

# MOLECULAR BIOLOGY

Expected entry-level knowledge for MSc Life Science & Technology

## **Part 1.**

The content listed in **part 1** below is taken from 'Lenninger' as an example. Similar content may also be found in other text books. You are expected to have an understanding of this or similar content when you arrive in Delft; you are not expected to have learned it by heart.

## **Part 2.**

In part 2 an overview of additional study materials

## **Part 1.**

Book: Lenninger Principles of Biochemistry 5<sup>th</sup> Edition

Authors: D.L. Nelson and M.M. Cox, Publisher: (2008) W.H. Freeman and Company ISBN 9781429208925

Chapter 8 Nucleotides and Nucleic Acids  
- 8.3 Nucleic Acid Chemistry

Chapter 9 DNA-Based Information Technologies  
- 9.1 DNA Cloning: The Basics  
- 9.2 From Genes to Genomes  
- 9.3 From Genomes to Proteomes

Chapter 24 Genes and Chromosomes  
- 24.1 Chromosomal Elements

Chapter 25 DNA Metabolism  
- 25.1 DNA Replication

Chapter 26 RNA Metabolism  
- 26.1 DNA-Dependent Synthesis of RNA (Transcription)  
- 26.2 RNA Processing (Introns & Exons)  
- 26.3 RNA Dependent Synthesis of RNA and DNA (Reverse Transcription)

Chapter 27 Protein Metabolism  
- 27.1 The Genetic Code  
- 27.2 Protein Synthesis  
- 27.3 Protein Targeting and Degradation

Chapter 28 Regulation of Gene Expression  
- 28.1 Principles of Gene Regulation (also: Operons)  
- 28.2 Regulation of Gene Expression in Bacteria  
- 28.3 Regulation of Gene Expression in Eukaryotes

## Part 2 - additional study materials

A good web-based course covering some of the topics outlined above may be at the Khan Academy (<https://www.khanacademy.org/>). **Please note that this resource is meant as additional help! These online courses do not substitute for profound textbook knowledge!**

| Platform   | Course   | Provider            |   |
|------------|--|---------------------|---|
|            | Biology – Cell Division                        | Khan Academy        | <a href="https://alison.com/courses/Understanding-Cell-Division">https://alison.com/courses/Understanding-Cell-Division</a>   |
|            | Fundamentals of Cellular Respiration           | Khan Academy        | <a href="https://alison.com/courses/Fundamentals-of-Cellular-Respiration">https://alison.com/courses/Fundamentals-of-Cellular-Respiration</a>                             |
| Lagunita   | Molecular foundations of medicine              | Stanford University | <a href="https://lagunita.stanford.edu/courses/Medicine/MolFoundations/SelfPaced/about">https://lagunita.stanford.edu/courses/Medicine/MolFoundations/SelfPaced/about</a> |
| Saylor.org | Introduction to molecular and cellular biology | Saylor Academy      | <a href="https://learn.saylor.org/course/view.php?id=349">https://learn.saylor.org/course/view.php?id=349</a>   |

These modules would need to be complemented with Modules in biochemistry providing a thorough overview of the chemical nature of the main cellular components (not only centred on higher eukaryotes, but including microbiology diversity).

The next essential addition would be a **basic course on DNA cloning**. The one provided by Stanford is very basic:

(<https://lagunita.stanford.edu/courses/Medicine/MolFoundations/SelfPaced/about>).

However, in the BSc-LST course ‘Gene Technology’ the book “Principles of Gene Manipulation and Genomics” by Sandy B. Primrose, Richard Twyman is used.

**The prerequisite for the LST master should be at the level of understanding of the 26 first chapters of that book.**