Faculty of Medicine in Rijeka

Curriculum
2026/2027

For course

Pathogenesis of Thermal Injuries

Study program:	**Medical Studies in English (R)** (elective) University integrated undergraduate and graduate study
Department:	**Department of Physiology, Immunology and Pathophysiology**
Course coordinator:	**prof. dr. sc. Mrakovčić-Šutić Ines, dr. med.**
Year of study:	**5**
ECTS:	**1.5**
Incentive ECTS:	**0 (0.00%)**
Foreign language:	**Possibility of teaching in a foreign language**

Course information:

The aim of the course is to acquaint medical students with the etiology, pathophysiological picture and consequences of burns and frostbite. Thermal injuries affect the skin and deeper parts of the tissue, destroying biological tissue, opening the way for the development of infection, and causing multiple hemodynamic, endocrine, renal and metabolic disorders.

Our task is to educate the future doctor of general medicine in the proper approach to such difficult patients, of which there are unfortunately more and more in the modern technologically developed society, realizing the importance of a proper and quick reaction for the patient's life, health and ability to work.

During this course, students will be trained to independently manage minor injuries, which are most often treated on an outpatient basis, and an effort will be made to provide them with an insight into the treatment of serious injuries, as well as a presentation of old injuries with all their consequences.

At the end of the course, the student should be able to:

1. independently characterize the type of injury

2. classify burns/frostbite, judge the state of the organism, and observe disorders of the function of individual organ systems

3. notice the disturbance of the electrolyte status and know how it can be corrected

4. observe pathological changes in other organ systems and know how to provide first aid on the spot

5. observe the possible existence of chronic diseases that can further complicate the recovery of burned/frozen patients

At the end of the course, the student is expected to be able to:

1. perform self-cleaning of the wounds of burned/frozen patients

2. provide analgesia when treating pain

3. diagnose «compartment» sy and participate in its surgical solution, in terms of decompression

4. bandage burns of different degrees

5. be familiar with taking free skin grafts

6. to be familiar with the necrectomy of burned surfaces

7. perform hydrotherapy

8. be familiar with physical rehabilitation

9. be familiar with the correction of functional contractures as a result of burns

List of assigned reading:

1. Scuderi N: Chirurgia plastica 1985 di Piccin, Nuova Libraria, S.p.A. Padova (selected chapters)
2. Gamulin S, Marušić M, Kovač Z i sur. Patophysiology, Medicinska naklada, peto izdanje, Zagreb, 2005 (selected chapters)

List of optional reading:

1. Babcock GF: Predictive medicine: severe trauma and burns. Cytometry B Clin Cytom. 2003 ;53(1):48-53.

2. Edwards-Jones V, Greenwood JE: What's new in burn microbiology? James Laing Memorial Prize Essay 2000. Burns..2003 ;29(1):15-24.

3. Schwacha MG: Macrophages and post-burn immune dysfunction. Burns. 2003;29(1):1-14.

4. Carsin H, Bargues L, Stephanazzi J, Paris A, Aubert P, Le Bever H: Inflammatory reaction and infection in severe burns. Pathol Biol (Paris). 2002;50(2):93-101.

5. Lederer JA, Rodrick ML, Mannick JA.: The effects of injury on the adaptive immune response. Shock. 1999;11(3):153-9.

Curriculum:

Seminars list (with titles and explanation):

S1: Systemic inflammatory response (SIRS), multiple tissue injuries (MOF), and hypovolemic hemorrhagic cyrculatory schock

Explain the classification and characteristics of MODS, MOF and SIRS

S2: Hemodynamic disorders caused by burns

Explain circulatory changes in burns

S3: Disorders of innate and acquired immunity in burns

Explain changes in the innate and acquired immune response during burns and their consequences

S4: Predispositions for the development of infection

Understand the factors that contribute to the more severe clinical picture of burns

S5: Changes in the concentration of electrolytes during different stages of the development of burns, as well as at different severities of the disease

Describe electrolyte imbalance

S6: Gastrointestinal and metabolic disorders during burn injuries

Explain the disorder of GIT and metabolic functions in burns

S7: Endocrine disorders in burns

Explain the complications of diabetes in burns; Explain the disorder of adrenal cortex hormone secretion in burns

S8: General and specific therapy

Describe wound treatment and fluid replacement

S9: Coagulation disorders in burns

Describe coagulation disorders in burns

S10: Burns and muscle damages

Describe skeletal muscle disorders in burns

S11: Changes in electrolyte status, and multiple disorders of organic functions during frostbite

Explain electrolyte disorders in frostbite

S12: First aid for frostbite and for burns

Describe first aid for frostbite and burns

S13: Characteristics of burns in children

Describe the characteristics of burns in children and the specifics of assessing the severity of the disease

S14: Artificial leather

Explain the term artificial leather

Lectures list (with titles and explanation):

Lecture 1: Etiology, classification and division of burns

Explain the different classifications of burns

Lecture 2: Indicators for assessing the severity of burns; Burn disease

Explain the assessment of burn size. Understand burn disease

Lecture 3: Pathophysiology of frostbite

Explain pathophysiological mechanisms in frostbite

Student obligations:

Regular class attendance, writing a seminar paper

Exam (exam taking, description of the written/oral/practical part of the exam, point distribution, grading criteria):

The final grade of the student's knowledge is formed on the basis of the grade acquired during the course (70% of the total grade) and on the basis of the knowledge test at the final exam (30% of the total grade). During the classes, the student's work will be evaluated and evaluated on the basis of a seminar paper that students make in small groups and present during the seminar.

Other notes (related to the course) important for students:

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COURSE HOURS 2026/2027

Pathogenesis of Thermal Injuries

Lectures (Place and time or group)	**Seminars** (Place and time or group)
10.11.2026	

Lecture 1: Etiology, classification and division of burns:
• ONLINE (17:00 - 20:45) [214]
  ○ PoTI
 	
Lecture 2: Indicators for assessing the severity of burns; Burn disease:
• ONLINE (17:00 - 20:45) [214]
  ○ PoTI
 	
Lecture 3: Pathophysiology of frostbite:
• ONLINE (17:00 - 20:45) [214]
  ○ PoTI	

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13.11.2026	

	S1: Systemic inflammatory response (SIRS), multiple tissue injuries (MOF), and hypovolemic hemorrhagic cyrculatory schock:
	• ONLINE (15:30 - 21:30) [214]
	  ○ PoTI
	
	S2: Hemodynamic disorders caused by burns:
	• ONLINE (15:30 - 21:30) [214]
	  ○ PoTI
	
	S3: Disorders of innate and acquired immunity in burns:
	• ONLINE (15:30 - 21:30) [214]
	  ○ PoTI
	
	S4: Predispositions for the development of infection:
	• ONLINE (15:30 - 21:30) [214]
	  ○ PoTI
	
	S5: Changes in the concentration of electrolytes during different stages of the development of burns, as well as at different severities of the disease:
	• ONLINE (15:30 - 21:30) [214]
	  ○ PoTI
	
	S6: Gastrointestinal and metabolic disorders during burn injuries:
	• ONLINE (15:30 - 21:30) [214]
	  ○ PoTI

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16.11.2026	

	S5: Changes in the concentration of electrolytes during different stages of the development of burns, as well as at different severities of the disease:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI
	
	S6: Gastrointestinal and metabolic disorders during burn injuries:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI
	
	S7: Endocrine disorders in burns:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI
	
	S8: General and specific therapy:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI
	
	S9: Coagulation disorders in burns:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI

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	S9: Coagulation disorders in burns:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI
	
	S10: Burns and muscle damages:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI
	
	S11: Changes in electrolyte status, and multiple disorders of organic functions during frostbite:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI
	
	S12: First aid for frostbite and for burns:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI
	
	S13: Characteristics of burns in children:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI
	
	S14: Artificial leather:
	• ONLINE (16:00 - 20:30) [214]
	  ◦ PoTI

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List of lectures, seminars and practicals:

LECTURES (TOPIC)	Number of hours	Location
Lecture 1: Etiology, classification and division of burns	1	ONLINE
Lecture 2: Indicators for assessing the severity of burns; Burn disease	2	ONLINE
Lecture 3: Pathophysiology of frostbite	2	ONLINE

SEMINARS (TOPIC)	Number of hours	Location
S1: Systemic inflammatory response (SIRS), multiple tissue injuries (MOF), and hypovolemic hemorrhagic cyrculatory schock	2	ONLINE

S2: Hemodynamic disorders caused by burns	1	ONLINE
S3: Disorders of innate and acquired immunity in burns	2	ONLINE
S4: Predispositions for the development of infection	2	ONLINE
S5: Changes in the concentration of electrolytes during different stages of the development of burns, as well as at different severities of the disease	1	ONLINE
S6: Gastrointestinal and metabolic disorders during burn injuries	1	ONLINE
S7: Endocrine disorders in burns	1	ONLINE
S8: General and specific therapy	1	ONLINE
S9: Coagulation disorders in burns	2	ONLINE
S10: Burns and muscle damages	1	ONLINE
S11: Changes in electrolyte status, and multiple disorders of organic functions during frostbite	2	ONLINE
S12: First aid for frostbite and for burns	2	ONLINE
S13: Characteristics of burns in children	1	ONLINE
S14: Artificial leather	1	ONLINE

EXAM DATES (final exam):