COURSE SPECIFICATION FORM,
approved by the Academic Council 17.06.2015 (#39)

SECTION A: DEFINITIVE

Items in this section may be reviewed and developed within Schools as part of the Annual Program Monitoring Process and in line with the Guidelines to Modifications to Programs and Courses.

1.	**General course information**		
1.1	School: Engineering	1.6	Credits (ECTS): 6
1.2	Course Title: Programming for Engineers	1.7	Course Code:
1.3	Pre-requisites: None	1.8	Effective from: *(year)*
1.4	Co-requisites:		
1.5	Programs: *(in which the course is offered)*	______________________________ ☒ Core	☐ Elective

2.	**Course description (max.150 words)**

This is an introductory course for programming essential for Engineering undergraduate study. The module would focus on the development of programming skills that can be directly applied to solve engineering problems where the computer is part of the system, or is used to model a physical or logical system.

This module introduces programming as a tool for solving engineering problems through C and Java programming languages. This is an introductory course providing foundational programming to Chemical, Mechanical, Civil and Electrical Engineers.

Topics covered include:

- Introduction to computers and programming
- Variables in C, assignment statements, and arithmetic expressions
- Input/output operations and functions
- Operators: rules of operator precedence
- Flow of Control, if-else, swicth, while, for, do
- Structured programming
- Arrays & Pointers
- Dynamic Memory Allocation
- Elementary programming in Java
- Methods in Java
- Methods and Arrays in Java
- Objects and Classes

3.	**Summative assessment methods** (tick if applicable)**:**				
3.1	Examination	☒	3.5	Presentation	☒
3.2	Term paper	☐	3.6	Peer-assessment	☐
3.3	Project	☒	3.7	Essay	☐
3.4	Laboratory Practicum	☒	3.8	Other *(specify)*	_Assignments_ ___________

4.	**Course aims**
1. To provide foundational knowledge and practice required to apply programming in solving Engineering problems. 2. To illustrate how the programming concepts presented in the lectures and labs are applied in project. 3. To demonstrate how the need to accommodate different practically motivated trade-offs can lead to alternative implementations.	
5.	**Course learning outcomes (CLOs)**
5.1	*At the end of the module the learner will be expected to be able to:* 1. Logically develop programming solutions to open ended engineering problems. 2. Be able to think and come up with alternate solutions to programming problems. 3. Demonstrate programming proficiency in C and Java through projects. 4. Apply knowledge of programming to solve practically relevant engineering problems. 5. Use the object oriented concepts to write optimal and efficient codes.
5.2	

CLO ref #	Program Learning Outcome(s) to which CLO is linked	Graduate Attribute(s) to which CLO is linked
1,2,3, 4,5	Apply integrated knowledge of basic science, mathematics, and engineering principles to the practice of electrical and electronics engineering	1
1,2,4,5	Apply analytical methods, computer modelling techniques and numerical analysis to study the performance of electrical and electronics engineering systems and products to identify, formulate, critically analyze, and solve complex electrical and electronics engineering problems through a systems approach	3. 5. 6. 8.
1,3,4,5	Recognize the need for continuing professional development and life-long learning as well as apply relevant practical skills to work with technical uncertainties, operate engineering equipment & processes, communicate technical and non-technical information to all kinds of audience, and function in multidisciplinary teams as a member or leader	4. 6. 8. 9.

SECTION B: NON-DEFINITIVE
Course Syllabus Template

Details of teaching, learning and assessment

Items in this Section should be considered annually (or each time a course is delivered) and amended as appropriate, in conjunction with the Annual Program Monitoring Process. The template can be adapted by Schools to meet the necessary accreditation requirements.

6.	**Detailed course information**		
6.1	Academic Year: 1st year	6.3	Schedule (class days, time):
6.2	Semester: 1st	6.4	Location (building, room):

7.	**Course leader and teaching staff**			
Position	**Name**	**Office #**	**Contact information**	**Office hours/or by appointment**
Course Leader	**Amin Zollanvari**	**6247B**	**amin.zollanvari@nu.edu.kz**	**Thu10A-12**
Course Instructor(s)	**Amin Zollanvari**	**6247B**		
Teaching Assistant(s)	**Beibit Abdikenov, Nurzhan Kalikulov, Aigerim Sametkhanova**	**6310**		

8.	**Course Outline**			
Session	**Date** (tentative)	**Topics and Assignments**	**Course Aims** (ref. # only, see item 4)	**CLOs**
	Week 1	Introduction to Computers and programming/ Writing a program in C	1	1
	Week 2	Variables in C, Assignment Statements, and Arithmetic Expressions	1	1,2
	Week 3	Input/Output Operations and Functions	1	1,2,3
	Week 4	Operators: Rules of Operator Precedence	1,2	1,2,3
	Week 5	Flow of Control	1,2	1,2,3,4
	Week 6	Functions and Structured Programming	1,2	1,2,3
	Week 7	Pointer Variables and Scopes	1,2	1,2,3
	Week 8	Arrays, Pointers, and Functions, Dynamic Memory Allocation	1,2	1,2,3,4
	Week 9	Project Week (Project Announcement)	1,2,3	1,2,3,4
	Week 10	Midterm	1,2,3	1,2,3,4,5
	Week 11	Writing a Java Program	1,2,3	1,2,3,4
	Week 12	Flow of Control in Java	1,2	1,2,3,4

	Week 13	Methods and Arrays in Java	1,2	1,2,3,4,5
	Week 14	Objects and Classes	1,2,3	1,2,3,4,5
	Week 15	Project Presentations	1,2,3	1,2,3,4,5

9.	**Learning and Teaching Methods** (briefly describe the approaches to teaching and learning to be employed in the course)
1	
2	
3	

10.	**Summative Assessments**			
#	**Activity**	**Date** (tentative)	**Weighting (%)**	**CLOs**
	Quiz #1	Week 3	6.66%	1,2
	Quiz #2	Week 6	6.66%	1,2,3,4
	Midterm	Week 10	25%	1,2,3,4
	Quiz # 3	Week 14	6.66%	5
	Presentation	Week 15	10%	1,2,3,4,5
	Project Report/Codes	Week 16	25%	1,2,3,4,5
	Graded Computer Lab Reports (quizzes)	Week 2,3,4,5,6,7, 13	20%	1,2,3,4,5

11.	**Grading**	
Letter Grade	**Percent range**	**Grade description** (where applicable)

12.	**Learning resources** (use a full citation and where the texts/materials can be accessed)
E-resources, including, but not limited to: databases, animations, simulations, professional blogs, websites, other e-reference materials (e.g. video, audio, digests)	
E-textbooks	
Laboratory physical resources	
Special software programs	
Journals (inc. e-journals)	
Text books	1. Jari R. Hanly, Elliot B. Koffman. *Problem Solving and Program Design in C*. Pearson, 7th Edition, 2013. 2. Al Kelly, Ira Pohl. *C by Dissection: The Essentials of C Programming*. Pearson, 4th Edition, 2001. 3. Y. Daniel Liang. *Introduction To Java Programming,*

	Comprehensive version. Pearson, 9th Edition, 2013.

13. Course expectations

List the expectations of students for the course regarding the course attendance, class participation, group work, late/missed submission of assignments.

Labs:

Labs in this course are designed to engage students in applying the concepts learned during the class in practice. Each student submits a report and all reports will be graded.

Tutorials:

Tutorials in this course are desinged not only to further engage students in applying the concepts covered in class, but also further extend their knowledge to the areas that will not be formally introduced in class. Nevertheless, tutorials and labs will be part of a student evaluation through the quizzes, midterm, and/or the project. Additional subjects that will be covered during the tutorials include: Recursion, Reading/Writing from/to Files, Java Graphical User Interface (GUI), and Creating Java Applets.

14. Academic Integrity Statement

Provide a statement requiring the students taking this course to abide by the University policies on academic integrity.

You may refer to the Student Code of Conduct and Disciplinary Procedures (approved by the AC on 05.02.2014), specifically, paragraphs 13-16 (plagiarism and cheating).

15. E-Learning

If the content of the course and instruction will be delivered (or partially delivered) via digital and online media, consult with the Head of Instructional Technology to complete this section and/or provide a separate document complementary to this Template.

16. Approval and review

Date of Approval:	**Minutes #:**	**Committee:**
Date(s) of Approved Change:	**Minutes #:**	**Committee:**