МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ КЫРГЫЗСКОЙ РЕСПУБЛИКИ

International Ala-Too University

Международный Университет «Ала-тоо»

Confirmed by / Утверждено

Head of Department/ Зав. Кафедрой

@FullName

Last Name, First Name / Ф. И. Signature (подпись)

“01” September 2021

SYLLABUS / РАБОЧАЯПРОГРАММА

CourseTitle / Название предмета: **@Title**

Department / Кафедра: Computer Science 2021 - 2022 academic year

Faculty/ Факультет: **Engineering and Informatics**

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| --- | --- |
| Semester Course Credits  Семестр Fall Курс Зачет6 Лекции (недель) 4 | Lectures (weeks)  14 |

Examinations Assignment(s)

Research Projects / Practical Work

Экзамены 2\_\_\_ индивидуальная работа курсовые работы/ практические занятия

The Syllabus is based upon the education a standard Рабочая программа составлена на оснавании стандарта образования

Assoc. Prof. @FullName

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| Author  Составитель  [**ruslan.isaev@alatoo.edu.kg**](mailto:ruslan.isaev@alatoo.edu.kg) | (Degree, Last Name, First Name, Middle Name) (Уч. Звание, Фамилия, Имя, Отчество) |
| Email / Элек. Почта  September 01, 2021 | (signature) / подпись |

APPROVED at the Department Session

РАСМОТРЕННО на Заседании кафедры

Syllabus (Программа)

COURSE TITLE/ Название предмета: **@Title**

1. COURSE DESCRIPTION/ Описание предмета:

This is self-paced course. But you should not be late with submitting your final project. This course about how to automate and serve data scraping tasks on Linux side. Optionally you can add function to your project: such as data visualization and telegram notifications.

Let's start with the strategic goals of this course:

Help students (who may or may not intend to major in computer science) to feel justifiably confident of their ability to write small programs. Map scientific problems into computational frameworks. Position students so that they can compete for jobs by providing competence and confidence in computational problem solving. Prepare students from other majors to make profitable use of computational methods in their chosen field. Objectives:

* Learning a language for expressing computations—Python
* Learning about the process of writing and debugging a program

Learning about the process of moving from a problem statement to a computational formulation of a method for solving the problem

**4.** GRADING/ Оценка:

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| Midterm Exam | 40% of Final Grade |
| Final Exam | 60% of Final Grade |

Final exam must be greater than **50**

P.S. If a project is given, then it is included in the midterm or final exam.

1. LITERATURE / Литература:

Course book:

* https://web.stanford.edu/~jurafsky/slp3/ (Speech and Language Processing (3rd ed. draft)

**Additional Books:**

* The Ultimate Linux Newbie Guide eBook Edition July 2016
* Linux Command Line and Shell Scripting BIBLE Third Edition Richard Blum, Christine Bresnahan
* William E. Shotts, Jr., The Linux Command Line 13.07Preview the documentMedia 2009) [ISBN 9780596516499; http://nltk.org/book].
* Introduction to natural language processing R. Kibble

https://www3.nd.edu/~dchiang/teaching/nlp/2017/ **Internet Resources:**

[https: // en.wikipedi a.org/wiki/Mathemati cal NLP](https://en.wikipedia.org/wiki/Mathematical_optimization)

Note: Literature from our library should be also included

1. **A) ATTENDANCE / Посещаемость:** The attendance policy of this class will follow the policy of the University. Students are expected to read and comply with this policy. (Policy description)

B) CHEATING

The cheating policy of this class will follow the policy of the University. Students are expected to know and comply with this policy. Cheating in this class includes, among the obvious:

1. False illness evidence
2. Partly or fully copying work from the Internet/classmates/others.
3. Communicating with anybody or looking at a classmate’s work during exam.

The same grade reduction will be also applied to the students who assisted in cheating.

1. **Course Learning Outcomes**

* Ability to use Linux operating system in different environments.
* Ability to install Linux on a personal computer.
* Ability to use Linux effectively.
* Ability to secure their Linux installation.

1. GUIDELINES DURING CLASS SESSION
2. Students are not allowed eating anything during the class session.
3. The course is done **without** taking break. The students who late may enter into the class during the break time as written in the schedule. **Entering** to the classroom and **leaving** out of the classroom after the **instructor** entered to the class is **not allowed**.
4. Student must sit properly and **switch off** all digital communication appliances (i.e., **mobile phone**, pager etc.).
5. **CONTENT&COURSECALENDAR/ содержание И календарь курса:**

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| **Weeks** | **Topics** | **Subtopics** | **Chapter** | **Home Assignments** |
| 1 | Regular Expressions, Text Normalization, Edit Distance | NLP Problems, Linear Programs Integer Programs, Quadratic Programs Problem formulation, Solution | **1** | p.14 1.16-1.26 |
| 2 | N-gram Language Models | Nonnegative conditions  Slack and surplus variables Generating an initial feasible solution Penalty costs  Standard forms..etc | **2** | p.29 2.22-2.36 |
| 3 | Naive Bayes and Sentiment Classification | The Simplex tableau, Tableau simplification, The simplex Method, Modification for programs with artificial variables, The dual Simplex Method | **3** | p.52 3.15-3.42 |
| 4 | Logistic Regression | Symmetric duals, Dual solutions, Unsymmetrical solutions, Sensitivity Analysis | **4** | p.83 4.30-4.58 |

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| 5 | Vector Semantics and Embeddings | The revised simplex method, Karmarkar’s Algorithm, | **5** | p.120 5.18-5.44 |
| 6 | Neural Networks and Neural Language Models | First Approximation  Branching  Bounding  Computational Considerations | **6** | p.131 6.9-6.14 |
| 7 | Part-of-Speech Tagging | The Gomory Algorithm Computational Considerations | **7** | p.139 7.8-7.13 |
| 8 | Sequence Processing with Recurrent Networks | Standard form  The transportation algorithm An initial basic solution Test for optimality Improving the solution Degeneracy | **8** | p.153 8.9-8.14 |
| 9 | Encoder-Decoder Models, Attention and Contextual Embeddings | Production problems Transshipment problems Augment problems  Travelling salesperson problems | **9** | p.165 9.10-9.21 |
| 10 | Machine Translation | The problem  Local and global optima Results from Calculus Sequential- search techniques Three-point interval search Fibonacci search | **10** | p.180 10.14-10.26 |
| 11 | Parsing | Local and global maxima  Gradient vector and Hessian Matrix The Newton- Rapson Method | **11** | p.197 11.15-11.24 |
| 12 | Logical Representations of Sentence Meaning | Standard forms  Lagrange Multipliers  The Newton- Rapson Method  Penalty Function | **12** | p.214 12.16-12.37 |

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| 13 | Information Extraction | Networks  Minimum span problems  Shortest route problems Maximal flow problems Finding a positive flow path | **13** | p.229 13.8-13.19 |
| 14 | Word Senses and WordNet | PERT/CPM  Construction of the network diagram Critical Path computation for PERT Project time and project cost | **15** | p.255 14.7-14.14 |