

**University Studies
of Agricultural Engineering
in Europe;
*a Thematic Network***

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**AGRICULTURAL ENGINEERING PROGRAMMES MEETING
THE FEANI AND EURAGENG CRITERIA
IN ITALY**

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Abstract

The only administrative change which took place in Italian institutions from the status described in the 1st Workshop, in the framework of Bologna process, is the updating of 3+2 years University study programmes.

According to the ECTS credit system used in Italian institutions, the total student workload in one year is 60 CFU, which are considered equivalent to 60 ECTS; each CFU represents 25 hours of learning, both as aided learning and as individual studies. The 1st cycle degree study programme (“Laurea”) consists of 180 ECTS, while the 2nd cycle one (“Laurea Magistrale”) is constituted by 120 ECTS.

No adjustment, alteration or difference concerning the quality assurance scheme used in Italy happened since the 5th USAEE Workshop.

At present the Faculties of Agriculture of the Universities of Molise, Palermo, Sassari and Viterbo offer 1st cycle degree programmes of studies with titles related to Agricultural Engineering. Moreover, nowadays the Universities of Bari, Molise, Sassari and Viterbo offer 2nd cycle Agricultural Engineering degree study programmes.

A proposal of virtual 1st and 2nd cycle study programmes, meeting the FEANI and EurAgEng criteria, the Italian cultural requirements and the criteria of the national University system, is shown in terms of course categories and ECTS credits.

1. Administrative changes which took place in Italian institutions from the status described in the 1st USAEE Workshop in the framework of Bologna process

The only administrative change which took place in Italian institutions from the status described in the 1st Workshop, held in Madrid (Spain), in the framework of Bologna process, is the updating of 3+2 years University study programmes: with the 1st cycle degree study programme the students are awarded 180 credits and with the 2nd cycle degree 120 credits.

Recently the D.M. (Law of the Ministry of Education, University and Research) n. 270 of the 22nd October 2004 established new degree programmes of studies, which can be activated from the academic year 2005-2006: the student can choice between a job-oriented study programme (180 CFU), finishing with a three-year degree (“Laurea”), and a methodological-educational one (180 CFU), preparing for another two-year study programme (120 CFU) for achieving the “Laurea Magistrale”, corresponding to the Master of Science degree. In order to enter a “Laurea Magistrale” study programme, a three-year degree or another recognised degree, previously achieved abroad, is required. Each University has to establish the specific criteria for entering each study programme.

2. Changes of the ECTS credit system used over the last year

A credit system, based on University education credits (CFU), was introduced in Italy by means of the D.M. (Law of the Ministry of Education, University and Research) n. 509 of the 3rd November 1999: the total student workload in one year is 60 CFU, which are considered equivalent to 60 ECTS; each CFU represents 25 hours of learning, both as aided learning (contact hours, practical activities, seminars) (generally 10 hours) and as individual studies (generally 15 hours), corresponding to 1500 hours a year. According to this law the Italian Universities have also to issue diploma supplements in two languages.

This new credit system was set up in the academic year 2001-2002 and is still developing towards the final objective, which is the implementation of ECTS label in the Italian Universities. Yet, until now in Italy the ECTS system has not been implemented and no Agricultural Engineering degree course has been ECTS accredited. Moreover, a few Universities issue diploma supplements both in Italian and English languages [1].

3. Differences concerning the quality assurance scheme used since the 5th USAEE Workshop

No adjustment, alteration or difference concerning the quality assurance scheme used in Italy happened since the 5th USAEE Workshop, held in Dresden (Germany).

4. The currently running and virtual programmes of studies concerning the 1st and 2nd cycles

At present the Faculties of Agriculture of the Universities of Molise, Palermo, Sassari and Viterbo offer 1st cycle degree programmes of studies with titles related to Agricultural Engineering. The degree study programmes of the Universities of Molise and Palermo are called “Food Engineering” and “Agricultural Engineering”, respectively; the programmes of studies offered by the Universities of Sassari and Viterbo are called “Agricultural Engineering and Rural Planning” and “Science of Rural and Environmental Planning”, respectively.

Moreover, nowadays the Universities of Bari, Molise, Sassari and Viterbo offer 2nd cycle Agricultural Engineering degree study programmes [2].

The updated versions of the 1st cycle study programmes offered by the Universities of Molise, Palermo, Sassari and Viterbo and of the 2nd cycle ones provided by the Universities of Bari, Molise, Sassari and Viterbo are presented below in terms of course categories and ECTS credits.

Finally, a proposal of virtual 1st and 2nd cycle study programmes, meeting not only the FEANI and EurAgEng criteria but also the Italian cultural requirements and the criteria of the national University system, is shown in terms of course categories and ECTS credits.

1st Cycle of the currently running program of studies

Option A: Integrated program of studies with first cycle pivot point degree

• ***Agricultural Engineering (University of Palermo)***

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Basic Sciences		
Mathematics, Computer Science	9	
Inorganic Chemistry, Organic Chemistry	9	
Physics	6	
Agricultural Economics, Agricultural Policy	9	
TOTAL	33	
Deviation of total corresponding ECTS credits from the FEANI report: - 3 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Electives courses (including humanities/economics)		
EU Foreign Language	3	
Student's choice courses	9	
Degree thesis	9	
Practical training	9	
TOTAL	30	
Deviation of total corresponding ECTS credits from the FEANI report: 0 ECTS		

Currently running courses NOT included in the FEANI categories	Corresponding ECTS credits
Rural Appraisal	6
Agricultural Botany, Systematic Botany	6
Plants for Food Processing	3
TOTAL	15

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Engineering courses (core basis courses)		
Fluid Mechanics	6	
Agricultural and Technical Hydrology	6	
TOTAL	12	
Deviation of total corresponding ECTS credits from the FEANI report: - 28 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Agricultural/Biological courses (core basis courses)		
Agronomy, Soil Science	9	
Animal Husbandry, Animal Production	9	
Zoology and Agricultural Entomology, Plant Pathology	9	
Herbaceous Crop Production and Irrigation	6	
Fruit Tree Cultivation	6	
Plant Production inside Greenhouses	6	
TOTAL	51	

Food Processing Technology, Food Microbiology	9	
Geography and Geomorphology	3	
TOTAL	57	20-25
Deviation of total corresponding ECTS credits from the FEANI report: + 32 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Applied Agricultural Engineering courses		
Engineering Surveying and Cartography	6	
Farm Buildings and Rural Land Planning	9	
Agro-Industrial Mechanics and Mechanisation	6	
Ergonomics and Safety	3	
Irrigation and Drainage Systems	9	
TOTAL	33	N/A

2nd Cycle of the currently running program of studies

- Agricultural Engineering Sciences (University of Bari)*

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Electives courses (including humanities/economics)		
EU Foreign Language	3	
Student's choice courses	15	
Degree thesis	12	
Practical training	4	
TOTAL	34	44-10
Deviation of total corresponding ECTS credits from the FEANI report: 0 ECTS		

Currently running courses NOT included in the FEANI categories	Corresponding ECTS credits
Land Appraisal	6
Agricultural Biotechnology	3
European Union Law	3
TOTAL	12

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Engineering courses (core basis courses)		
Information Systems	6	
Fluid Mechanics and Irrigation	6	
Rural Land Analysis and Planning	6	
TOTAL	18	40-50
Deviation of total corresponding ECTS credits from the FEANI report: - 22 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Agricultural/Biological courses (core basis courses)		
Food Processing Technology	3	
Waste Management and By-product Recovery	6	
Processing Quality and Certification	3	
Enterprise Economics and Management	5	
TOTAL	17	
Deviation of total corresponding ECTS credits from the FEANI report: - 3 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Applied Agricultural Engineering courses		
Cartography and GIS	6	
Engineering Design - CAD	4	
Integrated Management of Water Resources	5	
Mechanisation and Automation in Agriculture	6	
Machines and Plants for Post-harvest and Food Processing	6	
Buildings for Protected Production and Food Processing	6	
Work Safety	6	
TOTAL	39	

The 1st and 2nd cycle study programmes offered, respectively, by the Universities of Palermo and Bari, having titles related to Agricultural Engineering, were established from the introduction of the new education system, in the academic year 2001-2002. Therefore, with their present structure, more oriented towards agricultural/biological courses rather than engineering ones, they do not meet the FEANI and EurAgEng criteria.

1st Cycle of the currently running program of studies

Option A: Integrated program of studies with first cycle pivot point degree

- *Food Processing Engineering (University of Molise)*

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Basic Sciences		
Mathematics (5 courses)	5+5+5+3+1=19	
Physics (3 courses)	3+4+3=10	
Chemistry	5+3=8	
Computer Science	2	
TOTAL	39	
Deviation of total corresponding ECTS credits from the FEANI report: 0 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Electives courses (including humanities/economics)		
EU Foreign Language	4	
Student's choice courses	5+4=9	
Degree thesis	6	
Practical training	2	
TOTAL	21	
Deviation of total corresponding ECTS credits from the FEANI report: 0 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report	
Engineering courses (core basis courses)			
Machine Design	6		
Management Engineering	2		
Heat and Mass Transfer (2 courses)	4+4=8		
Electricity and Electronics	5		
Fluid Dynamics	3		
Fluid Machines	4+6=10		
Machines and Plants for Food Processing	6		
Applied Thermodynamics, Mechanics, Mechanical Technology, Machine Dynamics	6+4+6+4=20		
Strength of Materials, Machine Construction, Construction Components of Machines	6+6+4=16		
Material Science and Technology, Material Characterisation and Control	6+4=10		
Air-conditioning Equipment for Food Industries	5		
CAD/CAM	3		
TOTAL	94		40-50
Deviation of total corresponding ECTS credits from the FEANI report: + 44 ECTS			

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Agricultural/Biological courses (core basis courses)		
Farm Economics	2	
Biochemistry	2	
Food Economics, Food Marketing	4+2=6	
Microbiology	3	
Food Technology	3	
Hygiene in Food Industries	2	
TOTAL	18	20-25
Deviation of total corresponding ECTS credits from the FEANI report: - 2 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Applied Agricultural Engineering courses		
Heat Transfer in Food Industries, Heat Transfer	2+6=8	
TOTAL	8	N/A

2nd Cycle of the currently running program of studies

• ***Food Processing Engineering (University of Molise)***

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Electives courses (including humanities/economics)		
Student's choice courses	6	
Degree thesis	9	
TOTAL	15	44-10
Deviation of total corresponding ECTS credits from the FEANI report: 0 ECTS		

Currently running courses NOT included in the FEANI categories	Corresponding ECTS credits
Fluid Automation	6
Design Criteria of Industrial Plants	7
Machines and Plants for Food Industries	6
Governance and Society Patterns	3
Material Degradation and Protection	6
Tests and Measurements on Machine Components for Food Industries	2
Energy Saving Technologies in Food Industries	3
TOTAL	33

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Engineering courses (core basis courses)		
Mechanical Technology	6	
Machine Dynamics	6	
Material Science and Engineering	6	
Mathematical Methods for Engineering (2 courses)	6+6=12	
Machine Design and Construction, Machine Design, Mechanical Design	6+6+6=18	
Co-generation Equipment	1	
Material Science and Technology	2	
Applied Thermodynamics	2	
Information Systems - GIS	4	
Refrigeration Technologies	3	
TOTAL	60	40-50
Deviation of total corresponding ECTS credits from the FEANI report: + 10 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Agricultural/Biological courses (core basis courses)		
Food Process Microbiology	3	
Food Process Technologies	3	
TOTAL	6	20-25
Deviation of total corresponding ECTS credits from the FEANI report: - 14 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Electives courses (including humanities/economics)		
Student's choice courses	10	
Degree thesis	11	
Practical training	12	
TOTAL	33	
Deviation of total corresponding ECTS credits from the FEANI report: 0 ECTS		
Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Applied Agricultural Engineering courses		
Integrated Food Manufacturing Systems	6	
TOTAL	6	

The 1st and 2nd cycle study programmes offered by the University of Molise, with their present structure, show an engineering part largely prevailing on the agricultural/biological one, much more than it is required by FEANI and EurAgEng.

1st Cycle of the currently running program of studies

Option A: Integrated program of studies with first cycle pivot point degree

- *Planning of Rural Environment (University of Sassari)*

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Basic Sciences		
Mathematics	7	
Inorganic and Applied Chemistry	5	
Physics	7	
English Language (2 courses)	10	
TOTAL	29	
Deviation of total corresponding ECTS credits from the FEANI report: - 7 ECTS		

Currently running courses NOT included in the FEANI categories	Corresponding ECTS credits
Archeology and history of Greek and Roman Art	3
Management and Planning of Water Resources	5
Agricultural Production Planning	5
Rural Appraisal	5
Agricultural Policy	5
Landscape Planning	8
Town Planning	10
TOTAL	41

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Engineering courses (core basis courses)		
CAD	8	
Engineering Surveying and Cartography	8	
Hydrogeology	5	
Strength of Materials and Design of Structures	5	
TOTAL	26	
Deviation of total corresponding ECTS credits from the FEANI report: - 14 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Agricultural/Biological courses (core basis courses)		
Soil Morphology, Soil Science	5+5=10	
Ecology (2 courses)	4+4=8	
Animal Husbandry	5	
Agronomy and Herbaceous Crop Production	5	
Fruit Tree Cultivation	5	
TOTAL	33	20-25
Deviation of total corresponding ECTS credits from the FEANI report: + 8 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Applied Agricultural Engineering courses		
Farm Buildings and Rural Land Planning	8	
Hydraulic Forestry Land Protection and Soil-Water Conservation	5	
Agricultural Machines and Plants	5	
TOTAL	18	N/A

2nd Cycle of the currently running program of studies

- *Planning and Management of Rural Environment (University of Sassari)*

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Electives courses (including humanities/economics)		
Student's choice courses	12	
Degree thesis	15	
Practical training	20	
TOTAL	47	44-10
Deviation of total corresponding ECTS credits from the FEANI report: + 3 ECTS		

Currently running courses NOT included in the FEANI categories	Corresponding ECTS credits
Hydrogeological Instability Assessment	5
Buildings and Plants for Food Processing	5
Urban Green Areas and Ornamental Tree Cultivation	7
European Union Law	5
Machines and Plants for Animal Husbandry Farms	5
Livestock Environmental Impact	5
Environmental Economical Assessment and Restoration	5
Chemistry and Biochemistry of Irrigation Water	5
Techniques for Land Evaluation	6
Environmental and Applied Botany	6
TOTAL	54

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Engineering courses (core basis courses)		
TOTAL	0	40-50
Deviation of total corresponding ECTS credits from the FEANI report: - 40 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Agricultural/Biological courses (core basis courses)		
Farm Economics and Management	5	
TOTAL	5	20-25
Deviation of total corresponding ECTS credits from the FEANI report: - 15 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Applied Agricultural Engineering courses		
Energy Supply and Management in Agriculture	4	
Soil Protection	5	
Environment and Land Planning	5	
TOTAL	14	N/A

The 1st cycle study programme and, above all, the 2nd cycle one offered by the University of Sassari, with their present structure, do not meet the FEANI and EurAgEng criteria, neither for the engineering courses nor the agricultural/biological ones.

1st Cycle of the currently running program of studies

Option A: Integrated program of studies with first cycle pivot point degree

- *Rural and Environmental Planning Sciences (University of Viterbo)*

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Basic Sciences		
Mathematics	6	
English or other EU Language	6	
Physics	6	
Statistics and Computer Science	6	
Political Economics	6	
TOTAL	30	36-45
Deviation of total corresponding ECTS credits from the FEANI report: - 6 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Electives courses (including humanities/economics)		
Student's choice courses	8	
Degree thesis	4	
Practical training	11	
TOTAL	23	44-10
Deviation of total corresponding ECTS credits from the FEANI report: 0 ECTS		

Currently running courses NOT included in the FEANI categories	Corresponding ECTS credits
Land Agricultural Law	8
Town Planning	9
Sylviculture	9
Policy of Rural Development	6
Rural Appraisal	6
TOTAL	38

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Applied Agricultural Engineering courses		
Landscape Architecture	6	
Environmental Applied Thermodynamics	9	
Farm Buildings	9	
Hydraulic Forestry Land Protection and Soil-Water Conservation	9	
TOTAL	33	N/A

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Engineering courses (core basis courses)		
Engineering Surveying (2 courses)	9+6=15	
TOTAL	15	40-50
Deviation of total corresponding ECTS credits from the FEANI report: - 25 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Agricultural/Biological courses (core basis courses)		
Agricultural Economics	9	
Agricultural Ecology	6	
Animal Husbandry	9	
Agronomy and Herbaceous Crops	9	
TOTAL	33	20-25
Deviation of total corresponding ECTS credits from the FEANI report: + 8 ECTS		

2nd Cycle of the currently running program of studies

- *Rural Land and Environment Planning Sciences (University of Viterbo)*

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Electives courses (including humanities/economics)		
Student's choice courses	6	
Degree thesis	5	
Practical training	9	
TOTAL	20	44-10
Deviation of total corresponding ECTS credits from the FEANI report: 0 ECTS		

Currently running courses NOT included in the FEANI categories	Corresponding ECTS credits
Town Planning	8
Restoration and Valorisation of Farm Buildings	4
Protected Crops and Environmental Impact	4
Environmental Botany	6

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Agricultural/Biological courses (core basis courses)		
Geology	8	
Production Systems for Land Planning	9	
Crop Protection	8	
Economics and Policy of Rural Development	6	
TOTAL	31	20-25
Deviation of total corresponding ECTS credits from the FEANI report: + 6 ECTS		

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Agricultural/Biological courses (core basis courses)		
Geology	8	
Production Systems for Land Planning	9	
Crop Protection	8	
Economics and Policy of Rural Development	6	
TOTAL	31	20-25
Deviation of total corresponding ECTS credits from the FEANI report: + 6 ECTS		
Land Appraisal		6
European Union Land Law		4
Planning of Forestry Land and Infrastructures		8
TOTAL		40

Currently running courses	Corresponding ECTS credits	ECTS credits in the FEANI report
Engineering courses (core basis courses)		
Mathematics	4	
Physics	4	
TOTAL	8	40-50
Deviation of total corresponding ECTS credits from the FEANI report: - 32 ECTS		

Both 1st and 2nd cycle study programmes offered by the University of Viterbo were established as related to rural land and environment planning; therefore, their structure is different from that of Agricultural/Biosystems Engineering study programmes and, above all for the engineering courses, they can not meet the FEANI and EurAgEng criteria.

1st Cycle of the Virtual program of studies

Option A: Integrated program of studies with first cycle pivot point degree *Agricultural Engineering*

Basic Sciences

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged revised program of studies	Corresponding ECTS credits
General	4-5	-	0
Computer Science-Informatics	4-5	Fundamentals of Computer Science	6
Mathematics	4-5	Mathematics	9
Physics	4-5	Physics	9

Chemistry	4-5	Inorganic and Organic Chemistry	6
Economics	4-5	Economics	6
Total	36-45		36

Elective courses (including humanities/economics)

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged revised program of studies	Corresponding ECTS credits
-	-	EU Foreign Language	3
-	-	Student's choice courses	3
-	-	Practical training	3
-	-	Degree thesis	6
TOTAL			15

Core Engineering courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged revised program of studies	Corresponding ECTS credits
Engineering Graphics and Design - CAD	4-5	Engineering Design - CAD	6
Mechanics-Statics	4-5	Mechanics-Statics	3
Strength of Materials	4-5	Strength of Materials	6
Mechanics-Dynamics	4-5	Mechanics-Dynamics	3
Fluid Mechanics	4-5	Fluid Mechanics	6
Applied Thermodynamics	4-5	Applied Thermodynamics	3
Heat and Mass Transfer	4-5	Heat and Mass Transfer	3
Electricity and Electronics	4-5	Electricity and Electronics	6
System Dynamics	4-5	System Dynamics	3
Engineering Economics	4-5	Engineering Economics	3
TOTAL	40-50		42
Deviation (%) of total corresponding ECTS credits from the FEANI report: 0 ECTS			

Core Agricultural/Biological Sciences courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged revised program of studies *	Corresponding ECTS credits
Plant Biology	4-5	Crop Biology	6
Animal Biology	4-5	Animal Biology	6
Introduction to Soil Science	4-5	Soil Science	3
Introduction to Agricultural Meteorology and Micro-meteorology	4-5	Agricultural Meteorology	3
Understanding the Environment and its interaction with Living Organisms	4-5	Agricultural and Forestry Ecology	3
Agricultural Economics	4-5	Agricultural Economics	3
TOTAL	20-25		24
Deviation (%) of total corresponding ECTS credits from the FEANI report: 0 ECTS			

The above tables are common for the following modules, “Agricultural and Forestry Engineering” and “Food Processing Engineering”.

- *Title of Example Module: Agricultural and Forestry Engineering*

Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Mechanics	6
TOTAL			6

Agricultural/Biological module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Soil Chemistry	-	Plant and Soil Chemistry	6
-	-	Sylviculture	3
TOTAL			9

Applied Agricultural Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Remote Sensing, Engineering Surveying - GIS	-	Cartography and GIS	6
Soil Mechanics	-	Applied Geology and Geotechnics	6
Environmental Impact Assessment	-	Environmental Impact Assessment	3
-	-	Wood Technology	3
Power Generation Engines, Farm Power Units	-	Agricultural Mechanics	9
Design of Steel Structures, Design of Concrete Structures, Design of Timber Structures	-	Farm Buildings and Rural Roads	9
Fluid Mechanics	-	Hydraulics and Water Resource Management for Agriculture	9
Landscape Planning	-	Rural Land Planning	3
TOTAL			48

- *Title of Example Module: Food Processing Engineering*

Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Machines Design	6
Instrumentation and Measurements	-	Instrumentation and Measurements	3
TOTAL			9

Agricultural/Biological module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Soil Microbiology and Biochemistry	-	Biochemistry	3
Food Microbiology	-	Microbiology	3
-	-	Plant Protection	3
Introduction to Food Science, Post-harvest Technologies	-	Food Science and Post-harvest Technology	6
Food Microbiology, Food Quality	-	Food Microbiology and Food Quality	6
TOTAL			21

Applied Agricultural Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Applied Thermodynamics	-	Applied Thermodynamics	6
-	-	Refrigerating Machines and Equipment	3
-	-	Applied Mechanics	3
-	-	Machines and Plants for Food Processing	6
Food Process Technologies	-	Food Processing Technology	6
Food Manufacturing Systems	-	Food Manufacturing Systems	3
-	-	Buildings for Food Processing	3
Control Systems and Automation, Ergonomics, Health and Safety	-	Automation, Control and Safety	3
TOTAL			33

2nd Cycle of the Virtual program of studies

- *Title of Example Module: Water Resources in Agricultural Engineering*

Basic Sciences

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Mathematics and Statistics	6
-	-	Advanced Physics	6
TOTAL			12

Elective courses (including humanities/economics)

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Student's choice courses	6
-	-	EU Foreign Language	3
-	-	Degree thesis	9
TOTAL			18

Core Engineering courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Soil Mechanics	-	Soil Mechanics	3
TOTAL			3

Core Agricultural/Biological Sciences courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Crop Science and Management	-	Crop Production	6
Crop Protection	-	Crop Protection	6
Introduction to aquaculture	-	Aquaculture	3
-	-	Applied Chemistry	6
TOTAL			21

Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Design of Steel Structures, Design of Concrete Structures	-	Design of Concrete and Steel Structures	6
Instrumentation and Measurements	-	Instrumentation and Measurements	3
TOTAL			9

Agricultural/Biological module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Crop Science and Management	-	Horticultural Production	3
Soil Microbiology and Biochemistry	-	Microbiology	3
Manure Treatment and Bioconversion, Agricultural Water Quality Engineering	-	Manure Treatment and Water Quality	3
-	-	Forestry Management	6
TOTAL			15

Applied Agricultural Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Open Channel Flow, Pipe Flow	-	Open Channels and Pipe Flow	6
Surface Hydrology, Hydrogeology	-	Hydrology and Hydrogeology	6
Engineering Surveying - GIS	-	Engineering Surveying	6
-	-	Irrigation and Drainage Systems	3
Irrigation System Design, Drainage System Design	-	Hydraulic Equipment and Construction	9
Soil Erosion, Landscape Planning	-	Soil Erosion and Landscape Planning	6
-	-	Hydraulic Land Protection	6
TOTAL			42

- *Title of Example Module: Mechanical Systems and Mechanisms used in Agriculture*

Basic Sciences

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Mathematics and Statistics	6
-	-	Advanced Physics	6
TOTAL			12

Elective courses (including humanities/economics)

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Student's choice courses	6
-	-	EU Foreign Language	3
-	-	Degree thesis	9
TOTAL			18

Core Engineering courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Soil Mechanics	-	Soil Mechanics	6
TOTAL			6

Core Agricultural/Biological Sciences courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Crop Science and Management	-	Crop Production	6
Crop Protection	-	Crop Protection	6
Introduction to aquaculture	-	Aquaculture	3
-	-	Applied Chemistry	6
TOTAL			21

Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Mechanics Applied to Machines	6
-	-	Mechanical Technology	3
Ergonomics, Health and Safety	-	Ergonomics and Safety	6
Instrumentation and Measurements	-	Instrumentation and Measurements	3
TOTAL			18

Agricultural/Biological module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Animal Science and Management	-	Animal Husbandry and Management	3
Agro-chemicals	-	Agrochemicals	3
-	-	Forestry Management	3
Post-harvest Physiology	-	Post-harvest Physiology	3
Liquid Waste Management, Solid Waste Management, Waste Management and Environmental Quality	-	Agricultural Waste Management	3
TOTAL			15

Applied Agricultural Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Agricultural Machinery Design, Farm Power Units	-	Agricultural Machines and Mechanisation	9
Mechatronics, Techniques in Precision Agriculture, Spatial Information Technology (GPS, GIS, RS) for Agriculture	-	Mechatronics and Precision Agriculture	6
Remote Sensing	-	Remote Sensing	6
Power Generation Engines	-	Power Generation Engines	6
Design Methods for Machines for Biosystems	-	Machines and Plants for Food Processing	3
TOTAL			30

Structural Systems and Materials in Agricultural Engineering

Basic Sciences

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Mathematics and Statistics	6
-	-	Advanced Physics	6
TOTAL			12

Elective courses (including humanities/economics)

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Student's choice courses	6
-	-	EU Foreign Language	3
-	-	Degree thesis	9
TOTAL			18

Core Engineering courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Soil Mechanics	-	Soil Mechanics	6
TOTAL			6

Core Agricultural/Biological Sciences courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Crop Science and Management	-	Crop Production	6
Crop Protection	-	Crop Protection	6
Introduction to aquaculture	-	Aquaculture	3
-	-	Applied Chemistry	6
TOTAL			21

Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Design of Concrete Structures	-	Design of Concrete Structures	6
Design of Steel Structures	-	Design of Steel Structures	3
Design of Timber Structures	-	Design of Timber Structures	3
-	-	Architectural Design	6
-	-	Seismic Engineering	6
Ergonomics, Health and Safety	-	Safety in Structural Construction	3
TOTAL			27

Agricultural/Biological module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Crop Science and Management	-	Horticultural Production	3
Soil Microbiology and Biochemistry	-	Microbiology	3

Animal Science and Management	-	Animal Science and Management	6
TOTAL			12

Applied Agricultural Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Engineering Surveying - GIS	-	Engineering Surveying	6
Protected Plant Production	-	Protected Plant Structures and Equipment	6
Livestock Housing	-	Livestock and Manure Treatment Buildings	6
-	-	Building Design for Food Processing	6
TOTAL			24

Bio-processing Engineering

Basic Sciences

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Mathematics and Statistics	6
-	-	Advanced Physics	6
TOTAL			12

Elective courses (including humanities/economics)

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Student's choice courses	6
-	-	EU Foreign Language	3
-	-	Degree thesis	9
TOTAL			18

Core Engineering courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Material Properties of Biological Systems	-	Material Properties of Biological Systems	6
TOTAL			6

Core Agricultural/Biological Sciences courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Crop Science and Management	-	Crop Production	6
Crop Protection	-	Crop Protection	6
Soil Microbiology and Biochemistry	-	Agricultural Biochemistry	6
TOTAL			18

Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
-	-	Mechanics Applied to Machines	6
Food Manufacturing Systems, Analysis and Design of Biomachinery, Design Methods for Machines for Biosystems	-	Industrial Mechanical Equipment	6
Ergonomics, Health and Safety	-	Health and Safety	3
Energy Production and Supply	-	Energy Production and Supply	6
Mechatronics	-	Mechatronics	6
Fluid Rheology	-	Fluid Rheology	6
TOTAL			33

Agricultural/Biological module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Crop Science and Management	-	Horticultural Production	3
Soil Microbiology and Biochemistry, Food Microbiology	-	Microbiology	3
Waste Management and Environmental Quality	-	Waste Management and Environmental Quality	6
Introduction to Food Science	-	Chemical and Physical Analysis of Food Products	6
Food Quality	-	Food Quality	3
TOTAL			21

Applied Agricultural Engineering module courses

Courses in FEANI report	ECTS in FEANI report	Courses proposed for the envisaged program of studies	Corresponding ECTS credits
Remote Sensing	-	Remote Sensing	3
Environmental Impact Assessment	-	Environmental Impact Assessment	3
Image Processing	-	Image Processing	3
Unit Operations	-	Unit Operations	3
TOTAL			12

The two virtual 1st cycle and four virtual 2nd cycle study programmes, which are proposed according to the specific education requirements of the various Italian regions, meet both the Core Engineering and the Core Agricultural/Biological Sciences courses. Moreover, they would fulfil the eligibility criteria (e.g. structure, course content-learning outcomes, ECTS units) if they were to be evaluated and possibly “recognised” by EurAgEng in their current version.

References

- 1) A. Comparetti, P. Febo, S. Orlando, G. Scarascia Mugnozza, The implementation of ECTS in Italian University departments and institutes of Agricultural Engineering, 3rd USAEE Workshop, Dijon, France, 27-28 March 2004.
- 2) A. Comparetti, P. Febo, S. Orlando, G. Scarascia Mugnozza, The Italian University structure and degrees on Agricultural Engineering, 1st USAEE Workshop, Madrid, Spain, 28-29 March 2003.