
Level:	**1**
Semester:	**2**

Module Dependencies:

Description:
Beginning with the basics of co-ordinate geometry and trigonometry, this module introduces differential calculus and the principles behind differentiation before concentrating on the important applications of calculus.

Learning Outcomes:
On completion of this module you should be able to:

- Calculate heights and distances by using trigonometry
- Recognise a function as being continuous, smooth, increasing or decreasing
- Find the maximum or minimum of a function using differential calculus
- Express a real-world problem in the language of differential calculus and solve the problem.

Workload:	**Approximate Hours**
Class Contact: Lectures	36
Class Contact: Small Group	-
Class Contact: Practicals	10
Specified learning	36
Autonomous student learning	42
	124

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Module Descriptor Template

Module Title:	**Soil Science I**			
Module Code:	**ERM XXXX**			
Module Coordinator:	*Dr. P. O'Toole*			
Credits:	**5**	**Level: 2**		**Semester: 1**
Module Places	*100*			

Module Dependencies: **1st Year Chemistry**

Indicative Module Description: Soil as the natural medium for plant growth and the concept of soils as 3D-bodies that cover land surfaces more or less as a continuum but differing in the type and arrangement of horizons that make up their profiles. The constitution of soil is explained in terms of it being a porous medium comprising solid, liquid and gaseous phases. The importance of size distribution and mineralogy of their particles are emphasized as enduring characteristics of soils. The structure of soils is described and classified and the physical, chemical and biological processes involved in its development explained. The static and dynamic behaviour of water in soil is described with reference to plant availability and impact on soil management. The chemistry underlying the unique ability of soil to supply and retain plant nutrients is discussed and explained.

Indicative Learning Outcomes:
☐Interpret the terminology associated with the description and classification of rocks and rock forming minerals;
☐Explain the physical, chemical and biological weathering of rocks, the geomorphological processes responsible for Irish land forms and formation of soil parent materials;
☐Interpret the intrinsic differences between soils in terms of physical, chemical, mineralogical and biological characteristics;
☐Outline the principles which underpin management of soils for their maintenance and improvement.

Indicative Student Workload:	**Indicative Hours**
Class Contact: Lectures	24
Class Contact: Small Group	
Class Contact: Practical	24
Specified learning activities	
Autonomous student learning	**60**
Assessment Strategies:	
Continuous Assessment 30%	
Terminal Written Examination 70%	
Total Hours	**108**

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Module Descriptor Template

Module Title:	**Physiological Plant Ecology**			
Module Code:	**ERM XXXX**			
Module Coordinator:	*Dr. J. Fry*			
Credits:	**5**	**Level: 2**		**Semester: 2**
Module Places	*30*			

Module Dependencies: 2nd Year Applied Plant Biology

Indicative Module Description:
The course provides an understanding of the physiological processes underlying plant growth and productivity, with emphasis on the physiological basis for interactions between plants and the environment. Topics covered include: growth and development in plants; limits on growth; growth analysis and modelling; the hierarchy of development control; age and growth phase. Chemical regulation of plant growth: the biology and mode of action of plant growth regulators (PGR); regulation of principal stages in the life cycle by endogenous and exogenous PGRs; ecologically active chemicals. Principles and practices of crop nutrition; nutrient uptake and mobility; involvement of symbiotic associations. Water relations in relation to yield; stress physiology of crops including nutrient, drought, water-logging, saline, temperature (high and low); dormancy and survival. Photosynthesis; nutrition and source-sink relationships; plant-atmosphere interactions; canopy structure and influences; shade physiology. Photobiology and other forms of plant-environment interaction/co-ordination: plant phototropism; photomorphogenesis and photoperiodism: endogenous rhythms, vernalisation.

Indicative Learning Outcomes:
On completion of this module students should be able to:
☐Describe the hierarchical control of plant growth and development.
☐Explain the physiological bases of plant-environment interactions.
☐Describe the physiological basis of plant and crop productivity.
☐Demonstrate an ability to follow protocols and manipulate experimental data.
☐Construct analytical summaries of interpreted data.

Indicative Student Workload:	**Indicative Hours**
Class Contact: Lectures	30
Class Contact: Small Group	
Class Contact: Practical	12
Specified learning activities	**30**
Autonomous student learning	**40**
Assessment Strategies:	
Written exam at end of semester – 60% In-course assessment - 40%	
Total Hours	**112**