Principles of Organogenesis and Tissue Repair

Semester: Third

Prerequisite Courses: Principles of Tissue Engineering

Field and Degree: Tissue Engineering – PhD

Number and Type of Credits (Theoretical / Practical): 2 (Theoretical)

Course Name and Code: Principles of Organogenesis and Tissue Repair (19516/14)

Location: Faculty of Advanced Medical Sciences

Faculty Phone Number: 3325879

Instructor(s): Dr. Ahmad Mehdi Pour, Dr. Darush Mohammadzad, Dr. Leila Roshangar, Dr. Mohammad Karimi Pour

Be familiar with types of wounds and methods of wound repair.	**Cognitive**	**Lecture and encouragement for more participation**	**Active participation in class and engagement in discussions**	**Computer and Whiteboard**	**Final Exam**	

2. Understand that each body tissue requires different repair conditions.
3. Know the repair methods at cellular, tissue, and organ levels.
4. Understand the importance of histology and anatomy in repair and its process.

- Course policy regarding student absence and tardiness: Report to the Education Office.
- Student evaluation method and grading breakdown:
    - a) During the course (Quiz: Assignments/Midterm Exam...)
    - b) End of course: Exam
- Main Course Resources (References):
    - Lanza R, Langer R, Vacanti J. Principles of Tissue Engineering. San Diego: Academic Press (Latest Edition).

- Stocum DL. Regenerative Biology and Medicine. San Diego: Academic Press (Latest edition)

Semester: Third
Prerequisite Course: Principles of Tissue Engineering

Field and Degree: Tissue Engineering – PhD
Number and Type of Credits (Theoretical / Practical): 2 (Theoretical)

Course Name and Code: Principles of Organogenesis and Tissue Repair (1501614)
Location: Faculty of Advanced Medical Sciences
Phone Number: Faculty 2335579
Instructor(s): Dr. Ahmad Mehdi Pour, Dr. Darvish Mohammadzadeh, Dr. Leila Roshangar, Dr. Mohammad Karimi Pour

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Session 2 – Instructor: Dr. Ahmad Mehdi Pour

General Objective: Familiarity with development, histology, and repair mechanisms in skin tissue

Evaluation Method	Educational Time	Learning Environment	Student Activity	Professor Activity	Objective Domains	Specific Objectives
Final Exam	Computer and Whiteboard	2 hours	Classroom	Active participation in class and engagement in discussions	Lecture and encouragement of students for more participation	Cognitive

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It is expected that by the end of the session, the student will be able to:

1. Understand skin tissue from developmental, anatomical, and histological perspectives.
2. Know the factors causing skin wounds.
3. Identify the main layers involved in skin wound repair and their general functions.
4. Learn the existing strategies for skin tissue repair.
5. Identify and explain each stage of wound healing in the skin.
6. Differentiate between wounds and scars.
7. Learn the molecules involved in all stages of skin wound repair.

- Course policy regarding student absence and tardiness: Report to the Education Office.
- Student evaluation score and grading breakdown for each evaluation:
- a) During the course (Various: Assignments/Quizzes/Midterm...)
- b) End of course: Exam

Main Course Resources (References):

- **Lanza R, Langer R, Vacanti J. Principles of Tissue Engineering. San Diego: Academic Press (Latest Edition).**
- **Stocum DL. Regenerative Biology and Medicine. San Diego: Academic Press (Latest edition)**

Semester: Third
Prerequisite Course: Principles of Tissue Engineering

Field and Degree: Tissue Engineering – PhD
Number and Type of Credits (Theoretical / Practical): 2 (Theoretical)

Course Name and Code: Principles of Organogenesis and Tissue Repair (1511614)
Location: Faculty of Advanced Medical Sciences
Phone Number: Faculty 2335579
Instructor(s): Dr. Ahmad Mehdi Pour, Dr. Darush Mohammadzadeh, Dr. Leila Roshangar, Dr. Mohammad Karimi Pour

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Session 3 – Instructor: Dr. Ahmad Mehdi Pour

General Objective: Familiarity with development, histology, and repair mechanisms in intestinal tissue

Evaluation Method	Educational Time	Learning Environment	Student Activity	Professor Activity	Objective Domains	Specific Objectives
Final Exam	Computer and Whiteboard	2 hours	Classroom	Active participation in class and engagement in discussions	Lecture and encouragement of students for more participation	Cognitive

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It is expected that by the end of the session, the student will be able to:

1. Understand intestinal tissue from developmental, anatomical, and histological perspectives.
2. Identify diseases that can significantly damage the intestine and are addressable through tissue engineering.
3. Recognize stem cells and their niche in intestinal tissue.
4. Explain existing methods for intestinal tissue repair.

5. Name products used in the field of intestinal tissue engineering and know their general structure.

- Course policy regarding student absence and tardiness: Report to the Education Office.
- Student evaluation method and grading breakdown for each evaluation:
    - a) During the course (Quiz: Assignments/Midterm Exam...)
    - b) End of course: Exam

- Lanza R, Langer R, Vacanti J. Principles of Tissue Engineering. San Diego: Academic Press (Latest Edition).
- Stocum DL. Regenerative Biology and Medicine. San Diego: Academic Press (Latest edition)

Semester: Third
Prerequisite Course: Principles of Tissue Engineering

Field and Degree: Tissue Engineering – PhD
Number and Type of Credits (Theoretical / Practical): 2 (Theoretical)

Course Name and Code: Principles of Organogenesis and Tissue Repair (1591614)
Location: Faculty of Advanced Medical Sciences
Phone Number: Faculty 2335579
Instructor(s): Dr. Ahmad Mehdi Pour, Dr. Darush Mohammadzadeh, Dr. Leila Roshangar, Dr. Mohammad Karimi Pour

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Session 4 - Instructor: Dr. Ahmad Mehdi Pour

General Objective: Familiarity with development, histology, and repair mechanisms in liver tissue

Evaluation Method	Educational Time	Learning Environment	Student Activity	Professor Activity	Objective Domains	Specific Objectives
Final Exam	Computer and Whiteboard	2 hours	Classroom	Active participation in class and engagement in discussions	Lecture and encouragement of students for more participation	Cognitive

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It is expected that by the end of the session, the student will be able to:

1. Understand liver tissue from developmental, anatomical, and histological perspectives.
2. Identify diseases that can damage the liver and are addressable through tissue engineering.
3. Recognize stem cells and their niche in liver tissue.
4. Explain existing methods for liver tissue repair.
5. Name products used in the field of liver tissue engineering and know their general structure.
6. Explain Artificial Liver Devices created for blood filtration.

- Course policy regarding student absence and tardiness: Report to the Education Office.
- Student evaluation method and grading breakdown for each evaluation:
    - a) During the course (Quiz, Assignments/Exam/Midterm...)
    - b) End of course: Exam

- Lanza R, Langer R, Vacanti J. Principles of Tissue Engineering. San Diego: Academic Press (Latest Edition).
- Stocum DL. Regenerative Biology and Medicine. San Diego: Academic Press (Latest edition)

Semester: Third
Prerequisite Course: Principles of Tissue Engineering

Field and Degree: Tissue Engineering – PhD
Number and Type of Credits (Theoretical / Practical): 2 (Theoretical)

Course Name and Code: Principles of Organogenesis and Tissue Repair (19519624)
Location: Faculty of Advanced Medical Sciences
Phone Number: Faculty 23355790
Instructor(s): Dr. Ahmad Mehdi Pour, Dr. Darush Mohammadzadeh, Dr. Leila Roshangar, Dr. Mohammad Karimi Pour

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Session 5 – Instructor: Dr. Ahmad Mehdi Pour

General Objective: Familiarity with development, histology, and repair mechanisms in pancreatic tissue

Evaluation Method	Educational Media	Time	Learning Environment	Student Activity	Professor Activity	Objective Domains
Final Exam	Computer and Whiteboard	2 hours	Classroom	Active participation in class and engagement in discussions	Lecture and encouragement of students for more participation	Cognitive

Specific Objectives

It is expected that by the end of the session, the student will be able to:

1. Understand pancreatic tissue from developmental, anatomical, and histological perspectives.
2. Identify diseases that can damage the pancreas and are addressable through tissue engineering (with a main focus on diabetes).
3. Recognize stem cells and their niche in pancreatic tissue.
4. Name the most common cells currently used for pancreatic tissue repair and regeneration and state the advantages and disadvantages of each.
5. Explain existing methods for pancreatic tissue repair.
6. Name products used in the field of pancreatic tissue engineering and know their general structure.

- Course policy regarding student absence and tardiness: Report to the Education Office.
- Student evaluation method and grading breakdown for each evaluation:
    - a) During the course (Various: Assignments/Quizzes/Midterm
    - b) End of course: Exam
    - c) Grade: 1.25
- Main Course Resources (References):
- Lanza R, Langer R, Vacanti J. Principles of Tissue Engineering. San Diego: Academic Press (Latest Edition).
- Stocum DL. Regenerative Biology and Medicine. San Diego: Academic Press (Latest edition)

Semester: Third
Prerequisite Course: Principles of Tissue Engineering

Field and Degree: Tissue Engineering – PhD
Number and Type of Credits (Theoretical / Practical): 2 (Theoretical)

Course Name and Code: Principles of Organogenesis and Tissue Repair (1511614)
Location: Faculty of Advanced Medical Sciences
Phone Number: Faculty 2335579
Instructor(s): Dr. Ahmad Mehdi Pour, Dr. Darush Mohammadzadeh, Dr. Leila Roshangar, Dr. Mohammad Karimi Pour

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Session 6 – Instructor: Dr. Ahmad Mehdi Pour

General Objective: Familiarity with development, histology, and repair mechanisms in corneal tissue

Evaluation Method	Time	Learning Environment	Student Activity	Professor Activity	Objective Domains
Final Exam	Computer and Whiteboard	2 hours	Classroom	Active participation in class and engagement in discussions	Lecture and encouragement of students for more participation

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Specific Objectives

It is expected that by the end of the session, the student will be able to:

1. Understand eye and corneal tissue from developmental, anatomical, and histological perspectives.
2. Identify factors damaging the cornea and tissue engineering strategies for repairing defects.
3. Recognize stem cells and their niche in corneal tissue.

4. Identify and explain corneal repair at the endothelial, stromal, and epithelial levels.
5. Explain scar formation in corneal tissue.
6. Name products used in the field of corneal tissue engineering and know their general structure.

- Course policy regarding student absence and tardiness: Report to the Education Office.
- Student evaluation method and grading breakdown for each evaluation:
    - a) During the course (Quiz: Assignments Exam, Midterm
    - b) End of course: Exam
    - c) Grade: 1.25
- **Main Course Resources (References):**
    - Lanza R, Langer R, Vacanti J. Principles of Tissue Engineering. San Diego: Academic Press (Latest Edition).
    - Stocum DL. Regenerative Biology and Medicine. San Diego: Academic Press (Latest edition)

Semester: Third
Prerequisite Course: Principles of Tissue Engineering

Field and Degree: Tissue Engineering – PhD
Number and Type of Credits (Theoretical / Practical): 2 (Theoretical)

Course Name and Code: Principles of Organogenesis and Tissue Repair (1951/2014)
Location: Faculty of Modern Medical Sciences
Phone Number: Faculty 23355/79
Instructor(s): Dr. Ahmad Mehdi Pour, Dr. Darush Mohammadzadeh, Dr. Leila Roshangar, Dr. Mohammad Karimi Pour

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Session 7 – Instructor: Dr. Ahmad Mehdi Pour

General Objective: Familiarity with development, histology, and repair mechanisms in bone tissue

Evaluation Method	Educational Media	Time	Learning Environment	Student Activity	Professor Activity	Objective Domains
Final Exam	Computer and Whiteboard	2 hours	Classroom	Active participation in class and engagement in discussions	Lecture and encouragement of students for more participation	Cognitive

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Specific Objectives

It is expected that by the end of the session, the student will be able to:

1. Understand bone tissue from developmental, anatomical, and histological perspectives.
2. Identify factors damaging bone and tissue engineering strategies for repairing defects.
3. Name the most common cells involved in bone repair using tissue engineering and explain the materials and corrosion policy.
4. Be familiar with the mechanisms of intramembranous and endochondral bone repair and tissue engineering strategies for these repair cells.
5. Name products used in the field of bone tissue engineering and know their general structure.

- **Course policy regarding student absence and tardiness: Report to the Education Office:**
    - Student evaluation method and grading breakdown for each evaluation:

  - a) During the course (Various: Assignments/Exam/Midterm...)
  - b) End of course: Exam
  - c) End of course: Exam
- **Main Course Resources (References):**
  - Lanza R, Langer R, Vacanti J. Principles of Tissue Engineering. San Diego: Academic Press (Latest Edition).
  - Stocum DL. Regenerative Biology and Medicine. San Diego: Academic Press (Latest edition)

Semester: Third
Prerequisite Course: Principles of Tissue Engineering

Field and Degree: Tissue Engineering – PhD
Number and Type of Credits (Theoretical / Practical): 2 (Theoretical)

Course Name and Code: Principles of Organogenesis and Tissue Repair (19519624)
Location: Faculty of Advanced Medical Sciences
Phone Number: Faculty 33355790
Instructor(s): Dr. Ahmad Mehdi Pour, Dr. Darush Mohammadzadeh, Dr. Leila Roshangar, Dr. Mohammad Karimi Pour

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Session 8 – Instructor: Dr. Ahmad Mehdi Pour

General Objective: Familiarity with development, histology, and repair mechanisms in cartilage tissue

Evaluation Method	Educational Media	Time	Learning Environment	Student Activity	Professor Activity	Objective Domains
Final Exam	Computer and Whiteboard	2 hours	Classroom	Active participation in class and	Lecture and encouragement of students for	Cognitive

				engagement in discussions	more participation	

Specific Objectives

It is expected that by the end of the session, the student will be able to:

1. Understand cartilage tissue from developmental, anatomical, and histological perspectives.
2. Identify factors damaging cartilage and tissue engineering strategies for repairing defects.
3. Name the most common cells involved in cartilage repair using tissue engineering and explain the materials and signaling policy.
4. Learn the mechanisms of repair for hyaline, elastic, and fibrous cartilage and be familiar with tissue engineering strategies for these repair cells.
5. Name products used in the field of cartilage tissue engineering and know their general structure.

- Course policy regarding student absence and tardiness: Report to the Education Office.
- Student evaluation method and grading breakdown for each evaluation:
    - a) During the course (Quiz: Assignments/Exam, Midterm
    - b) End of course: Exam
    - c) Grade: 1.25
- **Main Course Resources (References):**
    - Lanza R, Langer R, Vacanti J. Principles of Tissue Engineering. San Diego: Academic Press (Latest Edition).
    - Stocum DL. Regenerative Biology and Medicine. San Diego: Academic Press (Latest edition)

Semester: Third

Prerequisite Course: Principles of Tissue Engineering

Field and Degree: Tissue Engineering – PhD

Number and Type of Credits (Theoretical / Practical): 2 (Theoretical)

Course Name and Code: Principles of Organogenesis and Tissue Repair (1591614)

Location: Faculty of Advanced Medical Sciences

Phone Number: Faculty 2335579

Instructor(s): Dr. Ahmad Mehdi Pour, Dr. Darvish Mohammadzadeh, Dr. Leila Roshangar, Dr. Mohammad Karimi Pour