

Project Acronym: MEDIS

Project Title: A Methodology for the Formation of Highly Qualified Engineers at Masters Level in the Design and Development of Advanced Industrial Informatics Systems

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Context

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1 Executive summary

This deliverable presents the report on the analysis of the possibilities of AIISM courses integration in the curricula of Master Programs at the Faculty Mathematics that is responsible for MEDIS Project in the Petrozavodsk State University

Introduction

The Faculty of Mathematics was founded in 1940. It consists of five departments:

- Department of probability theory and data analysis
- Department of computer science
- Department of mathematical analysis
- Department of applied mathematics and cybernetics
- Department of geometry and topology
- Department of theory and practice of teaching of mathematics

2 Analysis of the Unit Responsible for MEDIS Project

The Faculty of Mathematics has been chosen as the unit responsible for the fulfilment of MEDIS Project. This decision is caused by the following reasons:

1. The Faculty has a series of similar courses which allows AIISM courses be integrated into a new curricula easily and develop original university MA program.
2. This Faculty has a long history of cooperation with famous IT-companies and organizations (NOKIA, METSO AUTOMATION, FRUCT and others)
3. The Faculty and PetrSU IT- park have a solid base of equipment relevant for implementation of the project (including industrial controllers, microcontrollers and I/O cards, fiber networks and so on)
4. This Faculty has both professional experience and high potential for the effective participation in the project. Additional staff from other departments and Faculty of Physics can be involved to the project if necessary.

3 Degree Structure

3.1 Master Programme “Applied mathematics and informatics”

The Master Programme 010400 – “Applied mathematics and informatics” was selected as a pilot in implementation of AIISM courses, the programme includes 120 ECTS credits .

3.2 Target groups

- Teachers
- Students
- Administrative staff
- Scientific staff

List of courses, number of ECTS and working hours is presented in the Table 1.

Table 1

Code	Course title	ESTC	Hours (lectures)	Hours (practice and laboratory)	Independent (personal) work	Total hours
General cycle						
Basic Part						
M1B1	History and Methodology of Applied Mathematics and Informatics	3	17	17	74	108
M1B3	Foreign Language	5		68	112	180
M1B4	Continuous mathematical models	4	17	17	110	144
M1B5	Contemporary problems of applied mathematics and Informatics	4	17	17	110	144
Variable part						
M1B2	Modern philosophy and methodology of science	4	34	34	76	144
M1B1B Optional courses -1						
M1B1B1	Applied optimization problems	4	17	17	110	144
M1B1B2	Smart spaces	4	17	17	110	144
M1B1B Optional courses -2						
M1B2B1	Modeling of socio-economic dynamics	2		17	55	72
M1B2B2	Theory of Information Retrieval	2		17	55	72
M1B1B Optional courses -3						
M1B3B1	Basics of Financial Mathematics	3	17	17	74	108

M1B3B2	Routing algorithms in distributed systems	3	17	17	74	108
Professional cycle						
Basic part						
M2B1	Contemporary computer technologies	2	17	17	38	72
M2B2	Discrete and probabilistic models	4	17	17	110	144
Variable part						
M2B3	Methods and algorithms for parallel computation	4	17	17	110	144
M2B1B Optional courses -1						
M2B1B1	Symbolic computation in computer algebra systems	3	17	17	74	108
M2B1B2	Software project-1	3	17	17	74	108
M2B1B Optional courses -2						
M2B2B1	Object-Oriented Analysis and Programming	4	17	17	110	144
M2B2B2	Mathematical Methods for Pattern Recognition	4	17	17	110	144
M2B1B Optional courses -3						
M2B3B1	Dynamic systems	4	17	17	110	144
M2B3B2	Software verification	4	17	17	110	144
M2B1B Optional courses -4						
M2B5B1	Contemporary control systems	2	17	17	38	72
M2B5B2	Software project 2	2	17	17	38	72

M2B6	Special seminar	2	17	17	38	72
M2B7	System Engineering	2	17	17	38	72
Practice and scientific work		43				
Final state certification		12				
Total ESTC		120				

4. Laboratory equipment

The faculty of Mathematics has several computer laboratories and one specialized well-equipped industrial computer class (the only one in Russia) on the basis of PetrSU IT-park. Specialists from 53 IT Russian companies have been trained on the basis of this class.

- Each laboratory has 10-14 computers
- Local fiber network
- Internet connection
- Interactive whiteboards
- Projectors and multimedia screens
- Robotic assembling line
- Several systems of digital sensors of industrial electronics.
- Powerful industrial controllers with input/output cards of METSO Corporation on the basis Of PetrSU IT Park.
- Specialized software tools by METSO Corporation.

Moreover some rooms in the Faculty of Mathematics and Physics can be reorganized into specialized laboratories according to MEDIS Project requirements.

5 Conclusion

According to the results of our analysis we can conclude that the presented master's programme of the Faculty of Mathematics fits perfect for integration of the AIISM courses.