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: SST	1.6	Credits (ECTS): 6
1.2	Course Title: (Advanced) Statistical Programming	1.7	Course Code: MATH 449/542/742
1.3	Pre-requisites:	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)
	Introduction to the basics of programming and algorithms in statistics. Exploration data of storage, manipulation, plotting, and analysis. Modularization, conditional execution, looping, and function construction are covered along with program debugging techniques.

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)* Homework

4.	Course aims
	Students will: 1) Study common Python functionality and features used for data science 2) Study distributions, sampling, and statistical tests 3) Query DataFrame structures for cleaning and processing 4) Understand techniques such as lambdas and manipulating csv files

5.	Course learning outcomes (CLOs)
5.1	By the end of the course the student will be expected to be able to: 1) Apply statistical principles to experiments in various scenarios and understand how to make sense out of the data that is generated. 2) Interpret and present data to a wide audience and turn insight into decisions. 3) Conduct analyses which incorporate data and machine learning techniques to generate more complex understandings of data.

5.2			
	CLO ref #	**Program Learning Outcome(s) to which CLO is linked**	**Graduate Attribute(s) to which CLO is linked**
	1		
	2		
	3		

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: 2018-2019	6.3	Schedule (class days, time): TR 1:30-2:45 pm	
6.2	Semester: Spring	6.4	Location (building, room): 7e.229	

7.	Course leader and teaching staff			
Position	**Name**	**Office #**	**Contact information**	**Office hours/or by appointment**
Course Leader				
Course Instructor(s)	Zh. Assylbekov	7.231	zhassylbekov@nu.edu.kz	
Teaching Assistant(s)				

8. Course Outline

Session	Date tentative	Topics and Assignments	Course Aims (ref. # only, see item 4)	CLOs
1	Jan 10—16	Course Logistics		
2	Jan 17—23			
3	Week 1			
4	Week 2			
5	Week 3	Fundamentals of Data Manipulation with Python		
6	Week 4	Data Processing with Pandas		
7	Week 5	Statistical Testing. Principles of Information Visualization		
8	Week 6	Charting. Applied Visualizations. **Midterm Exam**		
9	Week 7	**Project-1**		
10	Week 8	Intro to SciKit Learn		
		Spring Break		
11	Week 9	Supervised Machine Learning – Part 1		
12	Week 10	Evaluation of ML Algorithms		
13	Week 11	Supervised Machine Learning – Part 2		
14	Week 12	**Project-2**		
	FE Period	**Final Exam**		

9.	**Learning and Teaching Methods** (briefly describe the approaches to teaching and learning to be employed in the course)
1	**Homework** will be assigned on a weekly basis. It will not be collected. It serves as preparation for colloquiums (see below). Most of your HW will be to study material and do programming assignments in Coursera.

2	**Colloquiums:** We will have a colloquium *almost* every class. I will sample several students and ask them questions or assign them problems or ask them to show the solutions of HW assignments. The students are expected to present their answers/solutions to the whole class. A student gets 1 if he/she provides an answer/solution regardless of whether it is correct or wrong; a student gets 0 if he/she has no answer/solution at all or if he/she is absent without an excuse.	
3	**Projects**: Projects will be assigned. Details will be provided later, but they will involve obtaining & analyzing data, training models, and writing reports.	
4	**Exam:** There will be a midterm exam and a non-comprehensive final exam.	

10.	**Summative Assessments**			
#	**Activity**	**Date** (tentative)	**Weighting (%)**	**CLOs**
	Colloquiums		20	1, 3
	Midterm Exam	Week 6	15	1-3
	Project-1	Week 7	25	1-3
	Project-2	Week 12	25	1-3
	Final Exam	Exam period	15	1, 3

11.	**Grading**	
Letter Grade	**Percent range**	**Grade description** (where applicable)
A	[95, 100]	
A-	[90, 94]	
B+	[85, 89]	
B	[80, 84]	
B-	[75, 79]	
C+	[70, 74]	
C	[65, 69]	
C-	[60, 64]	
D+	[55, 59]	
D	[50, 54]	
F	[0, 49]	

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)	https://www.coursera.org/learn/python-data-analysis https://www.coursera.org/learn/python-plotting https://www.coursera.org/learn/python-network-data https://www.coursera.org/learn/python-machine-learning	
E-textbooks		
Laboratory physical resources		
Special software programs	Python, Jupyter Notebook	
Journals (inc. e-journals)		
Text books		
13.	**Course expectations**	

Students are expected to actively and positively participate in this class, including (but not limited to):
- Attendance: students must report all absences for health reasons to the Department of Student Affairs.
  - It is the student's responsibility to understand material covered when there is an absence.
  - Students are expected to arrive to class on time.
- Learning: Students are expected to learn all the material in the course. Not all information will be presented in class; therefore, students are expected to study outside of class.
  - Students should allocate at least nine hours a week outside of class for study and improvement.
- Language: English is the official language of instruction for this university; therefore, all work is expected to be done neatly and accurately in English.
- Electronic Devices: All pagers, cell phones or other related electronic personal communication devices must be turned off during a class session.

14.	Academic Integrity Statement

Students are required to abide by the Student Code of Conduct and Disciplinary Procedures (approved by the AC on 05.02.2014), specifically, paragraphs 13-16 (plagiarism and cheating). Cheating will not be tolerated. Working in groups on homework problems is encouraged. Talking or looking at your classmate's paper during a quiz/exam is not allowed under any circumstances. All forms of cheating are grounds for a failing grade in the course for all parties involved.

15.	E-Learning

16.	Approval and review

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