Bialystok University of Technology	Faculty of Computer Science							cience	
Field of study	Comp	outer s	cience					Degree level and programme type	full-time Master's degree
Specjalization / diploma path	common subject				Study profile	general academic			
Field of study	Analysis and Testing Informatic						E	Course code	INF2ATS
	Systems						-	Course type	obligatory
Forms and	L	С	LC	Р	SW	FW	S	Semester	1
number of hours	30				30			No. of ECTS credits	4
Entry requirements									
	softwa (over princip	are sys 10K C ples of	stems. ++ inst progra	Stude ructio am de	ents ap ns) usi sign, a	ply the ng an " rchitect	learn agile ure d	ed principles in a group ' iterative program devel esign, and program mod	of the engineering principles of designing and testing project in which they implement a software system lopment process. Students learn fundamental dule interfaces; considering alternative design pox testing, requirements specification testing

Course objectives	solutions and justifying selected design decisions; black and white box testing, requirements specification testing, automated testing tools, writing a test plan, reporting testing results. The student will develop the skills to: design system architecture and modular interfaces; team work; planning and implementing an iterative program development process; planning, testing, writing test cases, documenting test results, using tools supporting the testing process. The aim of the course is also to develop the ability to communicate effectively - in writing and in discussion - regarding identified problems with other members of the project team.
	Lecture:
	1. Principles of program design, architecture design and interfaces of program modules.
	Considering and justifying alternative design solutions; "agile" iterative program development process.
	3. Black and white box tests.
	4. Integration testing and system testing.
Course content	5. Tools for automatic testing, writing test plans, reporting testing results.
	Specialist workshop:
	1. Project work using methods explained during the lecture.

- Project work using methods explained during the lecture.
 Working in a group and communicating in writing and in discussion regarding identified problems with other members of the project team.
 Architecture design, implementation, testing.

	Student workload (in hours):	No. of hours	with direct teacher participation	practical
	Lecture attendance	30	30	
	Project attendance	30	30	30
	Lecture test(s) attendance	2	2	
	Participation in teacher-student sessions related to the module	5	5	
	Preparation for lecture test(s)	3		
Calculation:	Preparation for project classes	30	-	30
			-	0
			-	0
			-	0
			-	0
			-	0
			-	0
	Total hour	s: 100	67	60
	Total of ECTS credit	s: 4	2,7	2,4
Author of the programme:		Data:		

	L informative-problem lecture										
Teaching methods	SW project method; subject exercises; programming; brainstorming; situational method; classic problem method										
reaching methous											
	-										
	L test										
Assesment methods	SW evaluation of project completion, current progress in project completion										
	<u>-</u>										
	-										
Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study									
LO1	knows and understands place of testing in the software life cycle and	INF2_W02 INF2_W08									
	can use it in practice	INF2_U10									
LO2	knows and understands basic software testing methods and	INF2_W03 INF2_W05									
	techniques and is able to test software in practice	INF2_U04 INF2_U08									
L03	is able to work in a group, taking on various roles	INF2_U13									
LO4	knows and is able to apply in practice methods of designing and verifying the architecture and implementation of large systems in the face of high reliability requirements	INF2_W05 INF2_W06 INF2_W08 INF2_U04 INF2_U08									
L05	has soft skills	INF2_U13 INF2_K04									
LO6	can design and use modular interfaces	INF2_W03 INF2_U03 INF2_U08									
L07	is able to plan and implement an iterative program development process	INF2_U04 INF2_U07									

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
L01	test, current progress in project completion	L, SW
LO2	test, current progress in project completion	L, SW
LO3	evaluation of project completion	SW
LO4	test, current progress in project completion	L, SW
LO5	current progress in project completion	SW
LO6	current progress in project completion	SW
L07	current progress in project completion	SW
Basic references	M.L. Hutcheson: Software Testing Fundamentals: I	inclined and michies. Thicy Fusilishing, Inc., 2003.
	5	
	5 1 R. Patton: Testowanie oprogramowania. Wydawnic	two MIKOM, 2002.
	R. Patton: Testowanie oprogramowania. Wydawnic S. Jarzabek: Podręcznik projektu inżynieryjnego (Pl	
Supplementary references		
Supplementary references		
Supplementary references		

Bialystok University of Technology					F	aculty of Computer Sc	ience		
Field of study	Computer science)				Degree level and programme type	full-time Master	's degree	
Specjalization / diploma path	common subject					Study profile	general acaden	nic	
Field of study	Scientific Calculations in Practice					Course code Course type	INF2ONP		
Forms and number of hours	L C LC 30	Р	SW 30	FW	S	Semester No. of ECTS credits			
Entry requirements									
Course objectives	with particular emp emphasis on com environments (e.g	ohasis o puter so J. MAPL	on sele cience E or N	ected el . Mathe IATLAE	emer matic 8). Aft	deepen the knowledge a tts of linear algebra and al operations are perforr er the course students s e of its possible applicat	differential and intended in the second	egral calculus, with the mathematical c	a clear computational
Course content	 Solving algebra Theorem. Example telecommunication Partial derivative integrals and their Selected methor Functional and 	ic probl es of ap ns and es of fu applica ods of so power s	ems. A oplicati compu nctions. tions. olving series.	Advance ons (e.e. iter scie s of ma ordinar Repres	ed ma g. app nce, ny va y first- sentat	s. Symbolic calculations. atrix calculation. Matrix d olication to analysis, com analysis of EEG signals riables. Extremes, extrei- order differential equatic ion of functions as powe unctions as Fourier serie:	ecomposition, SV pression and tran and brain NMR in mes and Lagrang ons. Examples of a er series. Application	smission of image nages in medicine. e multipliers. Doub applications. on to solving recurs	s in) le and triple sive equations.
	Student workloa	d (in ho	ours):				No. of hours	with direct teacher participation	practical
	Lecture attendance Project attendance						30	30 30	20
	Lecture test(s) atte		e				30 2	<u> </u>	30
				sessior	ns rela	ated to the module	5	5	
	Preparation for lea						5	-	
Calculation:	Preparation for pre	oject cla	asses				28	=	28
								· -	0
								· -	0
								· -	0
								-	0
									0
						Total hours	s: 100	67	58
						Total of ECTS credits	s: 4	2,7	2,3
Author of the programme:							Data:		
	L informative-	probler	n lectu	ire					
Teaching methods	SW subject exe	rcises							
	- L informative-	probler	n lectu	ire					
Assesment methods	SW evaluation o	of partia	l probl	em tasl	(S				
	-						Reference to t	he learning	
Symbol of learning outcome	Learning outcom	103					outcomes for t	he field of study	
_01						dvanced mathematical problems	INF2_W01		
	has basic knowled	lge of th	ne mat	thematio	cal co	mputing environment	INF2_W01		
_02	can use the functions of the mathematical computing environment perform selected problems of linear algebra and mathematical analysis applied in solving engineering and scientific problems						INF2_U01		
	perform selected p analysis applied in	n solving							
L03	perform selected p analysis applied in	n solving mather		compu	ting e	nvironment to create	INF2_U01		
LO3 LO4 Symbol of learning outcome	perform selected p analysis applied ir is able to use the their own applicati Methods of asse	n solving mathem ons ssing t	natical	rning o	utco		Type of tuition the outcome is	-	
LO3 LO4 Symbol of learning outcome LO1	perform selected analysis applied ir is able to use the their own applicati Methods of asse exam, evaluation	n solving mathem ons ssing the of partia	natical he lea	rning o lem tas	utco ks		Type of tuition the outcome is L, SW	-	
LO3 LO4 Symbol of learning outcome LO1 LO2	perform selected analysis applied ir is able to use the their own applicati Methods of asse exam, evaluation exam, evaluation	n solving matherr ons ssing the of partia	he lea al prob	rning o lem tas lem tas	utco ks		Type of tuition the outcome is L, SW L, SW	-	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3 LO4	perform selected analysis applied ir is able to use the their own applicati Methods of asse exam, evaluation	n solving mathem ons ssing the of partia of partia al proble	he lea al prob al prob em tas	rning o lem tas lem tas sks	utco ks		Type of tuition the outcome is L, SW	-	

 Basic references
 R. Klima, N. P. Sigmon, E. Stitzinger, Applications of Abstract Algebra with Maple and MATLAB, CRC Press, 1999

 Basic references
 G. H. Golub, Charles F. Van Loan, Matrix Computations, The John Hopkins University Press, 1996

 J. Li, Morris, Computational Methods in Elementary Numerical Analysis, John Wiley & Sons, 1983

	4		
	5		
	1	G. Strang, Computational Science and Engineering, Wellesley-Cambridge Press, 2007	
	2	E. S. Gopi, Mathematical Summary for Digital Signal Processing Applications with Matlab, Springer Science &	
	3		
	4		
Supplementary references	5		
Supplementary references	6		
	7		
	8		
	9		
	10		
Author of the programme:		Data: 04.04.202	23

Bialystok University of Technology	gy Faculty of Computer Science							Science	
Field of study	Computer science				Degree level and programme type	full-time Master's degree			
Specjalization / diploma path	common subject						Study profile	general academic	
Field of study	Distribute d Internet Curstance							Course code	INF2RSI
Field of study	Distributed Internet Systems E Course		Course type	obligatory					
Forms and	L	С	LC	Р	SW	FW	S	Semester	1
number of hours	30				30			No. of ECTS credits	4

Entry requirements	
Course objectives	The aim is to familiarize students with selected methodologies for implementing distributed systems on the Internet. Detailed discussion of issues related to SOAP and RESTful web services.
Course content	 Lecture: 1. JAVA Remote Method Invocation – remote objects, register, interfaces, substitutes, passing arguments. 2. The concept of Web Services, components, review of specifications and implementation. 3. SOA model. 4. Simple examples of web services. 5. Transport implementation for WWW services - SOAP protocol. Web service description - WSDL language. 6. Secure execution of calls to web services - WS-Security specifications, use of SSL. 7. Transferring binary files, handlers, error handling, asynchronous calls. 8. WS-Addressing, WS-Policy specifications. 9. Features of the REST architecture and its applications in the implementation of web services. 10. Selected issues of building RESTful web services: safe and idempotent methods, HTTP response codes, HATEOAS implementation, filters, interceptors, error capture. 11. Enterprise messaging systems, JMS API Programming Model. Specialist workshop: 1. Java RMI – running examples and writing applications with Java RMI. 2. Issues with SOAP web services: launching web services using the JAX-WS specification, using SoaPUI, testing the impact of JAX-WS annotations on WSDL, handlers, authentication implementation , using WS-Security and SSL, generating exceptions, sending binary attachments, writing projects. 3. Issues with RESTful web services: creating web services using the JAX-RS specification, testing annotations, generating various resource representations, testing web services using the Postman application, building applications with CRUD functionality, context, creating a client based on the Jersey library, WADL, monitoring queries and responses definition of an application using enterprise messaging systems based on JMS.

	Student workload (in hours):	No. of hours	with direct teacher participation	practical
	Lecture attendance	30	30	
	Project attendance	30	30	30
	Lecture test(s) attendance	2	2	
	Participation in teacher-student sessions related to the module	5	5	
	Preparation for lecture test(s)	3		
Calculation:	Preparation for project classes	30		30
				0
				0
				0
				0
				0
				0
	Total hou	ırs: 100	67	60
	Total of ECTS cred	its: 4	2,7	2,4
Author of the programme:		Data:		
	L Informative-problem lecture			
a a a h in ar an a th a sta	SW Programming using a computer			
eaching methods	-			
	-			
	L Informative-problem lecture			
	SW Programming using a computer			
ssesment methods	-			

	-	
Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Student	
L01	understands the semantics of remote procedure call, identifies problems related to its implementation and knows the solutions used	INF2_W05
LO2	has knowledge of the concept of Web Services, the SOA model and the protocols and standards used to implement these issues	INF2_W05
LO3	knows the structure of an application compliant with the J2EE specification and understands the mechanisms implemented within this specification	INF2_W05
LO4	can design and implement a distributed system using the Web Services concept	INF2_U08

LO5	can design and implement a distributed system using the J2EE specification	INF2_U03
LO6	is able to analyze the needs of a potential customer ordering an information system and adapt its solutions to the identified needs	INF2_U04
L07		

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed					
LO1	exam	L					
LO2	exam	L					
LO3	exam	L					
LO4	evaluation of project completion	SW					
LO5	evaluation of project completion	SW					
LO6	evaluation of project completion	SW					
L07							
	1 Java API for XML-Based Web Services, https://jcp.org						
Basic references	2 Java API for RESTful Web Services, https://jcp.org/en/jsr/detail?id=339.						
	3 http://www.w3c.org						
	4 Jersey User Guide, https://jersey.github.io/documentation/latest/index.html						
	5						
	1 Metro - Webservice toolkit, https://javaee.github.io/me	tro/.					
	2 GlassFish Server, https://javaee.github.io/glassfish/.						
	3						
	4						
Supplementary references	5						
Supplementary references	6						
	7						
	8						
	9						
	10						
Author of the programme:		Data:	22.05.2020				

Bialystok University of Technology	y Faculty of Computer Science						Science		
Field of study	Comp	outer se	cience					Degree level and programme type	full-time Master's degree
Specjalization / diploma path	common subject							Study profile	general academic
Field of study	Advanced Database Systems and				and		Course code	INF2ZBD	
Field of Study	Data	Wareh	ouses					Course type	obligatory
Forms and	L	С	LC	Р	SW	FW	S	Semester	
number of hours	30				30			No. of ECTS credits	3
Entry requirements									
Course objectives		sis bas							timization in practice, NoSQL databases and data s will also be covered as part of specialist workshop
	Lectu 1. Pro		al SQL	langu	lage.				

- Advanced database objects: functions, packages, triggers.
 Query optimization in practice.
 Data models in data warehouses.

- 5. Data warehouse architecture.
- 6. SQL for OLAP: multiple grouping.7. SQL for OLAP: analytical functions.
- 8. Integration of data from various sources.
- Course content
- 9. NoSQL databases (DB based on key values, document BD, column BD, graph BD). NoSQL databases (DB based on key values, document BD 10. Data analysis based on Bayesian networks. Specialist workshop:
 Procedural SQL language.
 Advanced database objects: functions, packages, triggers.
 Data models in data warehouses.
 SQL for OLAP: multiple grouping.
 SQL for OLAP: multiple grouping.
- - 5. SQL for OLAP: analytical functions.
 - 6. Integration of data from various sources.
 - NoSQL databases (DB based on key values, document BD, column BD, graph BD).
 Data analysis based on Bayesian network models.

	Student workload (in hours):	No. of hours	with direct teacher participation	practical
	Lecture attendance	30	30	
	Project attendance	30	30	30
	Lecture test(s) attendance		0	
	Participation in teacher-student sessions related to the module	5	5	
	Preparation for lecture test(s)	10		
Calculation:	Preparation for project classes	25	-	25
			-	0
			-	0
			-	0
			-	0
			-	0
			-	0
	Total hours	s: 100	65	55
	Total of ECTS credits	s: 4	2,6	2,2
Author of the programme:		Data:		

	L Informative-problem lecture								
Teaching methods	SW Programming using a computer								
reaching methods	-								
	-								
	L exam								
Assesment methods	SW evaluation of project completion, tests, activity during classes								
	-								
	-								
Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study							
St	udent								
L01	knows the principles of creating advanced SQL queries to data warehouses based on analytical functions; can create these types of queries	INF2_W03 INF2_W05 INF2_U06							
L02	can use a NoSQL database and formulate commands for selecting and modifying data	INF2_U04 INF2_U08							
LO3	can design data warehouse models	INF2_U04 INF2_U06							
LO4	can integrate data from various sources	INF2_U03 INF2_U04 INF2_U06							
LO5	is able to analyze data based on Bayesian network models	INF2_W07 INF2_U08 INF2_U09							
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed							
LO1	test	L, SW							

LO2	activity during classes SW							
LO3	evaluation of project completion SW							
LO4	evaluation of project completion SW							
L05	test, activity during classes L, SW							
	1 B. Inmon, D. Strauss, G. Neushloss, DW 2.0 – Architecture for the Next Generation of Data War 2 F. Silvers, Building and Maintaining a Data Warehouse, Auerbach Publications, 2008.	ehousing,						
Basic references	3 <u>4</u> 5							
	1 2 3							
Supplementary references	4 5							
	6 7							
	8 9 10							
Author of the programme:	Data:	20.05.2020						

Bialystok University of Technolog	y Faculty of Computer Scie	ence		
Field of study	Computer science Degree level and programme type	full-time Master	s degree	
Specjalization / diploma path	common subject Study profile	general academ	nic	
Field of study	Internet of Things Course code Course type	INF2IOT obligatory		
Forms and number of hours	L C LC P SW FW S Semester 15 30 No. of ECTS credits			1
Entry requirements				
Course objectives	The aim of the course is to introduce students to the issues of "Internet the possibilities of IoT, the systems used, standards, and they will che			learn to use
Course content	Lecture: The concept of "Internet of Things". IoT platforms and environments u interfaces. Wireless interfaces. Design focused on reducing energy co Lab: IoT platforms. Development environments. Preparation for work and fi Communication with peripheral devices. Remote communication. Prac consumption. Design and implementation of an IoT system.	used. Standards. onsumption (low p ïrst start-up. Basi	Tests and self-test power design). c tests and self-test	sting.
	Student workload (in hours):	No. of hours	with direct teacher participation	practical
	Lecture attendance	15	15	
	Laboratory classes attendance	30	30	30
	Lecture test(s) attendance Participation in teacher-student sessions related to the module	5	0	
	Preparation for lecture test(s)	0	0	
Calculation:	Preparation for project classes	25	-	25
			-	0
			-	0
			-	0
			-	0
	Total hours:	: 75	50	55
	Total of ECTS credits:	÷	2,0	2,2
Author of the programme:		Data:		
	L Informative-problem lecture			
Teaching methods	SW Programming using a computer, simulation, exercises			
Assesment methods	L test SW evaluation of project completion, activity during classes			
Symbol of learning outcome				
	Learning outcomes	Reference to the outcomes for the outcom	ne learning he field of study	
	Student		-	
L01	Student knows and understands key issues in the field of "Internet of Things" and its applications	outcomes for t	he field of study	
L01 L02	Student knows and understands key issues in the field of "Internet of Things"	INF2_W03 INF2 INF2_W05 INF2_U03 INF2	he field of study	
	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in loT design knows, uses and properly selects communication interfaces	INF2_W03 INF2 INF2_W05	he field of study 2_W06 _U06	
LO2	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design	outcomes for ti INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_U03 INF2 INF2_U03 INF2	he field of study 2_W06 _U06 _U08	
L02 L03	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_W05 INF2_U03 INF2	he field of study 2_W06 _U06 _U08 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_U03 INF2 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L	he field of study 2_W06 _U06 _U08 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in loT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test test test, evaluation of project completion, activity during classes	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_W05 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L L, LC	he field of study 2_W06 _U06 _U08 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_U03 INF2 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L	he field of study 2_W06 _U06 _U08 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in loT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test test, evaluation of project completion, activity during classes evaluation of project completion, activity during classes	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_W05 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L L, LC LC	he field of study 2_W06 _U06 _U08 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test test, evaluation of project completion, activity during classes	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_W05 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L L, LC LC	he field of study 2_W06 _U06 _U08 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in loT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test test, evaluation of project completion, activity during classes evaluation of project completion, activity during classes	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_W05 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L L, LC LC	he field of study 2_W06 _U06 _U08 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3 LO4	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test test, evaluation of project completion, activity during classes a https://www.raspberrypi.org/ 1 https://www.st.com/en/products/socs/esp32/overview 4 https://www.st.com/en/microcontrollers-microprocessors/stm32/	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_U03 INF2 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L L, LC LC	he field of study 2_W06 _U06 _U08 during which assessed	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3 LO4	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test test, evaluation of project completion, activity during classes 1 https://www.raspberrypi.org/ 2 https://www.arduino.cc/ 3 https://www.st.com/en/microcontrollers-microprocessors/stm32/ 5	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_U03 INF2 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L L, LC LC	he field of study 2_W06 _U06 _U08 during which assessed	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3 LO3 LO4	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test test, evaluation of project completion, activity during classes 1 https://www.raspberrypi.org/ 2 https://www.espressif.com/en/products/socs/esp32/overview 4 https://www.st.com/en/microcontrollers-microprocessors/stm32 5 1	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_U03 INF2 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L L, LC LC	he field of study 2_W06 _U06 _U08 during which assessed	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3 LO4	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test test, evaluation of project completion, activity during classes evaluation of project completion, activity during classes evaluation of project completion, activity during classes 1 https://www.raspberrypi.org/ 2 https://www.st.com/en/products/socs/esp32/overview/ 4 https://www.st.com/en/products/socs/esp32/overview/ 1 2 3 3	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_U03 INF2 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L L, LC LC LC	he field of study 2_W06 _U06 _U08 during which assessed	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3 LO4 Basic references	Student knows and understands key issues in the field of "Internet of Things" and its applications knows and is able to use platforms, environments and standards in IoT design knows, uses and properly selects communication interfaces can take into account the need to reduce energy consumption when designing and programming Methods of assessing the learning outcomes test test test, evaluation of project completion, activity during classes 1 https://www.raspberrypi.org/ 2 https://www.espressif.com/en/products/socs/esp32/overview 4 https://www.st.com/en/microcontrollers-microprocessors/stm32 5 1 1 2	outcomes for t INF2_W03 INF2 INF2_W05 INF2_U03 INF2 INF2_U03 INF2 INF2_U03 INF2 INF2_U08 Type of tuition the outcome is L L, LC LC LC	he field of study 2_W06 _U06 _U08 during which assessed	

Author of the programme:

Bialystok University of Technology	Faculty of Computer Sc	ience		
Field of study	Degree level and	full time Menter		
	Computer science programme type	full-time Master's	s degree	
Specjalization / diploma path	common subject Study profile	general academ	lic	
Field of study	Entrepreneurship Course code	INF2PRZ		
Forms and	Course type	obligatory		
number of hours	L C LC P SW FW S Semester 15 No. of ECTS credits			:
Entry requirements Course objectives	The aim of the course is to improve the students competence of aca	demic entrepreneu	urship in advance	d topics.
Course content	 Introduction to the subject, definition of passing requirements and Short business presentations of all projects submitted by students Division into groups. Organizational culture. Obtaining funds - types of financing sources. One-pager document - discussion and preparation. Pitch-Elevator document - discussion and preparation. BrandBook document - discussion and preparation. Business Plan document - discussion and preparation. Final project presentations. 		ding students into	groups.
	Student workload (in hours):	No. of hours	with direct teacher participation	practical
	Lecture attendance Project attendance	15	0 15	15
	Lecture test(s) attendance		0	
	Participation in teacher-student sessions related to the module	5	5	
Calculation:	Preparation for lecture test(s) Preparation for project classes	55		55
Salculation.		55		0
				0
			-	0
				0
				0
	Total bound			0
	Total hours Total of ECTS credits	-	20 0,8	70 2,8
Author of the programme:		Data:	0,0	2,0
	L project method, brainstorming, subject exercises			
	-			
Teaching methods	-			
	-			
	C evaluation of project completion			
Assesment methods				
	-			
Symbol of learning outcome	Learning outcomes	Reference to th		
· · ·	5	outcomes for t	he field of study	
	udent			
	udent knows the process of incubation of technology companies	INF2 W09 INF2	2 W10	
_01	knows the process of incubation of technology companies established based on the effects of commercialization of projects	INF2_W09 INF2 INF2_U07	2_W10	
LO1	knows the process of incubation of technology companies		2_W10	
	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy	INF2_U07 INF2_K04 INF2_W09 INF2		
	knows the process of incubation of technology companies established based on the effects of commercialization of projects	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07		
	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04	2_W10	
_02	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07	2_W10	
_02	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2	2_W10	
_02	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2	2_W10 2_W10	
LO2 LO3	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_K04 INF2_K04 INF2_W09 INF2 INF2_U07	2_W10 2_W10	
_02 _03 _04	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service has the attitude of an enterprising constructor/designer who repeatedly verifies the designed product/service	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_U07 INF2_L07 INF2_K04	2_W10 2_W10 2_W10	
L02 L03 L04	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service has the attitude of an enterprising constructor/designer who	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_K04 INF2_K04 INF2_W09 INF2 INF2_U07	2_W10 2_W10 2_W10 during which	
LO2 LO3 LO4 Symbol of learning outcome	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service has the attitude of an enterprising constructor/designer who repeatedly verifies the designed product/service	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_U07 INF2_K04 Type of tuition the outcome is C	2_W10 2_W10 2_W10 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service has the attitude of an enterprising constructor/designer who repeatedly verifies the designed product/service Methods of assessing the learning outcomes evaluation of project completion	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 Type of tuition the outcome is C C	2_W10 2_W10 2_W10 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service has the attitude of an enterprising constructor/designer who repeatedly verifies the designed product/service Methods of assessing the learning outcomes evaluation of project completion evaluation of project completion	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 Type of tuition the outcome is C C	2_W10 2_W10 2_W10 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service has the attitude of an enterprising constructor/designer who repeatedly verifies the designed product/service Methods of assessing the learning outcomes evaluation of project completion	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 Type of tuition the outcome is C C	2_W10 2_W10 2_W10 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service has the attitude of an enterprising constructor/designer who repeatedly verifies the designed product/service Methods of assessing the learning outcomes evaluation of project completion evaluation of project completion evaluation of project completion	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 Type of tuition the outcome is C C	2_W10 2_W10 2_W10 during which	
LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service has the attitude of an enterprising constructor/designer who repeatedly verifies the designed product/service Methods of assessing the learning outcomes evaluation of project completion evaluation of project completion evaluation of project completion evaluation of project completion 1	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 Type of tuition the outcome is C C	2_W10 2_W10 2_W10 during which	
LO1 LO2 LO3 LO4 Symbol of learning outcome LO1 LO2 LO3 LO4 Basic references	knows the process of incubation of technology companies established based on the effects of commercialization of projects resulting from the transfer of knowledge to the economy creates assumptions for the business model of an innovative economic venture verifies the adopted business model of the designed product or service has the attitude of an enterprising constructor/designer who repeatedly verifies the designed product/service Methods of assessing the learning outcomes evaluation of project completion evaluation of project completion evaluation of project completion	INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 INF2_W09 INF2 INF2_U07 INF2_K04 Type of tuition the outcome is C C	2_W10 2_W10 2_W10 during which	

	5		
	1		
	2		
Supplementary references	3		
	4		
	5		
Author of the programme:		Data:	22.05.2020

Bialystok University of Technology							Faculty of Computer S	Science
Field of study	Compute	er science	9				Degree level and programme type	full-time Master's degree
Specjalization / diploma path	commor	n subject					Study profile	general academic
	IT Projo	ct Manag	omont				Course code	INF2ZPI
Field of study	II Proje	ct manag	ement				Course type	obligatory
Forms and		C LC	Р	SW	FW	S	Semester	
number of hours	30	15					No. of ECTS credits	3
Entry requirements								
Course objectives	learn wh		ect mai	nagem	ient is al	labo		ssues related to project management. Students will practical knowledge related to them. They will also
Course content	3. Descr project n 4. Under career p 5. Descr Project N manage Classes: During p what the estimatir 1. Metho Develop 2. Estim: project o 3. Prepa Determin 4. Detern quality. A requirem 5. Super for the p 6. Risk a 7. Positio	nanagem rstand the ath for inf libe the pr Managemment soft : rractical cl basic stan g project dologies ment of n ating the opening m rration of f ining the r mining pro- Analysis c nents. vising the roject bei analysis. F	tt mana ent knor role of oject rr ent Ins ware. asses, iges of tasks. for det he proj esourcc, ng impl reparin project qu f comp	ageme wwledg f a projon tech hanage titute, 1 studer the pro The d erminir ies and quired s. ject bu ss nec- uality ir leted t Vorgan ement to g a st t team	nt and d e areas, ject man nology p ement pr the impo- nts will a oject are etailed s og the sc d project for each dget, es essary to ndicators asks. As nization o ted. rategy to	con age oroje ofes ortan cqui e as v cope i indi a tas tima o ac sess: . De sess: of pro	nmonly used tools and r, describe what project act managers is. ssion, including its histo ce of certification and e re practical knowledge well as acquire adequa e of issues covered in th of the project and deta icators. Creating a proje k. Assessment of task p tion of financial resource hieve the project goal a sscribing elements indic sment of the degree of oject meetings. Agile m spond to emerging risks tasks for individual tear	ject management, including project stakeholders, techniques, and project success factors. t managers do, what skills they need and what the ry, the role of professional organizations such as the thics, and show the development of project related to IT project management. They will also learn te knowledge in team cooperation and planning and he exercises is as follows: illed functional and non-functional requirements. act card. performance indicators. Planning and implementing es necessary to implement individual tasks. and the internal goals of each task. traing that the task was performed with adequate implementation of functional and non-functional ethodology. Selection of the appropriate methodology the Risk avoidance. Procedure in the event of risk. n members. Team Leader.

8. Issues related to closing the project. Final report.

	Student workload (in hours):	No. of hours	with direct teacher participation	practical					
	Lecture attendance	30	30						
	Project attendance	15	15	15					
	Lecture test(s) attendance		0						
	Participation in teacher-student sessions related to the module	5	5						
	Preparation for lecture test(s)	0							
Calculation:	Preparation for project classes	20	_	20					
			_	0					
				0					
			0						
				0					
			_	0					
				0					
	Total hours:	70	50	35					
	Total of ECTS credits:	3	2,0	1,4					
author of the programme:		Data:							
	L lecture problem, talk, informative lecture								
acching matheda	C project method, subject exercises, demonstration, programming	g, simulation gan	nes, situational me	thod					
eaching methods									
	-								
	L test								
ssesment methods	C evaluation of project competion, activity during classes								
assesment methous	-								

 Symbol of learning outcome
 Learning outcomes
 Reference to the learning outcomes for the field of study

 Student
 Image: Student stude is the project is and what its key elements are
 INF2_W02 INF2_W08

Author of the programme:		Data:	22.05.2020			
	5					
	4					
Supplementary references	3					
	2					
	1					
	5					
	4					
Basic references	3					
	2					
	1					
	,	_, _				
LO4	test, activity during classes	L, C				
L03	test, activity during classes	L, C				
LO2	test, activity during classes	L, C				
LO1	test	L				
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed				
LO4	zarządzać niewielkim zespołem i wykazuje się wiedzą w zakresie organizacji prac zespołu	INF2_U10 INF2_U13 INF2_K04 INF2_K05				
	implement the design process rozumie potrzebę zarządzania zespołem projektowym; umie	INF2 W02 INF2 W08				
LO3	are, and knows what the "design triangle" is; understands the essence of the project and is able to independently plan and	INF2_W02 INF2_W08 INF2_U10 INF2_U13 INF2_K05				
L02	is able to independently implement project management procedures; understands the role of a project manager and demonstrates knowledge of the skills necessary for this role; is able to cdrnndepently develope and what a stratectis; for acrusticity edemonst	INF2_W02 INF2_W08 INF2_U10 INF2_U13				

Bialystok University of Technology	Faculty of Computer Science								
Field of study	Comp	uter s	cience					Degree level and programme type	full-time Master's degree
Specjalization / diploma path	comm	on su	bject					Study profile	general academic
Field of study	Histor	vofN	<i>l</i> lathem	atics				Course code	INF2HMA
	mator	y 01 1	hattietti	anco				Course type	elective
Forms and	L	С	LC	Ρ	SW	FW	s	Semester	
number of hours	30							No. of ECTS credits	
Entry requirements									
Course objectives	creatio outsta	on of r nding	nathem	atical naticia	theorie ans fro	es and m anci	the s ent ti	olutions to specific prob mes to the twentieth cer	ment of the most important mathematical ideas, the plems. Presentation of the achievements of the most ntury, including a discussion of the achievements of
Course content	Euclid Eratos 2. Mati 3. The 4. The	s Eler thene hema histo histo	ments a s and E tics and ry of the ry of the	nd the liopha India creat deve	eir influ intus a n math ion of lopme	ience c ind the nemational algebra	n the ir influ cians a, Ca ffere	e development of mathe uence on the developm , mathematics in Arab c	countries. Mathematics of the Middle Ages in Europe. Viete, Lagrange, Abel, Gauss and Galois.

The most important achievements of Polish mathematicians.
 The life and work of mathematicians will be presented in the context of other achievements in human creative activity and important historical events.

	Student workload (in hours):	No. of hours	teacher participation	practical
	Lecture attendance	30	30	
	Project attendance		0	0
	Lecture test(s) attendance		0	
	Participation in teacher-student sessions related to the module	5	5	
	Preparation for lecture test(s)	15		
Calculation:	Preparation for project classes		-	0
			-	0
			-	0
			-	0
			-	0
			-	0
			-	0
	Total hou	rs: 50	35	0
	Total of ECTS credit	ts: 2	1,4	0,0

Author of the programme:		Data:
Teaching methods	L Informative lecture	
Assesment methods	- <u>L</u> test - -	
Symbol of learning outcome	- Learning outcomes	Reference to the learning outcomes for the field of study
	Student	
L01	knows the most famous mathematical problems, attempts to solve them determined the creation and development of mathematical theories	INF2_W01 INF2_K02 INF2_K04
LO2	knows approximately the most important achievements of outstanding mathematicians	INF2_W01 INF2_K02 INF2_K04
LO3	can identify approximate moments in history when the most outstanding mathematicians created their work	INF2_K02 INF2_K03
LO4	can list the most important achievements of Polish mathematicians	INF2_W01 INF2_K01 INF2_K02
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
L01	test	L
L02	test	L
LO3	test	L
LO4	test	L
	1	
	2	

3

	4		
	5		
	1		
	2		
Supplementary references	3		
	4		
	5		
Author of the programme:		Data	22.05.2020

Bialystok University of Technolog	gy Faculty of Comp	outer Science	
Field of study	Computer science Degree level a programme ty	nd full-time Master's degree	
Specjalization / diploma path	common subject Study profile	general academic	
Field of study	Introduction to Modern Music Course code Course type	INF2WMW elective	
Forms and number of hours	L C LC P SW FW S Semester 30 30 No. of ECTS c	redits	1 2
Entry requirements			
Course objectives	To acquaint students with the selected topics in contemporar works in contemporary music	ry music. To acquaint students with compose	rs and musical
Course content	Impressionist music (C. Debussy, M. Ravel). Minimal music (E. Satie). Polish contemporary music (K. Penderecki, H.M. Górecki, W Jazz (S. Joplin, L. Armstrong, D. Ellington, Ch. Parker, D. Br Film score (E. Morricone, H. Zimmer, J. Williams, J. Barry). Polish film score (J. Kaczmarek, W. Kilar, M. Lorenc).		
	Student workload (in hours):	with direct No. of hours teacher participation	practical
	Lecture attendance Project attendance	<u> </u>	0
	Lecture test(s) attendance	0	0
	Participation in teacher-student sessions related to the modu		
	Preparation for lecture test(s)	15	
Calculation:	Preparation for project classes		0
			0
			0
			0
			0
			0
	Tot	al hours: 50 35	0
	Total of ECTS		0,0
Author of the programme:		Data:	
	L conversational lecture, informative lecture		
Teaching methods			
	<u>-</u>		
	- L test		
	L test		
Assesment methods	-		
	-		
Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study	
	Student		
L01	knows the greatest composers and their works in contempor music.	INF2_K0 INF2_K03	
LO2	participates in cultural events	INF2_K03	
LO3	is able to analyze musical forms.	INF2_K01 INF2_K04	
LO4	knows the impact of technology and culture-art in the develo societies	pment of INF2_K02 INF2_K03	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	test	L	
L02 L03	test	L	
L03 L04	test	L	
		E	
	1 A history of Jazz Music, http://www.scaruffi.com/histor	y/jazz1.html	
	2 A history of Jazz, http://www.historyjazz.com/.		
Basic references	3 Classical Music, http://www.classical-music.com/great	•	
	4 A Brief History of Film Music, http://www.mfiles.co.uk/f	ilm-music-history.htm.	
	5		
	1 2		
Supplementary references	<u>2</u> 3		
exploring relevances	4		
	5		
Author of the programme:		Data:	22.05.2020

Bialystok University of Technology	Faci	ulty of Computer Scie	ance		
Field of study	Computer science De	egree level and ogramme type	full-time Master's	s degree	
Specjalization /	common subject St	udy profile	general academ	lic	
diploma path Field of study	Introduction to Photography Co	ourse code	INF2FOT		
Forms and		ourse type	elective		1
number of hours		o. of ECTS credits			2
Entry requirements					
Course objectives	To familiarize students with the history of photog photographers and different types of photograph presentation and copyright protection and image	hs. To familiarize stude			
Course content	 Basic photographic terms. Selected aspects of visual perception. The most famous artists and their most famou 4. Types of photography. Basic principles in photography - framing, exp 6. Protection of intellectual property in photograp 7. The impact of technology development on the 8. The role and use of photography in the mode 	posure, lighting, etc. phy. e development of phot	ography.		
	Student workload (in hours):		No. of hours	with direct teacher participation	practical
	Lecture attendance		30	30	
	Project attendance Lecture test(s) attendance			0	0
	Participation in teacher-student sessions related	d to the module	5	5	
Ostavlation	Preparation for lecture test(s)		15	_	-
Calculation:	Preparation for project classes		<u> </u>	-	0
				-	0
				-	0
				_	0
				-	0
		Total hours:	50	35	0
	т	otal of ECTS credits:		1,4	0,0
Author of the programme:			Data:		
	L Informative lecture				
Teaching methods	-				
-	-				
	L test				
Assesment methods	-				
Assesment methods					
	-		Reference to th	e learning	
Symbol of learning outcome	Learning outcomes			he field of study	
S	Student				
L01	knows the basic principles in photography	h - ¹ 2	INF2_K02	1400	
L02 L03	knows the most outstanding photographs and th can describe the known principles and means a		INF2_K01 INF2 INF2_K02 INF2		
	understands the joint influence of technology and				
LO4	development		INF2_K03 INF2		
L05	knows the problems of intellectual property prote	ection in photography	INF2_K03 INF2		
Symbol of learning outcome	Methods of assessing the learning outcome	S	Type of tuition the outcome is		
L01 L02	test test		L		
LO3	test		L		
LO4	test		L		
L05	test		L		
	1				
	2				
Basic references	3				
	4				
	5				
	2				
Supplementary references	3				
	4				

5		
Author of the programme:	Data:	22.05.2020

Bialystok University of Technology	Facul	ty of Computer Sci	ence		
Field of study	Computer science	gree level and gramme type	full-time Master	s degree	
Specjalization / diploma path	common subject Stu	dy profile	general academ	lic	
Field of study	Introduction to Research Design	irse code irse type	INF2WBN obligatory		
Forms and		nester			
number of hours	15 No.	of ECTS credits			
Entry requirements					
Course objectives	The aim of the course is to familiarize students wi use different methodologies and tools, there are r addition to common methodologies, the course w science. Knowledge of these methodologies will t according to the study regulations should contain	many common parts /ill pay particular atte pe useful in the final	and the course v ntion to the metho stage of Master's	vill primarily focus o odologies used in o	on them. In computer
Course content	 The nature of scientific research, scientific rese Review of selected topics in statistics, causality Architecture of scientific experiments: Experime Problems faced by empirical inquiry Computer simulation, computer-intensive meth Computer-based discovery Analysis of selected examples of research proj 	y and probability ental, quasi-experim nods		ıl designs	
	Student workload (in hours):		No. of hours	with direct teacher participation	practical
	Lecture attendance		20	20	
	Project attendance			0	0
	Lecture test(s) attendance			0	
	Participation in teacher-student sessions related t	to the module		0	
Pelevletien	Preparation for lecture test(s)			_	
Calculation:	Preparation for project classes			_	0
				-	0
				-	0
				-	0
				-	0
				-	0
		Total hours	20	20	0
	Το	tal of ECTS credits		0,8	0,0
A				-1-	-,-
Author of the programme:			Data:		
	L Informative-problem lecture, discussion				
Teaching methods					
0	<u>-</u>				
	-				
	L exam				
Assesment methods	-				
			Reference to the	e learning	
Symbol of learning outcome	Learning outcomes			he field of study	
Stud	dent				
01	understands principles underlying scientific resea	urch	INF2_W09		
_01			INF2_K01		
_02	will learn how to design scientific research, includ empirical experiments	ing the design of	INF2_W04 INF2_K04		
L03	understands the relationship between probability crucial in interpreting the results of scientific expe		INF2_K04		
LO4	understands problems and difficulties related to s and is capable of handling them	cientific research	INF2_W04 INF2_W09		
Symbol of learning outcome	Methods of assessing the learning outcomes		Type of tuition the outcome is	-	
LO1	Class discussions, examination		L		
LO2	Class discussions, examination		L		
LO3	Class discussions, examination		L		
LO4	Class discussions, examination		L		
	Paul R. Cohen, "Empirical Methods for Arti 03225-2 Donald T. Campbell, Julian C. Stanley, "Ex				
Basic references	² Houghton Mifflin Co., 1966, ISBN 0-395-30		si-Experimental L	esigns for Kesear	UIT, BUSION:
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	1	Robert Rosenthal, Ralph L. Rosnow, "Essentials of Behavioral Research: Methods and Data Analysis", New Yo McGraw-Hill, 1991, ISBN 0-07-053929-4