

**COURSE SYLLABUS**  
Summer 2008

**COURSE NUMBER: ANA 504**

**COURSE TITLE: SPINAL ANATOMY**

TRIMESTER: 1 OF 10 AND 1 OF 12

LECTURE HOURS: 4  
LABORATORY HOURS: 1

LECTURE HOURS PER TRIMESTER: 75

LABORATORY HOURS: 1

TRIMESTER CREDIT HOURS: 4.5

TRIMESTER CONTACT HOURS: 75

COURSE INSTRUCTORS :  
**LECTURE: *RICKARD J. THOMAS, D.C.***  
**LABORATORY: *Dr. Jawaid***

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OFFICE HOURS: Dr. Thomas Call for Appointment or see instructor  
Dr. Jawaid: Call for appointment or see instructor

## COURSE SYLLABUS FOR SPINAL ANATOMY

**COURSE PREREQUISITES:** None

**COURSE DESCRIPTION:** This is the study of the macro-anatomy of the human spinal column. The features of the cervical, thoracic, lumbar, sacral and coccygeal regions will be stressed as well as the ligamentous and muscular attachments. Included in this course is the embryology of the spinal column, the development of the spinal column and the autonomic and peripheral nervous system overview. There is a lab hour that will try to follow the lecture information as close as possible, in order to give the student a better understanding of the spine.

**REQUIRED TEXTS:** **BASIC AND CLINICAL ANATOMY OF THE SPINE, SPINAL CORD AND ANS:** by. Cramer and. Darby: Mosby publishing Co, 1995

**ALSO REQUIRED:** MODEL SPINE

**ATTENDANCE, TARDINESS, AND ABSENTEEISM:** Attendance is **REQUIRED** at all times. Attendance is taken at every class session (including laboratory sessions), and students are responsible for all assignments and requirements whether or not they are in attendance. In order to qualify students to sit for state board licensing examinations, course credit will be given only if the student is present at least 90% of the time and completes the course with a passing grade (C or above). Should absences exceed 10% of the scheduled class time (**8 hours of lecture**), the student will be dismissed from the course (absence number 9) with a grade of "XF". When excessive absences have occurred due to certain **extenuating circumstances beyond the student's control**, the student may **submit a written request to the INSTRUCTOR OF THE COURSE** for reinstatement in the course. You may also appeal to the Department Chair (Dr. Jill Davis). **IN THE OPINION OF DR. THOMAS, ONLY MILITARY DUTY and RELIGIOUS HOLIDAYS ARE EXTENUATING CIRCUMSTANCES.**

**Arriving late for class disrupts the instructor as well as the rest of the class. Some students are habitual in being tardy. For these reasons, if you are tardy twice (2 times), that will equal one (1) absence.**

It is important, as a doctorate program, to extend courtesy to each other and our fellow students. Getting up and walking out of the classroom, for any reason, disrupts the instructor and other students. For this reason, **if you if you get up and leave to get a drink walk around, etc., do not come back until class is over.** You will also be taken off the roll for that hour, as you did not receive the 50 minutes of classroom study. Also, **TURN OFF ALL CELL PHONES BEFORE ENTERING CLASS**, this is a major disruption.

**EVALUATION:** Your final grade for this course will depend upon your performance in 4 Lecture examinations and 2 Laboratory examinations. The **first lecture exam** is worth **15 % of the final grade**. **Exams 2 and 3** are worth **20%** of the final grade **each**, and the **final examination** is worth **25%** of the final grade. Altogether, the **lecture portion of this course is worth 80% of the final grade**. Each lecture exam may be of the multiple-choice, written, fill in the blank or essay format or matching or any combination of these. The **Laboratory portion** of this course is **worth 20%** of the final grade. The **first laboratory exam** is worth **5% of the final grade** and the **second lab exam is worth 15% of the final grade**. You may challenge any answer you feel was incorrectly marked. Bring your references. This challenge will be accepted only within one (1) week of the return of the test. After that, no challenges will be accepted. A few things to remember: 1). Your grade is figured on percentage (%) points, not actual points. It takes 3 test points (actual points) to represent a change in a percentage point. 2). Your notes from other sources does not necessarily represent what the instructors are telling you. These are not our notes, but notes from other students. I do not give out my notes, as you are supposed to read the book, study your notes (hopefully you are taking notes also and not relying on other peoples notes), and listening in class. Dr. Thomas adds new material each trimester and also tests over this new material. 3). This is one of the most important classes in your curriculum, and the instructors expect you to learn it well.

**LECTURE EXAMINATIONS:** ALL LECTURE EXAMINATIONS ARE COMPREHENSIVE. *Laboratory examination format will be up to the instructor of the laboratory class.* NOTE: According to the school policy **YOU MUST PASS THE FINAL EXAMINATION TO PASS THE COURSE.**

**The college grading scale will be applied regarding A, B, C, D, and F's.**

**NOTE:** If a major **examination is missed** (for whatever reason), the student **may** be allowed to make it up, **HOWEVER**, it will not be the same test as the others took, nor will it be multiple choices. It will be a ***written comprehensive examination***. Missed laboratory examinations will be more difficult because you have more time to study. **ALL MISSED EXAMINATIONS MUST BE MADE UP WITHIN ONE (1) WEEK OF RETURN TO CLASS. NO EXAMINATIONS WILL BE GIVEN EARLY. DO NOT MAKE PLANS TO LEAVE FOR HOME PRIOR TO TAKING THE FINAL EXAMINATION, if you do, you will be given a grade of incomplete and must take a written comprehensive examination within the first week of the next trimester OR receive score of "0" for that examination.**

**ACADEMIC POLICIES:** The college policies regarding course withdrawals, course incomplete, etc., will be followed. Read your student handbook and the college catalog for further information.

**SPECIAL ACCOMODATIONS:** Cleveland Chiropractic College has adopted the definition of disability as "a physical or mental impairment that substantially limits one or more of the major life activities of an individual, such as caring of oneself, learning,

working, performing manual tasks, walking, seeing, hearing, speaking and breathing.” Impairment may be “any physiological disorder or condition, cosmetic disfigurement, anatomical loss or psychological disorder such as retardation, organic brain syndromes, emotional or mental illness and specific learning disabilities.”

If you have a **DOCUMENTED DISABILITY**, or think you may have a disability that you believe entitles you to some type of special accommodation in this course, please **contact the Director of Academic Enhancement,(David Foose), in Room 3140 (phone 1650) within the first week of the trimester.** No accommodations will be made for you until the Office of Student Services has given this instructor official approval to do so and no accommodations will be retroactive.

**STANDARDS OF CONDUCT:** As a future Doctor of Chiropractic, you are expected to adhere to the highest professional, ethical, and personal standards of conduct. Any activities that violate the standards of student conduct specified in the College Catalog will form the basis of disciplinary action towards those involved.

**CLEVELAND CHIROPRACTIC HONOR CODE: (Adopted August 2003)**

Honesty, integrity and high ethical standards are essential features of Cleveland Chiropractic College. The honor code helps to build trust within the college community and instills common values and principles that will extend into all facets of personal and professional life.

As members of the Cleveland Chiropractic College community all faculty, staff and students are bound by honor to uphold professional standards of respect, honesty, integrity and social responsibility. We are responsible for promoting ethical behaviors and endeavors both in and out of the classroom and will act in a manner, which demonstrates concern for the personal dignity, rights and freedoms of all members of the community. We pledge that we will not take unfair advantage of any other member of the College community either by lying, cheating or plagiarizing. We are respectful of college property and the property of others.

I acknowledge that I am responsible for upholding the Honor Code at all times and that failure to do so will result in disciplinary action.

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Signature

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Date

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Rickard J. Thomas, D.C

Printed Name

**SPECIFIC OBJECTIVES OF THE COURSE:** The following are the specific objective for this course:

1. To have the student acquire a fundamental knowledge of the spinal anatomy.
2. To have the student be able to understand the practical application of this knowledge.
3. To have the student be able to relate this material to the physiology of the bones where applicable.
4. To have the student are able to understand the origin and insertion and action of the muscles of the back.
5. To have the student are able to understand the ligamentous attachments of the spine.
6. To have the student to be able to understand basic Neuroanatomy as it relates to the spinal column.
7. To have the student be able to apply the above knowledge to the general practice of chiropractic.

**You are expected to come to class prepared: this means having read the proper chapters prior to coming to class. Be ready to discuss the material in the classroom.**

**YOUR CONTINUATION IN THIS CLASS AFTER THIS SYLLABUS IS READ IS YOUR ACCEPTANCE OF THE CONDITIONS AND RULES OF THIS CLASS AND THE HONOR CODE.**

### **PROPER TEST TAKING BEHAVIORS**

Certain behaviors are considered inappropriate during the administration of an instrument meant to evaluate the student's progress (examinations, tests, quizzes, practical examinations, etc.). The following are specifically prohibited and are violations of **THE STANDARDS OF CONDUCT**.

1. Having personal belongings other than writing implements and erasers in the vicinity of the test. Examples of personal belongings include, but are not limited to: briefcases, backpacks, purses, notebooks, textbooks (opened or closed). These materials may be left in front of the classroom during the examinations.
2. Eyes wandering toward anyone else's paper. Keep your eyes on your own paper, do not look around.

3. Placing one's test and/ or answer sheet (scan-tron) so that another student may see it.
4. "Crib" notes of any kind.
5. Wearing of hats. All hats/ caps must be placed with the personal belongings in the front of the room.
6. Unauthorized use of headphones.
7. Unauthorized exit from the room. **ANYONE WHO LEAVES THE ROOM DURING AN EXAMINATION MAY NOT RETURN UNTIL AFTER ALL EXAMINATIONS HAVE BEEN COMPLETED.**
8. Eating or drinking during the examination.
9. Talking, tapping fingers, feet, or making other distracting noises or gestures that may be interpreted as signaling.
10. Distracting others when entering or leaving the examination area.

**ALL TESTS AND QUESTIONS SHOULD BE SELF EXPLANATORY. THE INSTRUCTOR WILL NOT ANSWER ANY QUESTIONS DURING THE EXAMINATION.**

If this instructor is satisfied that a misconduct has occurred, he/she will terminate the test for that individual(s) involved, record a test grade of zero, and report the name(s) of the individual(s) to the Director of Student Services for proper investigation and sanctions.

**Please note that there are special notes on the Dr. Thomas web-page that you are expected to view or download. These notes will also be tested on. These notes are what used to be handouts, since they are on the web page, no handouts (other than syllabus) will be provided.**

## **SPINAL ANATOMY OUTLINE**

- Week 1:**
- A: Introduction to the course:
    - 1. Reading of the syllabus
    - 2. What is expected from the students
    - 3. Examination format
    - 4. Importance of this course to chiropractic
  - B. Spinal Column:
    - 1. Other names
    - 2. Different parts of the spinal column
    - 3. Length of the spinal column: male/female
    - 4. True segments vs. False segments
  - C. Spine: **(CHAPTERS 1 and 2)**
    - 1. Different regions of the spine with the typical number of segments per region
    - 2. Typical spinal vertebra: (see picture page 22)
      - a. 2 general parts of a typical spinal vertebra (page 4 for posterior part)
      - b. Descriptive parts of a typical spinal vertebra
        - 1. Body (picture page 25)
        - 2. Pedicle (page 25)
        - 3. Lamina
        - 4. spinous process (page 23)
        - 5. Transverse process (page 23)
        - 6. Articular processes (zygapophysis) (page 24)
          - a. Angulations and rotation in cervical, thoracic and lumbar
          - b. Range of motion (biomechanics) of each region
          - c. Percentage of axial compression (weight) on facets
    - 3. Peculiar Vertebra
    - 4. Bone strength: (picture page 21)
      - a. Cortex bone
      - b. Cancellous bone
    - 5. Parts of the intervertebral foramen (IVF) **(Chapter 7-page 196)** (picture page 25)

- Week 2:**
- A. Intervertebral Motor Unit: **(Chapter 2)** (page 25 -picture and page 196)
    - 1. Definition
    - 2. Parts
  - B. Function of the vertebral column: (not in the book—Listen carefully)
  - C. Embryology **(Chapter 12)**
    - 1. Where conception takes place

2. Time to reach uterus
  3. Germ disc
  4. Henson's node
  5. Embryonic layers
  6. Notochord (page 378)
  7. Somites
  8. Fissure of Von Ebner
  9. Sclerotomes (page 385)—(picture on page 388)
  10. Myotomes
  11. Dermatomes
  12. Mesenchyme
- D. Embryology (3 stages of vertebral development) (Not in book)
1. Mesenchymal
  2. Chondrification
  3. Ossification
    - a. Primary
    - b. Secondary
- Centers of Vertebral Ossification (see areas in chapters 5,6,  
& 7)
1. Atlas
  2. Axis
  3. C-3 through C-7
  4. T-1 through T-12
  5. L-1 through L-5
  6. Sacrum (chapter 8)
  7. Coccyx (chapter 8)

A. Pyramids (not in book)

B. Curves: (**Chapter 5 6, & 7**)

1. Primary
2. Secondary
3. Functions of a curve

C. Curvatures (not in book)

1. Definition and reasons for curvatures
2. Anterior to posterior curvatures (Chapter 5,6,7)
  - a. Lordosis
  - b. Kyphosis
3. Lateral curvatures (page 168 and 169)
  - a. Scoliosis
  - b.

**Week 3:** A. Finish curves and curvatures.

B. Occiput (**Chapter 5**)

1. General parts.

- a. Basilar
- b. Condylar
- c. Squamous
  - 1. Nuchal lines
  - 2. Inion

C. Typical Cervical Vertebrae (**Chapter 5**)

- 3. Descriptive parts (picture page 126)
- 4. Articulations

D. Peculiar Cervical Vertebrae

- 5. Atlas (picture page 121)
- 6. Axis
- 7. C-7
- 8. Muscles attached to the various vertebral parts page 123)
- 9.

E. Important facts on specific cervical vertebra

- 1. Which vertebra has the longest transverse processes?
- 2. Which vertebra has the shortest transverse processes?
- 3. Which vertebra has the largest spinous process
- 4. Which vertebra has the longest spinous process
- 5. Which vertebra has the shortest spinous process
- 6. Which vertebra has the carotid tubercle
- 7. What is the vertebral prominens (VP)

F. Biomechanical range of motion for the Cervical Spine

- 1. Flexion
- 2. Extension
- 3. Rotation
- 4. Lateral flexion (bending)

G: **Vertebral Artery: (Chapter 5)**

- 1. **Anatomical location (page 136-139)**
- 2. **It's role in vertebrobasilar artery insufficiency**
- 3. **It's relationship to the basilar artery and the Circle of Willis**
- 4. **Stroke's and manipulation.**

**Week 4: A. Comprehensive Test # 1**

B. Typical thoracic vertebra (**Chapter 6**)

- 5. Descriptive parts of a typical thoracic vertebra (page 156 and 157)
- 6. Articulations of the typical thoracic vertebra

C. Peculiar thoracic vertebra

- 1. T-1:

2. T-9
3. T-10
4. T-11
5. T-12

A. Biomechanical range of motion for the thoracic spine.

E. Typical lumbar vertebra (**Chapter 7**)

2. Descriptive parts of a typical lumbar vertebra
3. Articulations of a typical lumbar vertebra

F. Peculiar lumbar vertebra

G. Sacrum (**Chapter 8**)

H. Coccyx (**Chapter 8**)

I. Sacroiliac Joint: (page 227-239)

- a. Characteristics
- b. Motion of S-I joint
- c. Ligaments of S.I. joint

**Week 5** A. Blood circulation within and around the vertebra (**Chapter 3**)

1. Arterial supply (page 67 also)
2. Venous supply

B. Joints of the spine (From Gray's Anatomy)

1. Fibrous---synarthrosis---immovable
  - a. Syndesmosis
2. Cartilaginous---amphiarthrosis---slightly movable
  - b. Synchrondrosis
  - c. Symphysis
3. Synovial----diarthrosis----freely movable
  - d. Trochoid/Pivot
  - e. Condylloid
  - f. Arthrodial, Articulatio plana, gliding.

**Week 6:** A. Ligaments of the spine (**Chapters 5,6,7, 8**)

1. 9 common ligaments (will have to look at same ligament in each spinal region)
2. Ligaments of the atlanto-occipital articulation (page 129- 133)
3. Ligaments of the atlanto-axial articulation (page 127-133)
4. Ligaments of the occipito-axial complex (pages 130- 133)

5. Ligaments of the lumbo-sacral articulation (page 208)
  6. Ligaments of the sacro-coccygeal articulation
  7. Ligaments of the sacro-pelvic articulation (Page 228, pictures 137 and 236)
  8. **Discussion on Whiplash and its implications for the chiropractor**
- B. Intervertebral Disc (pages 135, 136, 165, 166, 209-213, 406 and 407)  
Discussion on Chiropractic and Disc herniations and the implication in the clinical practice setting.
- A. Costo-vertebral articulation (page 166-168)

**Week 7: Comprehensive Test # 2: LABORATORY TEST #1**

**A. Spinal Cord (Chapter 9)**

1. Parts of a typical nerve
2. Synapse
3. Functional classification of neurons
4. Structural classification of neurons
5. Medulla spinalis
6. Ganglions
7. Coverings of the Spinal Cord—Menengies

**Week 8: A. Peripheral Nervous System (PNS) overview**

1. Cervical plexus (Chapter 5)
2. Brachial Plexus (Chapter 5, 6)
3. Lumbosacral plexus (Chapter 7, 8, 9, 10)
4. Upper Motor Neuron Lesions: signs and symptoms (not in book)
5. Lower Motor Neuron Lesions: signs and symptoms (not in book)

**B. . Autonomic Nervous System (ANS) overview (Chapter 10)**

1. Cervical ganglions
2. Ganglion of Impar

**Week 9: Complete the nervous system.**

**Week 10: A. Muscles of the Back (Chapter 4) TEST # 3**

1. Layer I  
Trapezius-----Latissimus Dorsi---
2. Layer II  
Rhomboid Major---Rhomboid Minor---- Levator Scapulae----
3. Layer III  
Serratus Posterior Superior--- Serratus Posterior Inferior

a.

**Week 11:**

1. Layer IV

Splenius Capitus----- Splenius Cervicis

2. Layer V

Sacrospinalis (Erector Spinae)---Intercostalis group----

Longissimus group Spinalis group

**Week 12**

A. Muscles of the Back:

1. Layer VI:

a. Transversospinal group (semispinalis),

Semispinalis thoracis----Semispinalis cervicis-----Semispinalis  
capitis-- Multifidus----Rotatores----Interspinalis -----

Intertransversarii

**Week 13**

A. Other muscles associated with the spine:

a. Suboccipital muscles:

Rectus Capitis Posterior major-----Rectus Capitis Posterior  
minor

Obliquus Capitis Inferior-----Obliquus Capitis Superior

b. Intertransversarii muscles:

c. Interspinalis muscles

d. Levator Costarum muscle

**Week 14** X—Ray review. Point out parts of x-rays and associated with what was learned in lecture **LABORATORY TEST #2**

**Week 15:** ***Comprehensive test # 4***, 100 points—Will be 100 multiple choice questions worth 1 point each for possible 100 points.

**THIS OUTLINE IS TO BE USED AS A GUIDE, IT IS SUBJECT TO CHANGE.**