

UNIVERSITY OF ZAGREB  
FACULTY OF VETERINARY MEDICINE  
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Register no.: **61-15-212-24**

Zagreb, 06. September 2024



|                                 |                      |           |
|---------------------------------|----------------------|-----------|
| 190684                          | REPUBLIKA HRVATSKA   |           |
| Veterinarski fakultet u Zagrebu |                      |           |
| Primljeno:                      | 06.09.2024           |           |
| Klasifikacijska oznaka          | Org. jed.            |           |
| 602-04/24-22/38                 | 251-61-41;251-61-32; |           |
| Uredžbeni broj                  | Prilozi              | Vrijednos |
| 251-61-15-24-50                 | 0                    | -         |

## COURSE SYLLABUS

Course name: **GENERAL AND CLINICAL RADIOLOGY**

Academic year 2024-2025

**Course leader:** Assoc. Prof. Hrvoje Capak, PhD

Teachers: Assoc. Prof. Hrvoje Capak, PhD  
Assoc. Prof. Zoran Vrbanac, PhD, DACVSMR, DECVSMR

Associate teachers: Ana Javor, DVM  
Barbara Mratović, DVM

**First day of classes:** 10. October 2024

**Last day of classes:** 18. December 2024

### Activities - General and Clinical Radiology (1/3)

| Start Date | Start T | End Ti | Subject                                       | Group            | Note | Length | Instructor             | Room             |
|------------|---------|--------|-----------------------------------------------|------------------|------|--------|------------------------|------------------|
| 10/10/2024 | 15:30   | 17:00  | p1 Introduction, X ray, CT machines           | 7E-1, 7E-2, 7E-3 |      | 1:30   | Capak H.               | P_fizika         |
| 18/10/2024 | 11:15   | 12:45  | v1 Introduction, X ray, CT devices            | 7E-3             |      | 1:30   | Nastavnici na predmetu | V_rendgen        |
| 18/10/2024 | 12:45   | 14:15  | v1 Introduction, X ray, CT devices            | 7E-1             |      | 1:30   | Nastavnici na predmetu | V_rendgen        |
| 22/10/2024 | 13:30   | 15:00  | p2 Radiology of skeletal system 1             | 7E-1, 7E-2, 7E-3 |      | 1:30   | Vrbanac Z.             | P_fiziologija    |
| 22/10/2024 | 15:00   | 16:30  | v1 Introduction, X ray, CT devices            | 7E-2             |      | 1:30   | Nastavnici na predmetu | V_rendgen        |
| 23/10/2024 | 14:30   | 16:00  | p3 Radiology of skeletal system 2 joints      | 7E-1, 7E-2, 7E-3 |      | 1:30   | Vrbanac Z.             | P_kemija         |
| 25/10/2024 | 13:00   | 16:00  | v2 Introduction 2 - positionioning techniques | 7E-2             |      | 3:00   | Nastavnici na predmetu | V_rendgen        |
| 28/10/2024 | 8:00    | 11:00  | v2 Introduction 2 - positionioning techniques | 7E-3             |      | 3:00   | Nastavnici na predmetu | V_rendgen        |
| 29/10/2024 | 14:30   | 16:00  | p4 Radiology of respiratory system            | 7E-1, 7E-2, 7E-3 |      | 1:30   | Vrbanac Z.             | P_mikrobiologija |
| 30/10/2024 | 9:45    | 12:45  | v2 Introduction 2 - positionioning techniques | 7E-1             |      | 3:00   | Nastavnici na predmetu | V_rendgen        |
| 04/11/2024 | 11:15   | 14:15  | v3 R Locomotor system 1                       | 7E-1             |      | 3:00   | Nastavnici na predmetu | V_rendgen        |
| 05/11/2024 | 11:15   | 14:15  | v3 R Locomotor system 1                       | 7E-2             |      | 3:00   | Nastavnici na predmetu | V_rendgen        |

### Activities - General and Clinical Radiology (2/3)

| Start Date | Start T | End Ti | Subject                                 | Group            | Note | Length | Instructor             | Room      |
|------------|---------|--------|-----------------------------------------|------------------|------|--------|------------------------|-----------|
| 06/11/2024 | 13:00   | 16:00  | v3 R Locomotor system 1                 | 7E-3             |      | 3:00   | Nastavnici na predmetu | V_rendgen |
| 07/11/2024 | 11:00   | 12:30  | p5 Radiology of cardiovascular system   | 7E-1, 7E-2, 7E-3 |      | 1:30   | Capak H.               | P_klinike |
| 08/11/2024 | 11:15   | 12:45  | p6 Radiology of gastrointestinal system | 7E-1, 7E-2, 7E-3 |      | 1:30   | Capak H.               | P_klinike |
| 11/11/2024 | 8:15    | 11:15  | v4 R Locomotor system 2 - joints, spine | 7E-1             |      | 3:00   | Nastavnici na predmetu | V_rendgen |
| 11/11/2024 | 12:30   | 15:30  | v4 R Locomotor system 2 - joints, spine | 7E-2             |      | 3:00   | Nastavnici na predmetu | V_rendgen |
| 12/11/2024 | 8:15    | 11:15  | v4 R Locomotor system 2 - joints, spine | 7E-3             |      | 3:00   | Nastavnici na predmetu | V_rendgen |
| 28/11/2024 | 9:00    | 10:30  | p7 Radiology of urogenital system       | 7E-1, 7E-2, 7E-3 |      | 1:30   | Capak H.               | P_klinike |
| 28/11/2024 | 14:30   | 15:15  | p8 Equine and farm animal radiology     | 7E-1, 7E-2, 7E-3 |      | 0:45   | Capak H.               | P_klinike |
| 29/11/2024 | 11:15   | 14:15  | v5 R Respiratory system, Coll 1         | 7E-2             |      | 3:00   | Nastavnici na predmetu | V_rendgen |
| 02/12/2024 | 11:30   | 14:30  | v5 R Respiratory system, Coll 1         | 7E-3             |      | 3:00   | Nastavnici na predmetu | V_rendgen |
| 03/12/2024 | 11:30   | 14:30  | v5 R Respiratory system, Coll 1         | 7E-1             |      | 3:00   | Nastavnici na predmetu | V_rendgen |
| 06/12/2024 | 11:15   | 14:15  | v6 R Cardiovascular system              | 7E-3             |      | 3:00   | Nastavnici na predmetu | V_rendgen |



### Activities - General and Clinical Radiology (3/3)

| Start Date       | Start T | End Ti | Subject                        | Group | Note | Length       | Instructor             | Room      |
|------------------|---------|--------|--------------------------------|-------|------|--------------|------------------------|-----------|
| 09/12/2024       | 8:15    | 11:15  | v6 R Cardiovascular system     | 7E-1  |      | 3:00         | Nastavnici na predmetu | V_rendgen |
| 09/12/2024       | 11:30   | 14:30  | v6 R Cardiovascular system     | 7E-2  |      | 3:00         | Nastavnici na predmetu | V_rendgen |
| 10/12/2024       | 9:00    | 12:00  | v7 R Gastrointestinal system   | 7E-1  |      | 3:00         | Nastavnici na predmetu | V_rendgen |
| 11/12/2024       | 9:00    | 12:00  | v7 R Gastrointestinal system   | 7E-2  |      | 3:00         | Nastavnici na predmetu | V_rendgen |
| 12/12/2024       | 9:00    | 12:00  | v7 R Gastrointestinal system   | 7E-3  |      | 3:00         | Nastavnici na predmetu | V_rendgen |
| 16/12/2024       | 9:00    | 12:00  | v8 R Urogenital system, Coll 2 | 7E-3  |      | 3:00         | Nastavnici na predmetu | V_rendgen |
| 17/12/2024       | 9:00    | 12:00  | v8 R Urogenital system, Coll 2 | 7E-1  |      | 3:00         | Nastavnici na predmetu | V_rendgen |
| 18/12/2024       | 9:00    | 12:00  | v8 R Urogenital system, Coll 2 | 7E-2  |      | 3:00         | Nastavnici na predmetu | V_rendgen |
| <b>Total: 32</b> |         |        |                                |       |      | <b>78:45</b> |                        |           |

**STUDENT OBLIGATIONS**

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lecture attendance                              | Attending lectures 3 - 6 points (15 lecture hours, 1 lecture hour is worth 0.4 point).<br>A student must attend minimal 8 lecture hours                                                                                                                                                                                                                                                                            |
| Seminars attendance                             | -                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Practicals attendance                           | Attending exercises 8-12 points (8 programmes, 1 programme (double period) is worth 1.5 points). A student must attend minimal 7 programmes (24 hours).                                                                                                                                                                                                                                                            |
| Active participation in seminars and practicals | Participation at exercises 5 - 10 points – participation at exercise will be evaluated with short oral tests with 5 points at least two times.                                                                                                                                                                                                                                                                     |
| Final exam                                      | ORAL EXAM: 24 - 40 points<br><br>(5 questions: 1 question is worth 8 points)<br><br>To take the final exam a student must gain minimal 16 points from attending lectures and exercises and participation at exercises and minimal 20 points from continuous knowledge checking.                                                                                                                                    |
| Examination requirements                        | Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine (2022). Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam.<br><b>Article 41:</b> a student can justifiably be absent from up to 50 % of the lectures; 30% of the seminars and 30 % of the exercises. |

**GRADING AND EVALUATING STUDENT WORK**

|                                           |                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Continuous knowledge-checking (mid-terms) | Continuous knowledge checking 20 - 32 points<br>1 <sup>st</sup> preliminary exam (10 questions) 10 points min. – 16 points max. (1 question is worth 1.6 points)<br>2 <sup>nd</sup> preliminary exam (10 questions) 10 points min. – 16 points max. (1 question is worth 1.6 points)<br><br>Preliminary exam in online form. |
| Preliminary exams (dates)                 | <b>1<sup>st</sup> preliminary exam 29/11/2024; 2/12/2024; 3/12/2024</b><br><b>2<sup>nd</sup> preliminary exam 16/12/2024; 17/12/2024; 18/12/2024</b>                                                                                                                                                                         |
| Final exams (dates)                       | <b>16/12/2024; 13/2/2025; 21/2/2025</b>                                                                                                                                                                                                                                                                                      |
| Form of final exam                        | Oral                                                                                                                                                                                                                                                                                                                         |

**LITERATURE**

|                       |                                                                                                                                                                                                                                                                                                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Obligatory literature | <ul style="list-style-type: none"> <li>Kealy J. Kevin, Hester McAllister (2004.): Diagnostic Radiology and Ultrasonography of the Dog and Cat, 4th Edition, Philadelphia</li> <li>Thrall D.E. (2013): Textbook of Veterinary Diagnostic Radiology. 6th ed Saunders. St. Louis, Missouri</li> </ul> |
| Optional literature   |                                                                                                                                                                                                                                                                                                    |

**OBJECTIVES AND LEARNING OUTCOMES**

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Course objectives | In the general part of the course the student is introduced to basics of X-rays physics, X-rays and CT devices and positioning. Both plain and digital radiography procedures will be covered. Interpretation protocols, projection effects and contrast survey will be explained to the student. In the clinical part of the subject, the theoretical and practical education of radiological diagnostic of different body systems (skeletal, digestive, respiratory, cardiovascular, and urogenital) will be covered. During the practical work, student will gain experience in analyses and interpretation of radiographs, composing the findings and determine the diagnosis. |
| Learning outcomes | <ol style="list-style-type: none"> <li>1. to understand the physics of x-ray and CT imaging, potential harmful effect of x-ray and protection</li> <li>2. to perform the x-ray survey and the image processing</li> <li>3. to analyse and interpret different anatomical structures and opacities with the goal of determining the diagnosis</li> <li>4. to choose and apply suitable contrast survey and to compare it with plain radiographs</li> </ol>                                                                                                                                                                                                                          |



5. to evaluate the diagnostic possibility in different pathological conditions and to determine the possible use of radiological exam.

**GRADING SCHEME**

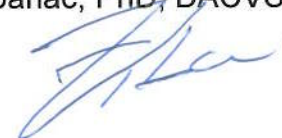
| <i>Points</i> | <i>Grade</i> |
|---------------|--------------|
| Up to 59      | 1 (F)        |
| 60-68         | 2 (E)        |
| 69-76         | 2 (D)        |
| 77-84         | 3 (C)        |
| 85-92         | 4 (B)        |
| 93-100        | 5 (A)        |

**Course leader:**

Assoc. Prof. Hrvoje Capak, PhD

**Head of Department/Clinic:**

Assoc. Prof. Zoran Vrbanac, PhD, DACVSMR, DECVSMR



Note: The course leader is required to submit a Course Syllabus to all teachers and associates pertaining to the Course.

**GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH LECTURES,  
SEMINARS and PRACTICALS**

| Type of activity                                | Minimum number of points | Maximum number of points |
|-------------------------------------------------|--------------------------|--------------------------|
| Lectures attendance                             | 3                        | 6                        |
| Seminar attendance                              | 4                        | 6                        |
| Practicals attendance                           | 4                        | 6                        |
| Active participation in seminars and practicals | 5                        | 10                       |
| Continuous knowledge checking (mid-terms)       | 20                       | 32                       |
| Final exam                                      | 24                       | 40                       |
| <b>TOTAL</b>                                    | <b>60</b>                | <b>100</b>               |

**GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH LECTURES and  
SEMINARS**

| Type of activity                          | Minimum number of points | Maximum number of points |
|-------------------------------------------|--------------------------|--------------------------|
| Lecture attendance                        | 3                        | 6                        |
| Practicals attendance                     | 8                        | 12                       |
| Active participation in practicals        | 5                        | 10                       |
| Continuous knowledge checking (mid-terms) | 20                       | 32                       |
| Final exam                                | 24                       | 40                       |
| <b>TOTAL</b>                              | <b>60</b>                | <b>100</b>               |

**GRADING AND EVALUATION OF STUDENT WORK ON COURSES WITH SEMINARS and  
EXERCISES**

| Type of activity                                | Minimum number of points | Maximum number of points |
|-------------------------------------------------|--------------------------|--------------------------|
| Seminar / practicals attendance                 | 11                       | 18                       |
| Active participation in seminars and practicals | 5                        | 10                       |
| Continuous knowledge checking (mid-terms)       | 20                       | 32                       |
| Final exam                                      | 24                       | 40                       |
| <b>TOTAL</b>                                    | <b>60</b>                | <b>100</b>               |