General Description of Master's Program

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Master's program	مهندسی مکانیک بیوسیستم Mechanics of Biosystems Engineering
Specialization	گرایش طراحی و ساخت (بهینه شده برای اگرومکاترونیک) Design and Construction (Modified for the Agro-Mechatronics)
Institution(s)	دانشگاه علوم کشاورزی و منابع طبیعی ساری Sari Agricultural Sciences and Natural Resources University (SANRU)
Accreditation organization(s)	Ministry of Science, Research and Technology of Iran (MSRT) (http://msrt.ac.ir)
Period of reference	Program completed within 2 years, starting in September 23, 2018
Responsible person	Assoc. Prof. Dr. _Ing. Davood Kalantari
Qualification awarded	Master of Science (M. Sc.)
Length of program	2 years
Number of credits	32(+6) Iranian-credits equal to 126.5 ECTS
Cycle/Level of qualification	QF for EHEA: Second Cycle; EQF level 7;NQF for Iran: Master of Science(M.Sc)
Fields of study	• Design, construction and developments of new intelligent agricultural machines, Robots and systems, • Implementation of the existing intelligent agricultural equipment, • Implementation of the Robots and intelligent systems in Greenhouses,
Specific admission requirements	1: Entrance examinations: Enrollment in the national examination managed by the Ministry of Science, Research and Technology of Iran (MSRT) for Master's program and obtaining a minimum required scores, A B.Sc certificate from a distinguished university or equivalent higher education systems inside Iran or abroad in the field of Mechanics of Biosystems Engineering, Mechanical Engineering. Every certificate for completion of undergraduate studies must contain the following disciplines: Basic Mathematics, Basic Physics, courses related to Basic Mechanical Engineering including Statics, Dynamics, Strength of Materials, and Design of Machine Elements, Design of Agricultural Machinery, Electrical engineering, and English language. The following set of documents must be submitted to the Admissions Committee of the university working under supervision of the Higher Educational Deputy of the University: Copy of Bachelor certificate, 2 photos 3x4 cm.
Specific arrangements for recognition of prior learning	Specific examining the knowledge of applicants in different disciplines is performed on the national entrance exam. Disciplines include: Mathematics, Basic Mechanical Engineering (Statics, Dynamics, Strength of Materials), Design of Agricultural Machinery, Engine Technology,
Qualification requirements and regulations	Bachelor's degree (B.Sc)
Mode of study	Full-time educational system,
Examination regulations, assessment and grading	Written examinations with/without Project for each course, Completion and Defense of the master's thesis at the end of M.Sc program, examined by a scientific committee established from academic staffs of the related subject from department and employers
Obligatory or optional mobility window	There is no obligatory point in studding "Mechanics of Biosystems engineering", but students are encouraged to do practical thesis rather than a theoretical approach to solve a technical problem related to agriculture and Biosystems. The thesis is also possible to jointly handle with the industry. General mobility from one university to another is possible with the consent of both origin and destination universities. However completing and performing the thesis at another university or other institution is possible with official permission of the supervisor. It is possible for student to take a Semester in another University inside the country

	or abroad.
Work placement(s) if applicable	*Khazar Electric industrial Company, Badeleh Agricultural Machinery Manufacturing Company, Kapic Research Centre for agricultural Machinery and equipment,*
Occupational profiles of graduates	*After successfully completing the master's degree, candidates will be able to move directly into the professional field as an engineer in a range of capacities. The program qualifies for work in different agricultural-based industry and business, and has direct relevance to agricultural equipment manufacturing, food processing or related industrial fields. However, job opportunities are not limited to such activities. Other prospective employers include: food producers and distribution companies, consulting companies, off-shore industry, biomaterials transportation companies and the public sector.* *Possible posts: Technical Director of Agricultural Machinery and Equipment Manufacturing Companies, Technical and Production Director of Food Industry, Technical Director of Smart Greenhouses, Technical Director of intelligent and mechanized Farms, Technical Manager of Automatic Packing and Grading for Gardening Products, Member of a Designing Group related to Mechatronics and smart factories.*
Access to further studies	*The program qualifies candidates for a career in research, and Ph.D. studies related to the Mechanics of Biosystems Engineering or other fields of mechanical Engineering such as Mechatronics.*

Program Profile Statement	
The M.Sc in "Mechanics of Biosystems Engineering" is a 4 semester oriented program. During these two years of education, the engaged students will try to learn professional engineering skills to prepare themselves for a career in the rapidly-growing fields of Agricultural Engineering, Automation in Agriculture, Agro-Mechatronics, Robotics, Machine vision and intelligent systems in view of an integrated approach to agricultural engineering and technologies. Graduates have the ability not only to adapt quickly and to be flexible in dealing with a variety of tasks and problems from different technical fields, but also to communicate easily in English and successfully work as part of international team.	
Program Learning Outcomes	
On competition of this program, students should be able to:	
LO1	**Identify**, formulate and solve problems related to Biosystems Engineering and Agro-Mechatronics
LO2	**Investigate** agro-mechatronics engineering problems using analytical, computational and experimental methods
LO3	**Design** and conduct engineering experiments to investigate a phenomenon
LO4	**Evaluate** the results of an experiment and its value for solving an agro-mechatronics engineering problem
LO5	**Implement** innovative methods or software in solving problems related to Biosystems Engineering and Agro-Mechatronics.
LO6	**Negotiate** with the specialists of electrical engineering, mechanical engineering, informatics and life science in developing or optimizing the Agro-Mechatronics devices and equipment
LO7	**Manage** effective teamwork practices in both intra-disciplinary and multidisciplinary teams
LO8	**Communicate** efficiently with abroad students, general public as well as contributions for scientific publications

The Program Module Structure

Year 1 (Two semesters of 16 weeks)

Y: Year, S: Semester, C: Core Course, SC: Specified Compulsory Course, E: Elective Course, S: Seminar, MTh: Master Thesis

Each theoretical credit stands for 16 hour official teaching, Each practical credit stands for 32 hour official practical training.

Code	Title	Credits (Theory/Practical)	Classroom Attendance (min/week)	Equivalent ECTS
Y1.S1.C1	Supplementary Engineering Mathematics	2	120	4.6
Y1.S1.SC1	Advanced Instrumentation	2+1	120/180	11.5
Y1.S1.SC2	Supplementary Finite Element Method	3	180	6.9
Y1.S1.E1	Soil-Machine Interaction	3	180	6.9
	Total Credits for the first semester	**11**	**660**	**29.9**
Y1.S2.C2	Research Methodology	2	120	4.6
Y1.S2.E2	Mechatronics	2	120	4.6
Y1.S2.E3	Mechanisms Design	3	180	6.9
Y1.S2.E4	Computer Aided Design (Advanced)	2+1	120/180	11.5
Y1.S2.E5	Advanced Internal Combustion Engines	2	120	4.6
	Total Credits for the second semester	**12**	**840**	**32.2**
	Total Credits for the first year of study	**23**	**1500**	**62.1**

Year 2 (One semester of 16 weeks, and 6 months for completion of Master Thesis)

*** The course is presented as an additional unit for matching the "Mechanics of Biosystems Engineering" with the new "Agro-mechatronics" discipline.**

e One of these course should be elected by the master students for matching the new Agro-mechatronics discipline with the Mechanics of Biosystems Engineering

Y2.S1.C3	Experimental Engineering Analysis and Design	2	120	4.6
Y2.S1.E6	Advanced Automatic Control *	2+1	120/180	11.5
Y2.S1.E7	Machine Vision *e	2+1	120/180	11.5e
Y2.S1.E8	Artificial Neural Networks*e	3	180	6.9e
Y2.S1.S	Seminar	1	180	6.9
Y2.S2.MTh	Master Thesis	6	1080	41.4
	Total Credits for the second year of study	**9(+6)**	**1680 (+300 or 180)**	**64.4(+11.5 or 6.9)**
Total credits		**32 (+6)**	**2880(+300 or 180)**	**126.5(+11.5 or 6.9)**

Program Key Learning Outcomes Module Map									
Module		LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8
Year1	Y1.S1.C1		*			*		*	
	Y1.S1.SC1	*	*	*	*	*	*	*	*
	Y1.S1.SC2	*	*			*	*	*	*
	Y1.S1.E1	*	*	*	*	*			*
	Y1.S2.C2	*		*	*			*	
	Y1.S2.E2	*		*	*	*			*
	Y1.S2.E3	*		*		*			
	Y1.S2.E4	*	*			*	*		
	Y1.S2.E5	*				*			*
Year 2	Y2.S1.C3	*		*	*	*		*	
	Y2.S1.E6	*				*	*	*	
	Y2.S1.E7	*	*	*	*	*	*	*	*
	Y2.S1.E8	*	*	*	*	*			
	Y2.S1.S	*					*		*
	Y2.S2.MTh	*	*	*	*	*	*		*