**National Research Tomsk State University**

School of Advanced Engineering Studies (Agrobiotech)

06.04.01. Biology

“Bioinformatics”

Sample Questions / Topics for Admission Interview

**Block 1a "Biology"**

1. Central dogma of life.

2. Structural features of DNA and Protein.

3. Types of OMICs technologies and their applications.

4. Next Generation Sequencing.

5. Molecular basis of gene expression and gene regulation

6. Evolution and phylogenetics

**Block 1b "Computer Science"**

1. Types of programming used in Bioinformatics (R and Python).

2. Computation and programming.

3 Computational biology and bioinformatics

4. Applications of AI in biology

**Block 2 "My motivation"**

1. My research project during my undergraduate studies

2. Projects, research competencies, and skills

3. What kind of specialist do I see myself after graduation from TSU (competencies and skills that I plan to acquire in TSU)

4. What is my proposed project for master thesis?

**List of literature for self-training**

1. Robert Gentleman. R Programming for Bioinformatics. 2008. Chapman and Hall/CRC. ISBN: 9781420063684.

2. Brown T. A. Genomes 2nd edition. 2002. Oxford: Wiley-Liss. ISBN-10: 0-471-25046-5

3. David P. Clark, Nanette J. Pazdernik and Michelle R. McGehee. Molecular Biology. 3rd edition. Academic Cell. ISBN. 978-0-12-813288-3.

4. Bromham, L. An Introduction to Molecular Evolution and Phylogenetics. 2nd edition. 2016. ISBN-13: ‎ 978-0198736363. Oxford Univ Press.

5. Advanced AI Techniques and Applications in Bioinformatics (Smart and Intelligent Computing in Engineering). 1st Edition. 2021. CRC Press. ISBN-13: ‎ 978-0367641696

6. Thomas, D., Hunt, A. The Pragmatic Programmer: Your Journey To Mastery, 20th Anniversary Edition. 2nd edition. Addison-Wesley Professional. ISBN-13: ‎ 978-0135957059