

International Information Technology University JSC

Faculty of Information Technology

Department of Radio Engineering, Electronics and Telecommunications

Approved

Vice-Rector for Academic and Educational
Affairs of IITU JSC, PhD

_____ Umarov T.F.

« ___ » _____ 2019

SYLLABUS (ACADEMIC PROGRAM)

Course (code, title): VVP 1205 Introduction to programming

Major: 5B011000 « Physics »

Educational program (code, title): 6B01503 « Computer Physics »

Year: 1; Semester: 2; Number of credits: 5 ECTS

Lectures: 15 hours

Laboratory classes: 30 hours

T/SIS: 105 hours

Total: 150 hours

Final assessment form: Written examination

Almaty 2019

Academic program of the course (code, title) VVP 1205 Introduction to programming has been developed on the basis of Academic Plan of the educational programs 6B01503 « Computer Physics »

Academic program has been reviewed at the meeting of Information Systems department.

Minutes №1 dated 28.08.2019

Head of the Department _____ V.Serbin_

Author _____ Ukibassov B.M.

The working academic program was approved at the meeting of the Educational and Methodological Board of JSC "IITU"

Minutes №1 dated 29.08.2019

Director of the Department _____ A.Mustafina
for Academic Affairs *Signature*

1. General information	
Faculty	Information Technology
Major code and title	5B071900-Radio Engineering, Electronics and Telecommunications B059 – Communication and Communication Technology
Educational program code and title	6B06201-Telecommunication Systems and Networks 6B06202-Wireless Information Systems
Year, semester	1 year, 2 semester
Subject category	Basic
Number of Credits	5 ECTS
Language of delivery:	English
Prerequisites:	VVP 1205 Introduction to programming
Postrequisites	OOP
Lecturer	Ukibassov B.M., senior-lecturer, Masters ukibas.b@gmail.com office 802, office hours: Mon 12:00-14:00
Instructors	Ukibassov B.M., senior-lecturer, Masters ukibas.b@gmail.com office 802, office hours: Mon 12:00-14:00
2. Goals, objectives and learning outcomes of the course	
<p>The goal of the course is to provide students with knowledge and skills necessary to write computer programs using imperative programming and algorithms.</p> <p>The objectives of the course are to:</p> <ul style="list-style-type: none"> • provide the student with a basic knowledge of imperative programming and algorithms; • provide the student with a sufficient background in these areas so that the student will then be ready to take advanced courses in these areas; • provide the student with the knowledge of these areas necessary to the pursuit of his/her major course of study in science or engineering; • develop in the student an analytic approach to problem solving, both in science and "everyday life"; • develop in the student an appreciation of the role of science in our current society, as well as in the past, and towards the future. <p>Learning outcomes of the course</p> <ul style="list-style-type: none"> • Formulate basic concepts and principles of solving problems related to computer science; • To identify the types of variables for solving the practical tasks; • To compare and contrast the different ways of solving a problem after testing the program; • To explain the constituted program documentation; • To list data structures, operators and basic algorithmic construction in C++. 	
3. Course description	
To learn basic of imperative programming and algorithms, data structures and to write programs to solve practical problems using the C++ programming language.	
4. Course policy	
Students are not allowed to miss classes, use cell phones during classes, browse the social networks and play on-line games. There are no late workshops for students who missed lecture or laboratory class. Instructor may change course outline at any time during the course. Cheating will not be tolerated. Students caught cheating will receive a "0" for the assignment.	
5. Literature	
<p>Basic literature:</p> <p>1.H. M. Deitel, Prentice Hall, C++, How to Program, 10th.Edition. 2017.-1568 p.</p> <p>2.Pachshenko G.N. Tutorial on course “Algorithms, data structures and programming”, -Almaty, 2017.-</p>	

202 p.

Supplementary literature:

1. <https://informatics.mccme.ru/>
2. <http://www.cplusplus.com>
3. <http://cppstudio.com>

Lecture, practical/seminar/laboratory session plans

Abbreviation	Meaning
TSIS	Teacher-supervised independent study (TSIS)
SIS	Students' independent study (SIS)
LW	Laboratory Work
LD	Lab Defense
PA	Practical assignment
TP	Team project
Ex	Exercise
CW	Course Work
MT	MidTerm
ET	EndTerm

6. Course Content

Week No	Course Topic	Reference Materials	Lectures (1 h/w)	Lab. Sessions (2 h/w)	TSIS (1 h/w)	SIS (6 h/w)
1	History of C++. Variables and Types. Flowcharts. Building blocks.	[1]	1	2	1	6
2	Declaration of variables. Operators. Initialization of variables. Type deduction: auto and decltype. Introduction to strings. Literals. Integer Numerals. Floating Point Numerals. Character and string literals. Other literals. Typed constant expressions. Preprocessor definitions. Operators. Assignment operator. Arithmetic operators. Compound assignment. Increment and decrement. Relational and comparison operators. Logical operators. Conditional ternary operator. Comma operator. Bitwise operators. Explicit type casting operator. Other operators. Basic Input/Output. Standard output. Standard input.	[1], [2], [3]	1	2	1	6
3	Iteration statements (loops). The standard header <code><sstream></code> . Statements and flow control. Selection statements: if and else. Iteration statements (loops).	[1], [2]	1	2	1	6

	Iteration statements (loops). The do-while loop. The for loop. Range-based for loop. Jump statements. The break statement. The continue statement. The goto statement. The switch statement.					
4	Arrays. Initializing arrays. Accessing the values of an array.	[1], [2], [3]	1	2	1	6
5	Multidimensional arrays. Arrays as parameters. Library arrays.	[1], [4],	1	2	1	6
6	Multidimensional arrays. Sum of the elements of all matrix. Product of the elements. Number of the elements. Sum of every row and every column.	[1], [2], [3], [4],[5], [6],[7]	1	2	1	6
7	Character sequences. Initialization of null-terminated character sequences. Strings and null-terminated character sequences.	[1], [2], [3],	1	2	1	6
8	Functions. Functions with no type. The use of void. The return value of main. Arguments passed by value and by reference.	MCQ + Practical Exercises	1	2	1	6
9	Functions. Efficiency considerations and const references. Inline functions. Default values in parameters. Declaring functions	[1], [2], [3]	1	2	1	6
10	Recursion. Recursive function.	[1], [2]	1	2	1	6
11	Data structures. Nesting structures.	[1], [2],[3]	1	2	1	6
12	Pointers. Address-of operator. Dereference operator. Declaring pointers. Pointers and arrays. Pointer initialization. Pointer arithmetics. Pointers and const. Pointers and string literals. Pointers to pointers. void pointers. Invalid pointers and null pointers. Pointers to functions.	[1],[2]	1	2	1	6
13	Files. Input/output with files. Open a file Closing a file.	[1],[4],[5], [6]	1	2	1	6
14	Pointers and arrays. Sorting.	[1],[4],[5]	1	2	1	6
15	Sorting. Classes.	[1], [2], [3]	1	2	1	6
	Total hours	150	15	30	15	90

7. List of assignments for Lab. sessions (list of laboratory works)

№	Assignments (topics) for Independent study	Hours	Recommended literature and other sources (links)	Form of submission
1	2	3	4	5
1	Fundamental data types. Boolean type. Basic mathematical functions in the C++ mathematics library	2	[1],[2],[3], [4],[5], [6]	Discussion
2	Operators. Assignment operator. Arithmetic operators. Basic Input/Output.	2	[1],[2],[3], [4],[5], [6]	Discussion
3	Iteration statements (loops). The do-while loop. The for loop. Range-based for loop. Jump statements. The break statement. The continue statement. The goto statement. The switch statement.	2	[1],[2],[3], [4],[5], [6]	Discussion
4	One-dimensional arrays.	2	[1],[2],[3], [4],[5], [6]	Discussion
5	Multidimensional arrays.	2	[1],[2],[3], [4],[5], [6]	Discussion Discussion
6	Tasks with Multidimensional arrays. Sum of the elements of all matrix. Product of the elements. Number of the elements. Sum of every row and every column.	2	[1],[2],[3], [4],[5], [6]	Discussion
7	Character sequences. String.	2	[1],[2],[3], [4],[5], [6]	Discussion
8	Function.	2	[1],[2],[3], [4],[5], [6]	Discussion
9	Recursivity.	2	[1],[2],[3], [4],[5], [6]	Discussion
10	Function. Arguments passed by value and by reference.	2	[1],[2],[3], [4],[5], [6]	Discussion
11	Data structures.	2	[1],[2],[3], [4],[5], [6]	Discussion
12	Pointers.	2	[1],[2],[3], [4],[5], [6]	Discussion
13	Files.	2	[1],[2],[3], [4],[5], [6]	Discussion
14	Tasks with arrays and pointers.	2	[1],[2],[3], [4],[5], [6]	Discussion
15	Sorting. Classes	2	[1],[2],[3], [4],[5], [6]	Discussion

8. List of assignments for Student Independent Study (SIS)

№	Assignments (topics) for Independent study	Hours	Recommended literature and other sources (links)	Form of submission
1	2	3	4	5
1	Fundamental data types. Boolean type. Basic mathematical functions in the C++ mathematics library	6	[1],[2],[3], [4],[5], [6]	Discussion
2	Operators. Assignment operator. Arithmetic operators. Basic Input/Output.	6	[1],[2],[3], [4],[5], [6]	Discussion
3	Iteration statements (loops). The do-while loop. The for loop. Range-based for loop. Jump statements. The break statement. The continue statement. The goto statement. The switch statement.	6	[1],[2],[3], [4],[5], [6]	Discussion
4	One-dimensional arrays.	6	[1],[2],[3], [4],[5], [6]	Discussion
5	Multidimensional arrays.	6	[1],[2],[3], [4],[5], [6]	Discussion Discussion
6	Tasks with Multidimensional arrays. Sum of the elements of all matrix. Product of the elements. Number of the elements. Sum of every row and every column.	6	[1],[2],[3], [4],[5], [6]	Discussion
7	Character sequences. String.	6	[1],[2],[3], [4],[5], [6]	Discussion
8	Function.	6	[1],[2],[3], [4],[5], [6]	Discussion
9	Recursivity.	6	[1],[2],[3], [4],[5], [6]	Discussion
10	Function. Arguments passed by value and by reference.	6	[1],[2],[3], [4],[5], [6]	Discussion
11	Data structures.	6	[1],[2],[3], [4],[5], [6]	Discussion
12	Pointers.	6	[1],[2],[3], [4],[5], [6]	Discussion
13	Files.	6	[1],[2],[3], [4],[5], [6]	Discussion
14	Tasks with arrays and pointers.	6	[1],[2],[3], [4],[5], [6]	Discussion
15	Sorting. Classes	6	[1],[2],[3], [4],[5], [6]	Discussion

9. List of assignments for TSIS

№	Theme	Hours	Reference	Form of submission	Deadline
1	Solve problems on specialized web sites to improve overall programming skills	7,5	Basic [3]-[5], Supplementary [1]-[2]	Presentation	7 th week
2	Solve problems on specialized web sites to improve overall programming skills	7,5	Basic [3]-[5], Supplementary [1]-[2]	Presentation	14 th week
Total hours		15			

10. Student performance evaluation system for the course

Period	Assignments	Maximum Points	Total
1 st attestation	Lecture Quiz	10	100 %
	LW1	20	
	LW2	20	
	LW3	20	
	TSIS	20	
	MidTerm	10	
2 nd attestation	Lecture Quiz	10	100 %
	LW1	20	
	LW2	20	
	LW3	20	
	TSIS	20	
	EndTerm	10	
Final exam	Written Exam	1002	100 %
Total	0,3*1stAtt + 0,3*2ndAtt + 0,4*Final	100	100

*If the number of absences exceeds 20%, student will be automatically scheduled for a Retake (summer semester)

11. Achievement level as per course curriculum shall be assessed according to the evaluation chart adopted by the academic credit system

№	Letter grade	Numerical equivalent	Percentage	Grade according to the traditional system	Assessment criteria
1	2	3	4	5	6
1	A	4,0	95 - 100	excellent	1. Explains the subject matter completely, correctly taking into account modern theory; 2. Shows additional knowledge; 3. Theoretical knowledge links with practice; 4. Fluent in terminology; 5. Establishes causal relationships; 6. Able to make a forecast; 7. Confidently answers additional questions.
2	A-	3,67	90 - 94		1. Explains the subject matter correctly taking into account modern theory; 2. Answers completely, independently draws conclusions and generalizations; 3. Knows the terminology well; 4. Establishes a causal relationship. 5. Fully answers additional questions.
3	B+	3,33	85 - 89	good	1. Explains the subject matter well; 2. Answers completely, independently draws conclusions and generalizations; 3. Fluent in terminology; 4. Logical answers. 5. Answers additional questions
4	B	3,0	80 - 84		1. Knows the basic material; 2. Reasonably gives examples; 3. Makes generalizations and conclusions; 4. Shows inaccuracies in terminology, presentation logic. 5. Answers additional questions
5	B-	2,67	75 - 79		1. Knows the basic material, but responds inconsistently without logic; 2. Allows inaccuracies when using the terms; 3. When answering additional questions, makes mistakes.
6	C+	2,33	70 - 74	satisfactory	1. Has only the basics of theoretical knowledge; 2. Do not know how to make conclusions and generalizations; 3. Does not use terminology; Answers additional and clarifying questions.
7	C	2,0	65 - 69		1. Has incomplete knowledge of the basic material; 2. Does not own logic; 3. The answer is fragmented; 4. Additional questions are not fully answered.
8	C-	1,67	60 - 64		1. Has incomplete knowledge of the basic material; 2. Allows inaccuracies, can not draw conclusions, generalizations; 3. Does not own logic; 4. Mistakes when answering additional questions.

9	D+	1,33	55 - 59		<ol style="list-style-type: none"> 1. Does not know the essential part of the material; 2. Orients in the material badly; 3. Does not possess a logics of answer to a question; 4. Finds it hard to answer additional questions;
10	D	1,0	50 - 54		<ol style="list-style-type: none"> 1. Knowledge and understanding of the fundamentals of theory committing significant inaccuracies, some superficiality which reduces understanding, but capability to come to correct statement with help of a teacher.
11	FX	0	25 - 49	Fail (Exam Retake)	<ol style="list-style-type: none"> 1. Fragmentary knowledge, presentation of it without understanding of the meaning; 2. Additional questions of the members of the committee complicate the idea, theory statements studied formally;
12	F	0	0 - 24	unsatisfactory	<ol style="list-style-type: none"> 1. Do not demonstrate any knowledge and any desire to the subject.