Molecular biology of nucleic acids (lecture)

**Course title**
Molecular biology of nucleic acids (lecture)

**ECTS code**
13.1.0177

**Name of unit administrating study**
Intercollegiate Faculty of Biotechnology UG-MUG

**Teaching staff**
prof. dr hab. Igor Konieczny

**Studies**

<table>
<thead>
<tr>
<th>faculty</th>
<th>field of study</th>
<th>type</th>
<th>form</th>
<th>specialty</th>
<th>specialization</th>
<th>semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercollegiate Faculty of Biotechnology UG-MUG</td>
<td>Biotechnology</td>
<td>second tier studies (MA)</td>
<td>full-time</td>
<td>all</td>
<td>all</td>
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</tbody>
</table>

**Forms of classes, the realization and number of hours**

<table>
<thead>
<tr>
<th>Forms of classes</th>
<th>Number of hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wykład (to translate)</td>
<td>30 hours</td>
</tr>
</tbody>
</table>

**ECTS credits**
3

**The academic cycle**
2013/2014 summer semester

**Type of course**
obligatory

**Language of instruction**
english

**Teaching methods**
- wykład (to translate)
- wykład problemowy (to translate)

**Form and method of assessment and basic criteria for evaluation or examination requirements**

**Final evaluation**
Egzamin (to translate)

**Assessment methods**
- egzamin pisemny testowy (to translate)
- egzamin pisemny (dłuższa wypowiedź pisemna / rozwiązanie problemu) (to translate)
- egzamin pisemny z pytaniami (zadaniami) otwartymi (to translate)

**The basic criteria for evaluation**
The following components will be assessed:
- understanding by the student of the complex processes connected with nucleic acids and their significance in biotechnology
- knowledge concerning issues of molecular biology of nucleic acids presented during lectures and currently discussed in specialist literature
- knowledge of English and specialist terminology allowing students to understand the discussed issues

The final grade will result from the above elements. The student must obtain a passing grade for each of the mentioned elements. Assessment will be performed on the basis of an examination, where questions will concern the above elements.

**Required courses and introductory requirements**

A. Formal requirements
B. Prerequisites
The learning outcomes for the basic courses Molecular Biology, Biochemistry and Genetics are required

**Aims of education**
The aim of the course is to let students understand the molecular basis of metabolism of nucleic acids, acquire
knowledge allowing to interpret and analyze the results of contemporary research concerning nucleic acids. Get acquainted with complex issues connected with the processes of transcription, replication, repair, recombination, transposition, and the significance of these processes in biotechnology (K_W01)
Students will acquire knowledge concerning the newest research connected with the metabolism of nucleic acids (K_W03)
Students will perfect their English to the extent that will allow them to understand utterances and read, with understanding, scientific literature concerning molecular biology of nucleic acids (K_U03)

Course contents
- History of research on metabolism of nucleic acids - key experiments
- Notions of replicon and operon
- DNA replication initiation in bacterial chromosomes and extrachromosomal genetic elements
- DNA replication initiation in eukaryotic cells
- Structure of Rep proteins
- Helicases - structure, the role in the process of DNA replication
- Primosom complex - synthesis of DNA replication starters
- RNA and DNA dependent polymerases - structure, properties, molecular basis of the synthesis of nuclear acids
- Structure of the E. coli Pol III holoenzyme complex
- Mechanism of synthesis of leading and lagging strands in prokaryotic and eukaryotic cells
- DNA repair - kinds of DNA repair, enzymes taking part in repair
- Topology and dynamics of chromosomes and extrachromosomal genetic elements
- Mobile genetic elements
- Molecular basis of transposition process

Bibliography of literature
- Genes VIII – by Benjamin Levin
- Essential cell biology – by Bruce Alberts at all
- Molecular Biology of the cell by Alberts at all.

The learning outcomes

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
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</thead>
<tbody>
<tr>
<td>K_W01</td>
<td>K_U03</td>
</tr>
<tr>
<td>Understands complex biological phenomena on the molecular level, knows their significance for biotechnology and their relationships with other areas and disciplines of science</td>
<td>Knows the English language to an extent that allows him/her to understand an utterance and read with understanding scientific literature and simple reviews in the fields of science and scientific disciplines connected with biotechnology; can prepare a short written review and an oral presentation in English, concerning particular issues of biotechnology and related scientific areas and disciplines.</td>
</tr>
<tr>
<td>K_W03</td>
<td></td>
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<tr>
<td>Possesses knowledge in the field of selected issues currently discussed in biotechnological literature and problems concerning related scientific areas and disciplines significant for biotechnology.</td>
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Social competence

Contact
igor@biotech.ug.gda.pl