

Syllabus

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| Code/Name | SEC402.3 / Gene Therapy |
| Type | Elective |
| Credit/ECTS | 5/5 |
| Hour per Week | 3 (3+0+0) |
| Level/Year | Undergraduate/4 |
| Semester | Spring |
| Classroom | D306 |
| Content | In this course, students will cover the following key topics: Understanding the mechanisms and methods of gene modification. Gene Therapy Approaches: Investigation of gene delivery methods, therapeutic gene design and <i>in vivo</i> applications. Genome Editing Technologies: In-depth review of CRISPR-Cas9 and other genome editing techniques. viral and non-viral gene transfer techniques Ethical and Regulatory Aspects: Discussion of ethical considerations, regulatory frameworks, and safety protocols in gene therapy. Case Studies and Clinical Applications: Analyzing real-world examples of gene therapy success stories and challenges, |
| Prerequisites | Genetic engineering |
| Textbooks | Primary "Gene Therapy" by Mauro Giacca "Genome Editing: The Revolution in Gene Editing and the Creation of a New World" by Nessa Carey Secondary Recent articles Website of American Society of Gene & Cell Therapy |
| Objectives | <ul style="list-style-type: none"> • To understand the importance of nanotechnology in bioengineering • To gain knowledge about the design and characterization of nanomaterials • To interpret biosensors and their applications |
| Course Outcomes | In this course you will be able to: CO1 Explain the principles and techniques of gene modification. CO2 Evaluate and apply various gene therapy approaches to specific genetic disorders. CO3 Demonstrate proficiency in genome editing technologies. CO4 Understand the ethical, legal, and regulatory issues in gene therapy. CO5 Analyze and discuss clinical applications and case studies in gene therapy. |

Weekly Schedule of Topics

| W | Topic |
|---|---|
| 1 | Introduction to gene therapy |
| 2 | Introduction to gene therapy |
| 3 | Last report of the American Society of Gene & Cell Therapy I |
| 4 | Last report of the American Society of Gene & Cell Therapy II |
| 5 | Tissue-directed gene delivery systems |
| 6 | Viral vectors |
| 7 | Viral vectors |
| 8 | Midterm exam |
| 9 | Non-viral vectors |

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Mechanical Engineering Department
2023-2024 Spring Semester

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| 10 | Non-viral vectors |
| 11 | Liposomal gene delivery system |
| 12 | Targeted gene delivery methods |
| 13 | Genome editing technologies |
| 14 | Case discussion |
| 15 | Safety and ethical issue of gene therapy |
| 16 | Final exam |

**Professional
Contribution**

Contribution to Program Outcomes*

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO1 | 4 | 4 | 3 | 4 | 4 | 3 | 3 | 4 | 5 | 4 | 5 |
| CO2 | 5 | 4 | 4 | 3 | 5 | 3 | 3 | 4 | 5 | 4 | 5 |
| CO3 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 4 | 5 | 4 | 5 |
| CO4 | 4 | 3 | 2 | 2 | 0 | 3 | 3 | 4 | 5 | 3 | 5 |
| CO5 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 4 | 5 | 4 | 5 |

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

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| Special Conditions | Students work in groups for the presentations. |
| Requirements | Genetic engineering |
| Course Policy | <ul style="list-style-type: none">• Be in the class on time.• English should always be used to communicate with one another.• At least 70% attendance is required, otherwise, a grade of DZ will be assigned.• You must be present in class for the presentations, otherwise you will not be graded. |
| Cheating & Plagiarism | <ul style="list-style-type: none">• Copying or letting someone copy your work on exams, assignments, or reports is cheating.• Cutting and pasting text, figures, and tables from web sources or any other electronic source is plagiarism.• The consequence of academic dishonesty is to receive a grade of FF for the course. |
| Evaluation | Midterm 30% Project 20% Final Exam 50% Total 100% |
| Rubric | A rubric will be announced before the project sessions. The rubric has 2 main parts for the grading: technical assessment and writing or presentation performance. |

Instructor

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| Name/Surname | Şurhan Göl | Email | surhan.gol@alanya.edu.tr |
| Room | 131 | Office Hours | Tuesday 14:30-15:15 and Wednesday 10:30-11:15/15:30-16:15 |

Prepared by Şurhan Göl on June 5th, 2024.