(*faculty stamp*)

COURSE DESCRIPTION

1. Course title: COMPUTER METHODS IN ENGINEERING	**2. Course code**
3. Validity of course description: 2014/2015	
4. Level of studies: MSc programme	
5. Mode of studies: full time stationary studies	
6. Field of study: BIOTECHNOLOGY	(FACULTY SYMBOL) RAU1
7. Profile of studies: General academic	
8. Programme: bioenergy engineering	
9. Semester: 2	
10. Faculty teaching the course: Institute of Automatic Control, Rau1	
11. Course instructor: dr inż. Witold Nocoń, dr. inż Sebaastian Student	
12. Course classification: specialization courses	
13. Course status: compulsory	
14. Language of instruction: English	
15. Pre-requisite qualifications: Fundamentals of computer programming (computer science and bioinformatics courses).	

16. Course objectives: The objective of this course is to present the newest modern programing environments used for implementation of control-measurements systems, data analysis application and data analysis results visualization and data storage.
The objective of laboratory exercises is to teach students the practical aspects of control algorithms implementation, controller tuning and programing of PLCs (Programmable Logic Controllers)

- Modern programming environments
- Synchronization methods in programming
- Multithreaded programming
- Implementation of user interfaces
- Implementation of control algorithms
- Modern environments for advanced data analysis
- Massive data processing, machine learning
- Web applications and creating independent applications

17. Description of learning outcomes:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
W1	Student knows the common synchronization and multithreads methods in software development	SP	WM	K_W01
W2	Student knows the modern environments for advanced data analysis	SP	WM	K_W25

U1	Student is able to use the modern programing environments for program implementation of data acquisition, and data processing methodology	CL, OS	WM, L, P	K_U07
U2	Student is able to implement alghoritms for massive data processing and web application	CL, OS	WM, L, P	K_U10
K1	Student is aware of the need to use modern programing environments and data analysis methods in bioenergy science	RP, OP	WM, P	K_K01
K2	Student is able to present and exaplain the created application for data acquisition, processing, and archiving.	RP, OP	WM, P	K_K03

18. Teaching modes and hours

Lecture 15 h, Laboratory 15 h, Project 15

19. Syllabus description:

Lectures

- Modern programming environments
- Synchronization methods in programming
- Multithreaded programming
- Implementation of user interfaces
- Implementation of control algorithms
- Modern environments for advanced data analysis
- Massive data processing, machine learning
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Laboratory

- Introduction in LabView programing
- Synchronization methods in LabView
- Data save and archiving, algorithms implementation
- Introduction in data analysis in R and Matlab
- Masive data analysis, multithreads programing
- Basic web interface development in data analysis application

20. Examination: YES

21. Primary sources:

1. J. Travis, J. Kring. LabVIEW for Everyone - Graphical Programming Made Easy and Fun (3rd Edition). Prentince-Hall, London, 2006.
2. Floria H, Huber W, Gentleman R, Falcon S. Bioconductor Case Study. Springer, 2008.

22. Secondary sources:

1. P.A. Blume. LabVIEW Style Book, Prentice Hall; 1 edition, 2007
2. Trevor H, Tibshirani R, Friedman J. The Elements of Statistical Learning: Data Mining, Inference, and Prediction, 2008.

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	15/15
2	Classes	0/0
3	Laboratory	15/30
4	Project	15/30
5	BA/ MA Seminar	0/0
6	Other	5/5
	Total number of hours	50/50

24. Total hours:100

25. Number of ECTS credits: 4

26. Number of ECTS credits allocated for contact hours: 2

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 2

26. Comments:

Approved:

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(date, Instructor's signature)

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(*date , the Director of the Faculty Unit signature)*